Otway District Strategic Fire Management Plan 2021-24

SHIRES OF CORANGAMITE, COLAC OTWAY AND SURF COAST

Otway District Bushfire Planning Collaboration

SAFER TOGETHER

Version Control Table

Version	Release Date	Author	Changes
1.0	4 November 2016	Cheryl Nagel and Peter Ashton	First complete working draft of plan for review of Steering Group
1.1	9 November 2016	Cheryl Nagel and Peter Ashton	Draft refined throughout and provided to Project Control Group for review
1.2	10 November 2016	Cheryl Nagel and Peter Ashton	Draft updated to include Project Control Group direction and provided to members of all three MFMPCs for review and endorsement,
1.3	11 November 2016	Cheryl Nagel and Peter Ashton	Actions removed from document with strategic directions headlines retained, under direction of project control group. Other minor updates.
1.4	15 November 2016	Cheryl Nagel and Peter Ashton	Minor adjustments following further direction of the project control group. Submitted to each MFMPC and MEMPC for endorsement.
1.5	21 November 2016	Cheryl Nagel and Peter Ashton	Minor adjustments to incorporate MFMPC and MEMPC review, minor editing and formatting improvements. Submitted to the Barwon South West Regional Fire Management Planning Committee for review
2.0	15 May 2020	Mandy Baker	Draft update for version 2 distributed
2.1	30 June 2020	Mandy Baker and Peter Ashton	Draft update distributed to other shires
2.2	17 July 2020	Peter Ashton, Callum Fairnie, Sharna Whitehand	Comments to draft
2.3	2 Sept 2020	Mandy Baker and Peter Ashton	Appendices updated
2.4	August 2021	Mandy Baker	Final draft sent to members from each Municipal Fire Management Planning Committee for comment
2.5	September 2021	Mandy Baker	Final draft update distributed to MFMPCs for endorsement
2.6	March 2022	Mandy Baker	Updating of Acknowledgement of Country

Front cover photograph – Zac Hooper Travers

Acknowledgement of Country

We proudly acknowledge the many Traditional Owner groups of the Otway Region. We pay our respects to their Elders past and present; and any other First Nations people who continue to care for Country in this region. We have much to learn from Traditional Owners on what Healthy Country looks like; and we are committed to working alongside them, as partners in fire and land management.

Context statement

This is an updated version of the strategic fire management plan across the three Otway Shires. It replaces and supersedes the Strategic Fire Management Plan Otway district 2017-2020.

Comments on this Plan are welcome and should be sent to:

Otways Bushfire Planning Collaboration
c/- Surf Coast Shire Council
PO Box 350 Torquay Vic, 3228

Or otwaybushfireplanning@surfcoast.vic.gov.au

Map of the planning area

Figure 1 The three shires that make up the Otway District and which constitute the planning footprint; their location in south west Victoria

Strategic Fire Management Plan Otway District
Shires of Corangamite, Colac Otway and Surf Coast

Foreword

This Strategic Fire Management Plan for the Otway District fire risk landscape advances integrated fire management across the footprint of the Corangamite, Colac Otway and Surf Coast Shires. It describes how Councils, fire agencies, relevant authorities, groups and communities will share the responsibilities, and work together to reduce fire – risk, impacts, consequences and increase resilience. Taking a risk-based approach, the Objectives and Strategic Directions of this plan assist in treating current fire risks and the future development of plans and projects that get to the real detail of risk management and mitigation at township scale.

The plan is aspirational, describing what we would ideally like to achieve with fire management over the long term, while understanding that it will take some time to achieve. The plan has a defined term of three years; however the vision for this plan stretches well beyond. This approach will ensure a continuum, short and long term, of the many varied risk treatments required to meet the challenges faced by a fire risk landscape with a history of numerous, and sometimes destructive fires in bushland, grasslands, peri-urban and structural environments.

The plan focusses on enhanced collaboration between agencies, and with communities; it embeds ways for community aspirations to influence fire management and at the same time build greater community resilience. Many objectives and actions of the plan can only be achieved through agencies and communities working more closely together regardless of land tenure and traditional agency delineations.

A robust landscape risk analysis is employed by this plan which underpins its content. The plan seeks to ensure finite agency and community resources are allocated to best effect – to address the highest risks and achieve the best possible results for all of our communities. The plan seeks to foster cooperative learning and development and to then effectively apply learnings to achieve greater risk reduction and more resilient communities. There have been significant projects across the broader Otway Landscape that have evolved from the previous iteration of this plan and have been the direct product of this collaborative and innovative approach to risk management. The plan has been the catalyst for works relating to tenure blind fuel management, community resilience and leadership programs and the development of multi-agency township response plans. This body of work further enhances the concepts of share responsibility and is underpinned by the principals of "community first". This planning framework continues to provide a platform for innovation and allows agencies to leverage deliverables off a shared concept of responsibility and accountability.

The responsibility for Fire Management Planning, including implementation at Municipal level is legislatively vested in Municipal Fire Management Planning Committees, which are a subcommittee of the Municipal Emergency Management Planning Committee. These committees recognise the need for shared planning, shared learning and shared responsibility in order to get meaningful results for our communities in this fire prone landscape.

In commending this plan to the attention of all agencies and communities affected by it, I acknowledge the substantial works and efforts already undertaken in the furtherance of fire risk management in the Otway region and look forward to continuing to work cooperatively toward giving effect to this plan to reach even greater and safer outcomes for us all.

Aaron Ledden
Ranger In Charge – Fire and Emergency, West Coast District
Parks Victoria

Authorisations and endorsements

In authorising this plan, each Council adopts elements of the plan that pertain to that Council only.

This plan was adopted by each Council in partnership with the committees described in below:

Plan endorsed by each **Municipal Fire Management Planning Committee**:

Byron Kershaw
Corangamite Shire, 18/7/2022

Tristan Crews
Colac Otway Shire 5/7/2022

Wayne Alymer
Surf Coast.Shire,4/7/2022

Plan endorsed by each **Municipal Emergency Management Planning Committee**:

Lyall Bond
Corangamite Shire, 28/7/2022

Heath Chasemore
Colac Otway Shire 26/8/2022

Adam Lee
Surf Coast Shire 29/7/2022

Plan reviewed and endorsed by **Barwon South West Regional Emergency Management Planning Committee**

Chairperson   Mick McGuinness

Date   1/8/2022

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Introduction

Overview

This Strategic Fire Management Plan for the Otway District (the Plan) extends across the footprint of the three Shires – Corangamite, Colac Otway and Surf Coast. It describes how agencies and councils will work together and with communities to reduce fire risk, impacts and consequences and to build community resilience.

The Otway District is recognised as being one of the highest bushfire risk areas in Australia and the world (Bradstock 2010). The factors that make up that risk include: extensive and highly flammable vegetation, rugged terrain and occasional extreme weather, combined with the proximity of houses to the bush, the nature of house construction and limited road access. Traversing the three Shires, the Otway ranges are a key bushfire risk and a regional priority for risk management (Barwon South West Regional Fire Sub Committee 2016)

Fire has long been a part of the Otway District landscape. As history shows, there is considerable potential for devastating bushfires[1], and effective management of that risk is needed to minimise bushfire impacts. Now and into the future climate change brings additional factors that need to be considered, such as longer drier periods, heat waves and more extreme events.

Figure 1   Victoria's Black Thursday 1851; Oil on canvas by William Strutt 1864

Within the three-shire footprint, this plan describes how agencies involved in fire management will work together, and with communities to achieve more effective fire risk reduction and help communities become safer and more resilient.

In the context of a thorough understanding of landscape risk and the benefits of integrated risk mitigation, this plan predominantly focusses on reducing fire risk for private and municipal land and assets within towns and on the wildfire interface. It also addresses risk to critical infrastructure and community values. Taking a risk based approach, this plan promotes shared responsibility for planning and action.

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[1] The term bushfire is used throughout this plan as a generic description of wildfire in grasslands, heathlands, woodlands and forest. If a more specific term is needed the terms 'grassfire' and "bushfire in forested areas' are used.

Shared responsibility does not mean *equal* responsibility, and it is important to understand the limitations or strengths of communities in planning.

 While bushfire is the major risk addressed in this plan, structural and chemical fire risk are considered to a lesser extent.

Plan purpose and aim

The *purpose of this plan* is to enhance integration, coordination and effectiveness of fire risk reduction and community fire safety activities across the three shires and across all fire management agencies, groups and communities. Through this enhancement, the aim and objectives of this plan will be more effectively achieved.

The *aim of this plan* is to reduce the risk to life and community values from the threat of fire, and facilitate the development of resilient and fire adapted communities which have an increased capacity to recover from fire.

About this plan

Planning across the three Shire areas together acknowledges that while each Shire has unique attributes, there are some commonalities in landscape and fire risk. It recognises that bushfires and grassfires in this district can and do cross municipal boundaries. Planning for the district will enhance the integration, coordination and effectiveness of bushfire risk reduction activities across the landscape and across emergency management agencies; that it is achievable is an acknowledgment of the maturity of the partnerships developed between the councils and agencies.

It is intended that this Plan recognise and provide guidance to the extensive work already undertaken in fire management and planning across the three shires, but not duplicate it. Its role is to enhance integration, coordination and effectiveness of fire management and planning.

Key parts of this Strategic Fire Management Plan define its purpose, aim and objectives, and describe the strategic directions to outline how agencies will work together and with communities to deliver the plan.

Fire management prescriptions are provided at three scales:
- landscape
- township
- household/ property.

This plan has been built on a detailed examination of the bushfire risk across the District, and a much less developed understanding of what communities' value and want to protect. Delivery of this plan will help fill that knowledge gap so that the future development of this plan can be better informed and targeted to meet community needs.

Authority and term

This plan will extend for three years from the date it is adopted by the Barwon South West Regional Emergency Management Committee.

Development of the Plan

The responsibility for preparing Fire Management Plans rests with Municipal Fire Management Planning Committees (MFMPCs), which consist of representatives from fire and land management agencies including DELWP, Parks Victoria, CFA, Local Government, Victoria Police, Department of Transport, water authorities and DFFH. Taking an innovative approach, the MFMPCs of each of the three Otway District Shires agreed on a new model for municipal fire management planning, resulting in one strategic fire management plan being produced for the three shires (Figure 3).

Figure 2 – Model for Municipal Fire Management Planning
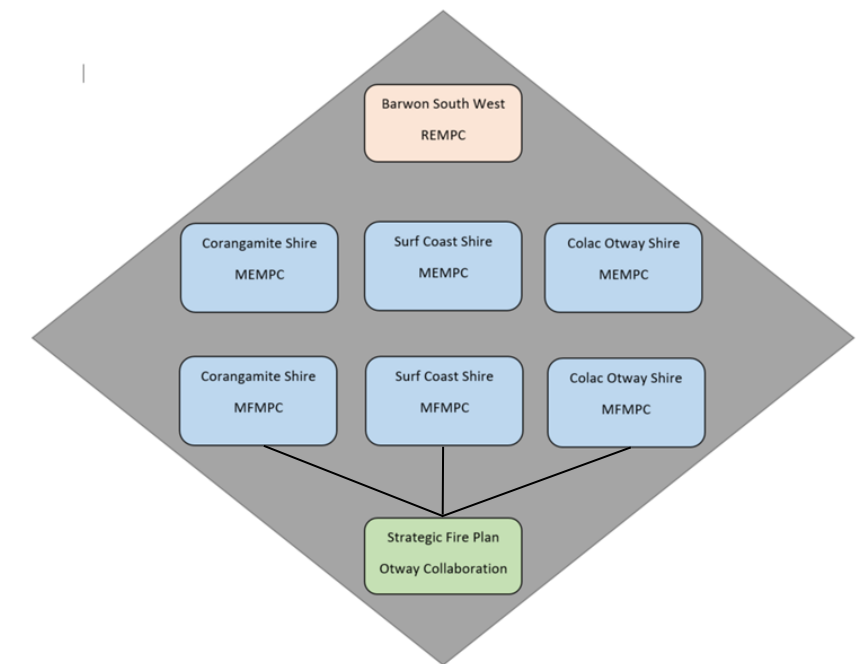
The three MFMPCs combined to review the update of the plan. Data for the risk analysis was sourced primarily from DELWP, the Councils and the ABS. Risk analysis for the plan was undertaken by Council and DELWP staff, and drafting of the plan was undertaken by Council staff funded through the State Government Municipal Emergency Resource Program.

The original 2017-2020 plan project Steering Group guided development of the purpose, aim and objectives and directions/actions for this Strategic Fire Management Plan. These have been further refined in this update to help reduce the risk, impacts and consequences of fire on important community values and assets. As our understanding of priorities for protection increases and the detailed understanding of the nature of the risk to values grows, the plan objectives and actions will be refined

Relationship with other planning

This plan does not operate in isolation – it is nested within a planning framework, which guides fire management at the State, Regional, Landscape and Municipal level. It accords with the direction set through related plans and policies listed below applying and adapting relevant elements at a District scale. It will contribute towards achieving the broader aims and objectives of these related documents. Key guidance or support applied to this plan includes:

Policies

- **Safer Together** (Department of Environment Land Water and Planning 2016). This Victorian Government Policy seeks to ensure that fire and land management agencies partner with locals to find the most effective mix of actions to reduce bushfire risks and impacts for communities across private and public land in the highest risk areas.

- **Victorian Emergency Management Reform White Paper 2012** (State Government of Victoria 2012) gives priority to building community resilience and community safety.

Plans

- **State Bushfire Plan 2014** (Emergency Management Victoria 2014) states that the objective of all bushfire management activities in Victoria is to reduce the impact and consequences of bushfire on human life, communities, essential and community infrastructure, the economy and the environment.

- **The State Emergency Management Plan 2020** guides the preparation of municipal fire management plans.

- **Barwon South West Regional Emergency Management Plan 2020**

- **Barwon South West Regional Strategic Fire Management Plan 2019**

- **Municipal Emergency Management Plans** created by each Municipal Emergency Management Planning Committee in each of the three local government areas. Note; The Otway district Strategic Fire Management Plan informs the Municipal Fire Management Plans (MFMP) of each Shire. The MFMP is a sub-plan of the Municipal Emergency Management Plan.

Relationship with Barwon South West Regional Strategic Fire Management Plan 2019

The Otway District Strategic Fire Management Plan has a special relationship to the Barwon South West Regional Strategic Fire Management Plan. This is because both plans detail strategies over this landscape to help address the challenges and objectives laid out across the State planning spectrum.

It should also be noted, that the regional plan whilst having some direction over townships and settlements, it largely focuses in on the broader landscape. The Otway District Plan whilst having some direction over the broader landscape, has a larger focus on settlements and the built environment. Areas identified as part of the Regional Plan, known as Bushfire Risk Engagement Areas will be integrated into the engagement and risk strategies identified and further developed as actions in the delivery of this plan. In this way, the two plans will work in conjunction with each other to cover a broad range of areas, issues and goals.

The below table outlines the how this plans strategic objects seek to meet and in some areas expend those of the Barwon South West Regional Plan.

Vision – Barwon South West Regional Strategic Fire Management Plan
Safer and more resilient communities

Policy context
The Victorian Preparedness Goal is *A safer and more resilient community that has the capabilities to withstand, plan for, respond to and recover from emergencies that pose the greatest risk.* The Safer Together policy's four priorities for reducing the risk of bushfires in Victoria are *Community first, Land and fire agencies working together, Measuring success* and *Better knowledge = better decisions*.

Strategic objectives (Code of Practice for Bushfire Management on Public Land)
• To minimise the impact of major bushfires on human life, communities, essential and community infrastructure, industries, the economy and the environment. Human life will be afforded priority over all other considerations. • To maintain or improve the resilience of natural ecosystems and their ability to deliver services such as biodiversity, water, carbon storage and forest products.

Links to the Strategic Directions of the Otway District Strategic Fire Management Plan

Values	Aligns with SFMP Strategic Direction
Human life and human settlement	SD 1,2,3,4,5,6
Human health and well-being	SD 1,2,3,4
Critical infrastructure, assets, systems and networks	SD 1,6,7,
Regional economy	SD 4,5,6
Natural environment	SD 6,7
Aboriginal cultural heritage	

Bushfire management approaches beyond fuel management

Approach	Aligns with SFMP strategic directions
Reduce bushfire ignitions through prevention activities	SD 7
Increase the effectiveness of fire suppression	
Reduce bushfire spread and severity	SD 6,7,
Reduce the physical effects of bushfires in inhabited areas	SD 6,7,8,
Reduce the social effects of bushfires on communities	SD 1,2,3,4,5,6
Reduce impacts from fire management actions	

The Otway District Strategic Fire Management Plan Strategic Directions (SD)

SD1.   Develop and implement place based bushfire safety planning in targeted high risk towns or settlements
SD2.   Seek to enhance the provision and management of public bushfire shelters; Bushfire Place of Last Resort – Neighbourhood Safer Place (BPLR-NSP)
SD3.   Develop and implement a community engagement and education plan.
SD4.   Tourist, visitor and other vulnerable groups' bushfire risk reduction
SD5   Evacuation planning – continue to investigate and contribute to the development of evacuation planning for the Great Ocean Road Region.
SD6.   Continue to identify and review priorities for the protection of assets and values, and determine and review treatments.
SD7.   Fuel management – collate, prepare and review fuel management strategy to help ensure landscape fuel management is integrated with township and wildfire interface fuel management, and takes a tenure-complementary approach

SD8.   Statutory planning and Council strategic planning – align council planning objectives and directions with those required to meet bushfire safety requirements

Relationship with statutory planning – planning overlays that consider fire

Councils have mapped Bushfire Prone areas throughout each Shire and have updated the Planning Schemes to include Bushfire Management Overlays. These maps can be found at
http://services.land.vic.gov.au/landchannel/jsp/map/PlanningMapsIntro.jsp

Other planning overlays apply to various parts of the State that may influence fire management. The overlays and their conditions apply to all authorities and organisations and it is advisable that fire suppression agencies assist their members to become familiar with those that influence fire suppression management in the Otway District. For the information of Incident Controllers or Incident Management teams these overlays and the conditions that they may apply can be found on the Department of Environment Land, Water and Planning website at:

http://planningschemes.dpcd.vic.gov.au/schemes/corangamite
http://planningschemes.dpcd.vic.gov.au/schemes/colacotway
http://planningschemes.dpcd.vic.gov.au/schemes/surfcoast

Governance and approval process

The MFMP Committees of Corangamite, Colac Otway and Surf Coast Shires established the Barwon South West Safer Together Committee, which is a multi-agency Steering Group to guide the development of the Plan. The project governance and approval model for this plan is shown in Figure 4.

Approvals

The Plan has been endorsed by the multiagency Municipal Fire Management Planning Committees and Municipal Emergency Management Planning Committees of each of the three Shires. The plan has been formally approved by the Barwon-South West Regional Emergency Management Committee.

Engagement process

Engagement for the updating of this plan has been undertaken primarily through the Safer Together Project Group which has taken on the responsibilities of the original Steering Group. Representatives from Surf Coast Shire, Colac Otway Shire and Corangamite Shire. The Municipal Fire Management Committees for each Shire are responsible for the development and implementation of this plan. This group is comprised of representatives of the following organisations:

- Department of Environment, Land, Water and Planning
- Country Fire Authority – Districts 6 and 7
- Victoria Police
- Department of Transport
- Parks Victoria
- Corangamite Shire Council
- Colac Otway Shire Council
- Surf Coast Shire Council

The planning strategy

The strategy to reduce bushfire risk in the Otway District has a number of key elements:

- A robust and detailed understanding of the risk and its nature as the basis for all planning and action.

- Understanding what is important to protect, and this includes what communities and individuals value along with what critical services and assets need to be protected for community safety and resilience – for example, telecommunications, electricity, roads, and business districts.

- Fire and land management agencies working in effective partnership and with communities, including embedding avenues for communities to shape decisions on risk appetite and mitigation.

- Growing our knowledge of fire risk and risk reduction effectiveness and sharing information across agencies, research institutions and communities.

- Targeting of resources and efforts to activities and actions that can deliver the most effective risk reduction outcomes, and for agencies, this is regardless of historical delineations.

- Increasing the capacity of agencies and communities to prepare, respond and recover.

- Building community resilience and supporting the transition to fire adapted townships.

Importantly, this work will be based on and articulate a better understanding the nature and detail of bushfire risk to life and community values – across the landscape, and specifically within the high risk towns and settlements, as this is the foundation for any successful risk reduction work.

How we will collectively go about achieving this strategy is described in the section on strategic directions.

Three scales of planning and action

This plan recognises that to reduce the overall bushfire risk to things that we value, it is important to address risk at all three scales of:

- landscape
- township or settlement
- individual property or household

Having a gap at any one level creates a weak link in the chain. For example, the best planned burn program possible cannot prevent embers from a fire landing on a flammable garden near a house and burning that house down.

Reducing residual risk is the focus of this document and guides its strategic directions and actions. It is important to note however, that bushfire risk in this District can never be fully removed. The actions and strategic directions of this plan, seek to predominantly tackle risk at the township and property, in the context of landscape scale risk reduction

Landscape scale risk reduction

DELWP's South West Regional Strategic Fire Management Plan is a plan to address risk at the landscape scale, predominantly through selecting a planned burning program that maximises the reduction of Bushfire risk while minimising impacts on other values. Other actions to reduce risk at the landscape scale include fire behaviour research and modelling, risk analysis, bushfire suppression and preparedness, and patrols. CFA and Parks Victoria are also involved in landscape scale risk reduction through many of these activities.

DELWP have assessed that landscape scale actions undertaken in the Otway District have reduced the overall bushfire risk from a notional 100% (no risk treatments) to approximately 60%. Further risk reduction – tackling the residual risk – can be achieved at the township and property scales.

Township or settlement scale risk reduction

In developing this Strategic Plan an exploration was undertaken into how fire management planning could be improved to deliver better community safety outcomes. This exploration highlighted opportunities for improvement in risk analysis and risk mitigation at the township or settlement scale. It further identified that a community based planning approach for high risk townships could increase community input, ownership and action. While this strategic plan is required to deliver legislative requirements, and give a mandate for higher level directions and actions, it is township scale planning that could deliver real benefits in community safety and resilience.

Activities to reduce risk at the township or settlement scale include:

- building a detailed understanding of risk within towns and at the wildfire interface
- fuel reduction on private and public land and at the wildfire interface
- bushfire and township fire suppression
- access, egress and evacuation
- public bushfire shelter options
- community engagement and education
- building community resilience and township fire adaptation
- asset protection
- research into bushfire and township/community interactions
- township level bushfire safety planning

Groups and organisations primarily involved in tackling risk at this scale include: Councils, CFA, Victoria, EMV, Police, Department of Transport and local communities – groups and individuals. DELWP and Parks Victoria are involved at the wildfire interface.

The development of community based township/settlement plans is a key deliverable of this strategic plan.

Property or household scale risk reduction

Management of individual properties and assets is a critical part of reducing fire risk. Landscape and township scale risk works cannot be effective unless they are joined by that undertaken at the property level.

Activities to reduce risk at the property scale include:

- having a solid understanding bushfire risk associated with the property
- design and management of houses to avoid ember incursion and flame contact
- design and management of gardens
- having an effective and practiced household bushfire survival plan.

Identifying what's important to protect

Key to this plan is empowering communities to help identify what is important to protect and how these values or assets should be protected. To achieve this, the plan provides objectives and actions which develop and embed this approach, and it will be a feature of township scale planning.

The plan also needs to protect assets, services and values which are important for community functioning, including at a broader scale, and some of these have national or international value – all of which must be considered.

The VFRR-B asset list is the current home for recording assets requiring protection and these assets are grouped in themes of: social, built, economic, natural and cultural.

Projections for future fire risk

Climate influences

Climate change is forecast to increase the number of extreme bushfire weather events and to extend the bushfire season – both starting earlier and continuing later into the season (Clarke 2011). This effect is expected to be strongest in the forested areas of the southern states, particularly near the coast (Bradstock 2014). The projections for risk in the grassland systems across this district are likely to be less well understood as a major driving factor will be fuel biomass and its association with rainfall. Whilst predictions for increasing high fire risk days are forecast for 2100, declining rainfall predictions may counteract this to a certain extent (Clarke 2011).

Demographic influences

Whilst it is predicted the climate factors will increase bushfire risk, the changes in communities are likely to present the greatest change to the risk profile for many of communities across the planning district. The changes in the climate risk profile are relatively slow in comparison to the changes associated with a changing community profile. This profile has changed quickly over the last 20 years and this trend is predicted to continue. It will need to be a focus of mitigation going forward.

Three major areas of change that are of particular importance are: 1) the population uniformly across the planning district are getting older, with the percentage and amount of people moving into the over 65 age bracket increasing. This will mean more people will become more vulnerable in the face of a fire threat, as the statistics have shown in the Black Saturday studies. 2) A number of communities in the district have experienced general population growth and a percentage of these have been into areas of high fire risk. 3) The projected and the current increasing use of the area by visitors may also have a significant bearing, as generally these groups have limited knowledge and understanding of bushfire and by virtue of this will also be vulnerable in the face of a major incident.

Preparedness, response and recovery influences

It can be assumed that our future response systems and hardware will continue to improve as has been seen in the past. However as our climate and population change it will be increasingly important to continue to improve both preparedness and recovery.

If we do improve our capacity in preparedness, response and recovery and continue to build resilience in our communities, it is possible that we can not only maintain current risk levels in the face of increasing environmental and social challenges, but that we can in fact reduce it.

Plan Fundamentals

Plan Purpose: enhance the integration, coordination and effectiveness of fire risk reduction and community fire safety activities across the three shires and across all fire management agencies, groups and communities.

Plan Aim: reduce the risk to life and community values from the threat of fire, and facilitate the development of resilient and fire adapted communities which have an increased capacity to recover from fire.

Key Objectives

1. Reduce the residual risk to life and communities from the threat of fire in the Otway district landscape. Achieve this by focussing on risk in townships and settlements, at the wildfire interface, and for important community assets, road corridors, critical infrastructure and the regional economy.
2. Assist communities to better understand their bushfire or grassfire risk, including the nature of that risk and available mitigation options, so they can make informed decisions about their response.
3. Facilitate the development of bushfire resilient communities and fire adapted townships – which are both less impacted by fire and have better capacity to recover
4. Ensure priority is given to the protection of designated critical assets and general assets and values identified by communities as important to protect.
5. Contribute to reducing impacts of bushfire on the regional economy, including regional tourism and the Great Ocean Road, and agricultural and manufacturing enterprises and assets.
6. In undertaking bushfire works including planning, fire preparedness, response and recovery activities, be cognisant of and avoid or minimise impacts on cultural values, high value environmental assets and ecosystem resilience and functioning.
7. Build community and agency capacity to reduce risk, increase resilience and recover from impacts.

Strategic Directions

SD1. Develop and implement place based bushfire safety planning in targeted high risk towns or settlements

SD2. Seek to enhance the provision and management of public bushfire shelters; Bushfire Place of Last Resort – Neighbourhood Safer Place (BPLR-NSP)

SD3. Develop and implement a community engagement and education plan.

SD4. Tourist, visitor and other vulnerable groups' bushfire risk reduction

SD5 Evacuation planning – continue to investigate and contribute to the development of evacuation planning for the Great Ocean Road Region.

SD6. Continue to identify and review priorities for the protection of assets and values, and determine and review treatments.

SD7. Fuel management – collate, prepare and review fuel management strategy to help ensure landscape fuel management is integrated with township and wildfire interface fuel management, and takes a tenure-complementary approach

SD8. Statutory planning and Council strategic planning – align council planning objectives and directions with those required to meet bushfire safety requirements.

see Appendix A for more detail on each of these Strategic directions

Guiding Principles

1. A robust and detailed understanding of the risk and its nature will be the basis for all planning and action, as this is the foundation for any successful risk reduction work.

2. Collectively, we will strive to understand and respond to that which is important to protect – this includes what communities and individuals' value, along with the critical services and assets protected for community safety and resilience – for example, telecommunications, electricity, roads, and business districts.

3. Fire and land management organisations will work in effective partnerships with each other and with communities, and these partnerships will embed avenues for communities to influence decisions on risk appetite and mitigation.

4. We will grow our collective knowledge of fire risk and risk reduction effectiveness and share this information across agencies, research institutions and communities.

5. Improve information flow across agencies and between agencies and communities before, during and after an event or threat.

6. We will target resources and efforts to activities and actions that can deliver the most effective risk reduction outcomes. For maximum effectiveness, this needs to occur both within and across organisations taking a tenure-blind and agency-blind approach. This work will also encourage and assist communities and individuals to target their efforts to best effect.

7. We will strive to increase the capacity of agencies and communities to prepare, respond and recover. Building community resilience and supporting the transition to fire adapted townships will be a priority for all.

8. When a bushfire does occur, we will:
    *   Seek to better understand and respond to needs of impacted communities,
    *   Maximise sharing of learnings from bushfire events
    *   Foster stronger linkages and better transitions between response and recovery by providing opportunities for staff involved in response to better understand recovery and vice versa

About the planning area

Overview

For the purposes of this plan, the combined area of the Shires of Corangamite, Colac – Otway and Surf Coast shires is known as the Otway District. Located in the south west of Victoria, the District occupies a footprint of over 9,400 square kilometres, with Corangamite Shire accounting for 4,400, Colac–Otway Shire 3,400 and Surf Coast Shire 1,560, and this constitutes the footprint of this plan. Together, the three shires have a population of some 66,425 people. (ABS census 2016)

Figure 4
The Otway District planning footprint

Table 1 Land area and population of each Shire in 2016

Shire	land area	population
Corangamite	4,407 sq km	16,051
Colac Otway	3,433 sq km	20,972
Surf Coast	1,569 sq km	29,402

Landscape

The Otway District encompasses a rich tapestry of natural and cultural values which are the backbone of a vibrant regional lifestyle and economy. From the extensive fertile grasslands of the volcanic plains and the unique Stony Rises, to the forests, woodlands and heathlands of the Otway ranges and the iconic coastline, there is outstanding natural diversity and wealth. For thousands of generations Aboriginal people have occupied the area creating this cultural landscape, often shaping the landscape through the use of fire.

Significant features of the District include:

- The iconic coastline from Torquay to Peterborough with its sandy beaches, rocky headlands, estuaries and bays, and the internationally renowned cliffs and stacks of the 12 Apostles.

- Internationally and locally significant Indigenous cultural values; including landscapes, places, artefacts and songlines, extending back some 60,000 years and through to the present day.

- The tourism icon of the Great Ocean Road and the coastal holiday towns from Torquay to Port Campbell including Aireys Inlet, Lorne, Wye River, Apollo Bay and Cape Otway

- Productive agricultural land supporting forestry, cropping, grazing, dairy and niche agriculture.

- National Parks including the Great Otway National Park and Port Campbell National Park, protecting landscapes, cultural values and important native species and communities of plants and animals, while providing visitors and locals with valuable nature based recreation experiences.

- Waterways and estuaries, including internationally significant wetlands and valuable rivers and streams.

- The nationally significant Victorian Volcanic Plains – expansive volcanic plains, scoria cones and ephemeral wetlands supporting important and threated grassland communities, and providing productive agricultural land.

- Lake Corangamite – the largest natural lake in Victoria.

- The impressive Otway Range – with its rivers, gorges and waterfalls and extensive remnant forests, interspersed with picturesque townships and settlements.

Figure 4
Cliffs and sea stacks of the Port Campbell coastline

(photo: http://visit12apostles.com.au

Environment

Environmental factors have a substantial influence on bushfire behaviour, which, in turn influences the bushfire risk; these are:

- **Vegetation** (fire fuel) – amount, type and availability to burn – including fuel flammability (ignitability, combustibility and sustainability), moisture content, structure, arrangement, height and connectivity,

- **Topography** – elevation, aspect, slope, terrain ruggedness and influences on aridity,

- **Climate and weather** – including temperature, relative humidity, wind speed and direction and atmospheric instability, along with underlying conditions (such as long term dryness) and the timing of weather events such as wind changes. The nature of these factors and how they interact place a significant proportion of the Otway District in an extreme risk category for bushfire.
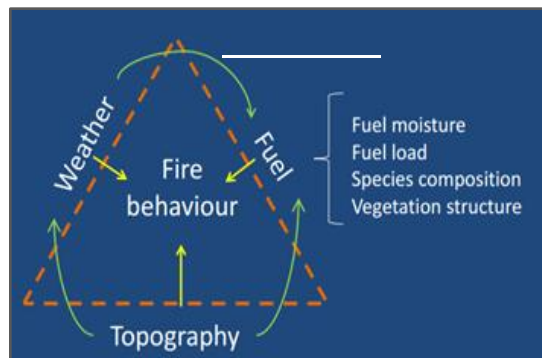
Figure 5-Fire Triangle

Vegetation

The District is home to spectacular and high value native forests, woodlands, heathlands and grasslands. Large areas of the District support agricultural and horticultural enterprises including grazing, cropping and forestry.

Forested vegetation extends across some 25 percent of the District, commonly in large tracts on and around the Otway ranges and foothills, extending from Bellbrae in the east to Port Campbell in the west. Heathlands are scattered through foothills of the ranges and in patches along the coast, and notably in the dryer environment around Anglesea and the wetter area around Carlisle River.

Figure 6
Wet forests of the Otway Ranges

(photo:
Parks Victoria)

Dry eucalypt forests and woodlands are generally found at the foothills of the range and interspersed between heathland areas. The District also contains numerous plantations, consisting mainly of introduced pine and blue gum, which are generally located in wetter environments. Wet eucalypt forests, through to rainforests are generally found along the central part of the main ridge through the Otways, and in associated gullies and south facing slopes. Patches of forested areas also occur away from the main association and some of these will have a bearing on fire risk for some settlements.

Extensive grasslands and cropping land dominate in the north and west, and the south west is home to one of the State's most productive dairying areas – the Heytesbury, established through clearing of forest under a former soldier settlement scheme. Grasslands including native, grazing and cropping lands make up about 70% of the district and for the majority of its range is located north of the forested lands.
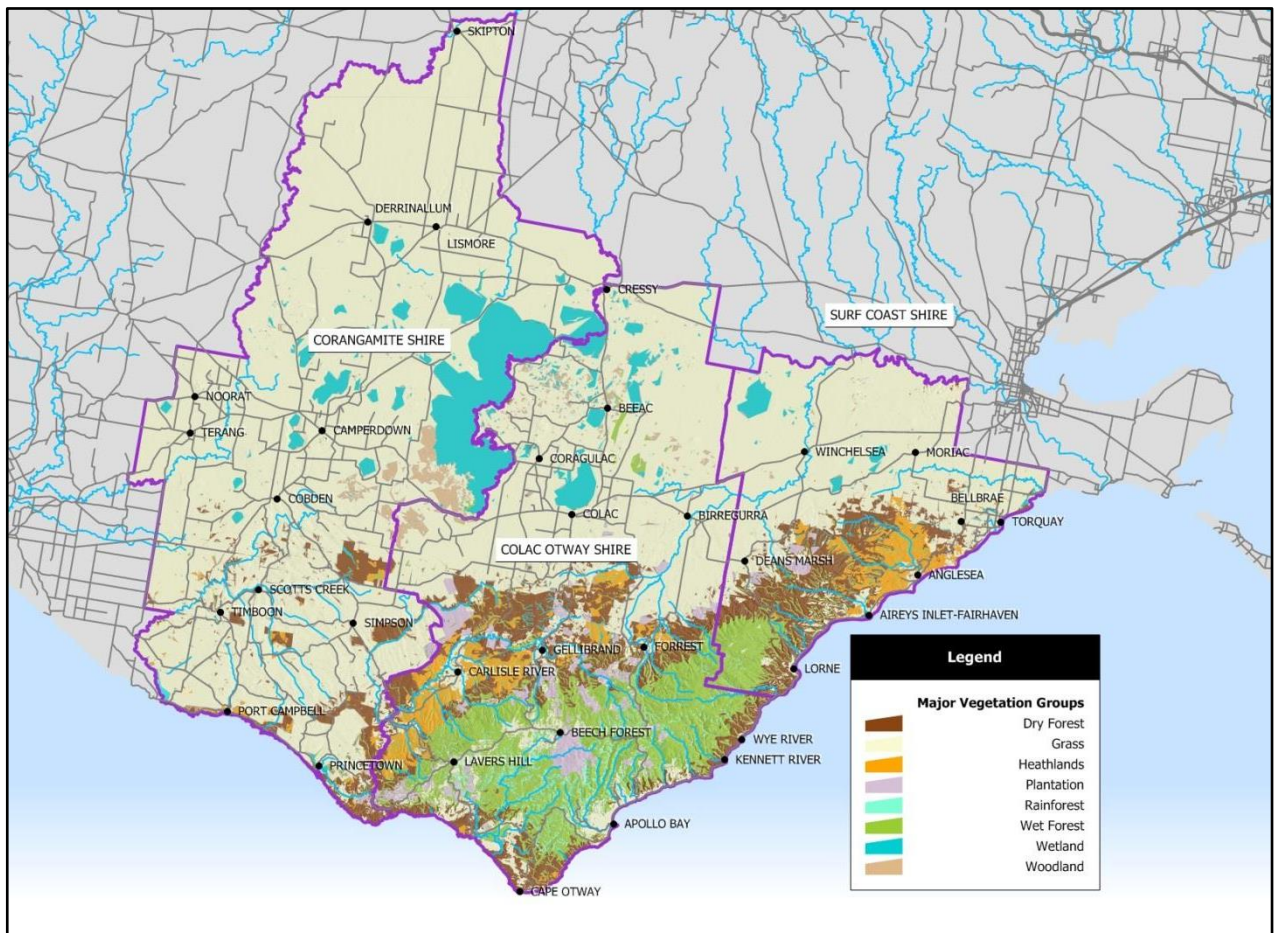
Figure 7 Major vegetation groups of the Otway District

Distinctive bushfire risk profiles are associated with the different vegetation types across the District. From the dry heathlands in the east, to the woodlands and wet forests of the central and western Otway ranges, and to the extensive grasslands beyond – the three Shires share a number of similar environmental features. This in turn, presents corresponding similarities in the bushfire risk profiles. Notably, this part of Victoria is considered amongst the highest bushfire risk areas in Australia and internationally (Bradstock 2010).

Topography

The ranges, rising to a height of near 600 metres at Mount Sabine, predominantly have distinct north and south facing aspects, which are dissected by numerous ridges and gullies. The main ridge of the range becomes less distinct in its northwest and westerly extent where the land is characterised by undulating country, where the landform is characterised by broad areas of basalt plains that are occasionally dissected by low valleys and interspersed with extinct volcanoes. These fertile volcanic plains support high value native grasslands, and large areas have been modified and developed into productive grazing and cropping land.
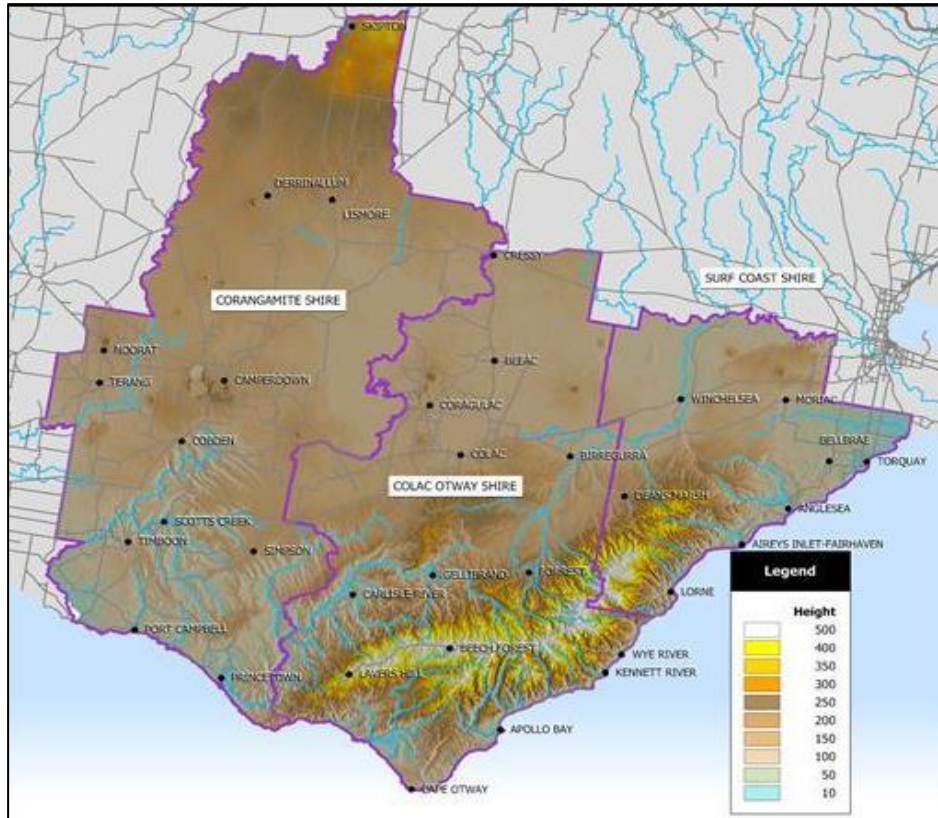
Figure 8
Elevation within the Otway District – height (m) above sea level

District elevation highlighting the distinctive Otway Range and foothills, and showing the volcanic plains.

Terrain has a significant influence on bushfire behaviour and risk. Not only does it influence the type of vegetation occurring and its moisture content, terrain ruggedness can provide extra energy for a bushfire, and long uphill fire runs can be associated with increased fire spread and intensity, along with the potential for unusual fire behaviour and ember storms.

Figure 9
Stony Rises

Rainfall

Rainfall of the district shows similar variation to the topography. The area of highest rainfall receives approximately 2,000mm annually, and this occurs in the highest parts of the range near Lavers Hill. The annual average rainfall then drops away to the north and east of the ranges and reduces to below 500mm in some areas. As you move west from the main part of the range into the undulating country the rainfall remains relatively high in the 800 – 1000 mm range.
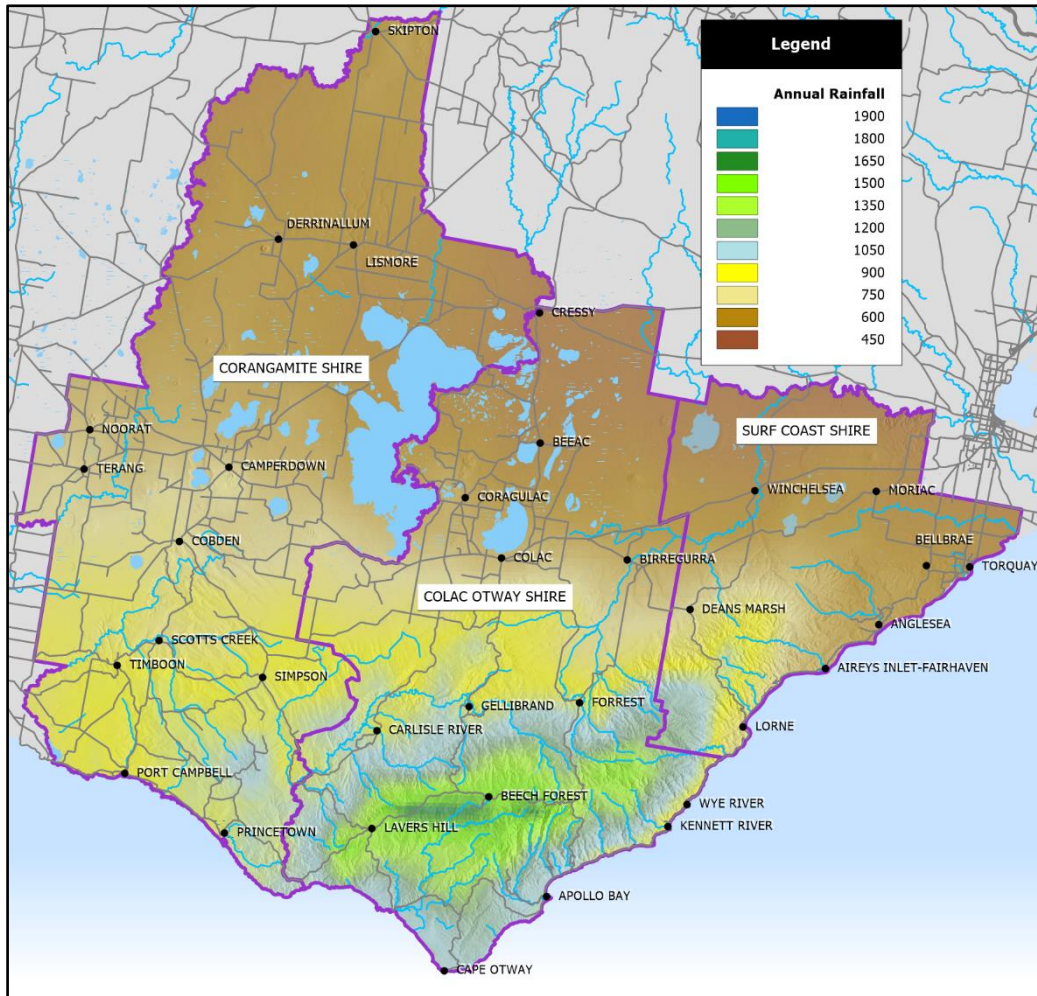
Figure 10

Annual rainfall (mm)

Environmental influences on fire behaviour and risk

It is this complex make up of vegetation, terrain and weather that plays a major part in defining the fire risk in the Otway District. An understanding of these factors contributes to defining the risk environment across the landscape and for each settlement or towns and also plays an important role in determining which management strategies will be most valuable.

Figure 11 Wye River-Jamieson Track fire suppression – *photo Andrew Hack*

People and demographics

In understanding fire risk and determining the best range of actions to reduce that risk, it is important to understand relevant aspects of the people of the District. There are a number of human factors that can both increase and decrease fire risk. In this section, we look at those elements that have a bearing on bushfire risk.

Population

The population of the region is forecast to grow from around 65,000 in 2015 to 84,000 in 2036; nearly 20,000 more permanent residents.

Table 2 Population across the District in 2016 and forecast to 2036

Population						
	Population Density (persons per hectare)	Census 2016 population	Population 2019	2026	2036	Total change
Surf Coast Shire	0.22	30,445	32,651	37,948	45,717	+15,272
Colac Otway Shire	0.06	21,361	21,564	23,047	25,394	+4,033
Corangamite Shire	0.04	16,135	16,020	16,395	16,574	+439
3 shires		**67,941**	**70,235**	**77,390**	**87,685**	**+19,744**

Dwellings and households

Around one third of all dwellings in the region are not permanently occupied; in Surf Coast Shire, this is 42%. Additional bushfire risk is associated with this pattern of residency. Part time residents of the District may find it difficult to access to the education and engagement programs offered by agencies and councils to help people understand reduce their risk. Further, the work required to maintain properties at an optimal bush risk standard can be more challenging if people visit infrequently.

Table 3 Comparison of the number of dwellings and households across the three shires, where households are those with permanent residents.

Dwellings and Households					
	Dwellings	Households	Average household size	Unoccupied dwellings	
				No.	% of all dwellings
Surf Coast Shire	18,269	10,872	2.56	7,332	40.1
Colac Shire	11,739	8,659	2.3	3,015	25.7
Corangamite Shire	7,751	6,473	2.34	1,268	16.4
3 shires	**37,759**	**26,004**	**2.4**	**11,615**	**27.4**
Victoria			2.55		11.0

source: ABS Census 2016

Visitation and part time populations

Part time populations are significant in the district including holiday home residents, seasonal visitors, event populations and day trippers. During peak visitation periods, the overnight population of Surf Coast Shire is estimated to increase to over 85,000 and Colac Otway Shire to around 48,600. This does not include day trippers to the area. Some coastal towns experience an 8 fold increase or more in numbers over the holiday season, which also coincides with the fire danger period – for example, Aireys Inlet and Wye River.

This large seasonal population increase can result in significant challenges for emergency management. Township facilities, including roads, can be over-capacity, and in the event of a fire, any evacuation is likely to involve very larger numbers of people on a very limited road network, which could easily become blocked. While some regular visitors to the district may have a good understanding of bushfire risk with effective plans in place to reduce that risk, most will not.

Table 4 Peak overnight population for Surf Coast, Colac Otway and Corangamite Shires, 2016

Peak Population						
	Permanent population 2016	Population Holiday Homes	Population Caravan Parks, Cabins & Camping Sites	Population Hotels, Motels, Apartments, Units & B&Bs	Peak overnight population	Permanent to peak multiplier
Surf Coast Shire	29,402	40,002	13,057	4,376	86,078	2.9
Colac Otway Shire	20,971	16,446	7,971	2,925	48,313	2.3
Corangamite Shire	16,243	Data not available				

Source: Peak Overnight Population Barwon Region 2016 – 17 City of Greater Geelong

Demographics of fire risk of susceptible populations

It is well recognised that dealing with an emergency such as a bushfire is very demanding, and when people in this situation need to provide support to others, the success of dealing with the emergency can be significantly compromised. Young people, some older people and people with disabilities require extra support during an emergency. Disadvantaged people may also be at greater risk.

There are around 11,000 people aged 65 years and over living in the region currently and this number will nearly double by 2036. There are also more the 3,000 households with children under 15 years of age.

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Table 5 Summary of age characteristics for the three shires

Age Characteristics							
	Median age	Population 65 years and over 2016		Population 65 years and over 2036		Children under 15 years	
		No.	%	No.	%	No.	%
Surf Coast Shire	46	5,136	16.8	10,334	22.8	6,312	20.7
Colac Otway Shire	57	4,552	21.8	6,868	27.2	3,695	17.6
Corangamite Shire	47	3,647	22.7	4,181	21.8	2,929	15.2
3 Shires	**50**	**13,335**	**20**	**21,383**	**24**	**12,936**	**18**
Victoria			20.4				18.2

Source: ABS Census 2016

Key characteristics									
	Need for assistance		SEIFA index of disadvantage	Households with no internet connection		Households with no car		No qualification	
	No.	%	No.	No.	%	No.	%	No.	%
Surf Coast Shire	1,043	3.5	1,077	1,077	9.9	264	2.4	7,540	32.3
Colac Otway shire	1,333	6.4	961	1,898	21.9	438	5.1	7,891	45.7
Corangamite shire	920	5.7	977	1,429	22.0	275	4.2	6,406	48.8
Three shires	**3,296**	**5.2**		**4,404**	**18**	**977**	**12**	**21,837**	**42**
Victoria		6.0			18.1		5.1		42.8

Source: ABS Census 2016

Table 6   Disadvantage and need for assistance characteristics across the three shires

With the advent of COVID – 19 we acknowledge that there may be likely changes to these demographics figures. This includes the fact that people are occupying holiday homes for longer with the ability to work flexibly/remotely and that there has been a dramatic shift downwards in international tourism and emphasis on domestic tourism.

Vulnerable people

The Department of Families, Fairness and Housing (DFFH) is the designated lead agency to improve the safety of vulnerable people in emergencies by supporting emergency planning and preparedness. The DFFH Vulnerable people in emergencies policy (State of Victoria 2018) encourages personal and community emergency planning for vulnerable people because they are likely to require more time or assistance to respond safely to emergencies. The policy defines a vulnerable person as "someone living in the community who is frail, and/or physically or cognitively impaired; and unable to comprehend warnings and directions and/or respond in an emergency situation"

The policy prescribes that where there is recognised bushfire risk, specific bushfire planning should be undertaken in addition to basic personal emergency planning, and that funded agencies have a responsibility to support vulnerable people to undertake this planning. Other agencies and groups also support vulnerable people. For example, the Red Cross in partnership with the State Emergency Service (SES) has developed a range of resources including the 'Rediplan' emergency planning tool to assist emergency preparation, including materials targeting seniors and people with a disability – http://www.redcross.org.au/emergency-resources.aspx   .

Councils have a further role to maintain a register of vulnerable people and to maintain a list of local facilities where vulnerable people are likely to be situated, (State of Victoria 2015). The Municipal Emergency Management Plan of each Council contains further information on support to vulnerable people in each shire.

Susceptible people

In addition to people who are recognised as vulnerable and possibly included on the vulnerable people register, this District has a large number of people who are more susceptible to bushfire risk. These include tourists and visitors, older and younger people, people from non English-speaking backgrounds and those that are disadvantaged. The scale of susceptible people, described in the earlier sections on demographics, is considerable. The risk analysis undertaken for this plan incorporates an assessment of susceptibility for each locality. The objectives, directions and actions acknowledge this challenge and provide specific approaches to reduce risk for susceptible people and for facilities that support susceptible people.

Figure 12 Lorne Beach December 2015 – view of the convection column of the Wye River-Jamison Creek bushfire

Of note, many beach-goers do not appear to be responding to the fire threat.

Image by Sal Buchanan

Bushfires in the Otway district

Bushfire history

Fire has had a long association with the Otway ranges and the surrounding plains, so much so that the majority of plant species now present have developed adaptations to survive fire, and in many cases rely on its occurrence for their ongoing survival. We know from the diary extracts of early sailors that smoke and fire in the area was commonly reported. "In March 1802, the French explorer Nicolas Baudin, sailing westwards along the Victorian coast from Wilson's Promontory, passing Cape Otway saw smoke in the distant inland and later saw fire burning on top of a rise on the shore" (Blainey 2013).

Figure 13
'Aborigines using fire to hunt kangaroos', Joseph Lycett, c1820. National Library of Australia

The role that Aboriginal people played in shaping the vegetation through the use of fire and the evolution of fire adapted plants takes this fire history back many thousands of years. What is difficult to define is, if or how, the type of fire has changed since indigenous people managed the landscape. Some speculate that although there was much fire in the landscape for thousands of years, the intensity of those fires may have been less than what we commonly see today. In part, this is likely to be due improved response efforts – as a community we have become very good at suppressing all but the large and intense fires, and as a result this is the type of fire we now commonly associate with the term bushfire. Another consideration is that a change in fire regime and intensity could have led to a change in vegetation structure and fuel availability, providing a positive feedback loop for the development of large uncontrollable fires.

It is likely that large uncontrollable fires were also a feature of the landscape before the European settlers arrived. The presence of Mountain Ash in the higher regions of the Otway ranges may tell a story. This species occurs in areas that are generally wetter and dry out less often than the surrounding foothills and plains, however, the species has developed a regeneration strategy that requires at least one episode of reasonably intense fire during a three to four hundred year time period; suggesting that that intense fires did extend into the less fire prone areas.

It is difficult to fully understand fire regimes and intensity of the past and how it may have changed over the millennia, however, it is worth considering when we consider the part fire will play in our communities in the future.

Whilst the recent fire history has at times been devastating to our modern way of life, there has been a distinct change in how fire is viewed and used in the last 200 years. Interestingly, indigenous people often view fire as a life-giver; an essential tool for their survival in this landscape. Conversely, later arrivals to this land tend to view fire through a lens of devastation and loss.
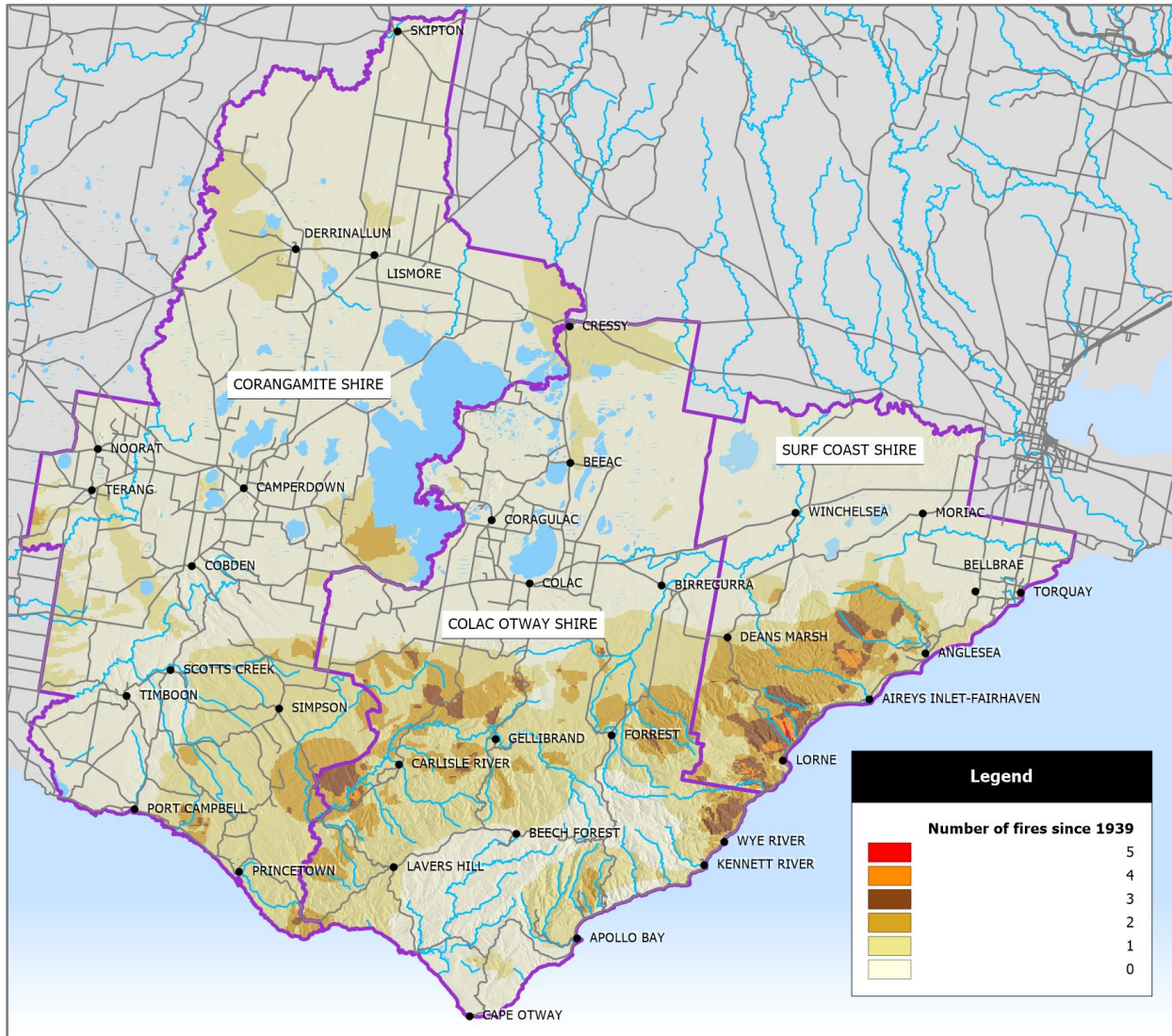
Figure 14   Wildfire history of the Otway District since 1939

The map indicates that approximately half of the area of the District has experienced at least one wildfire in the past 77 years, and some areas have been impacted by five wildfires (note that our capacity to systematically map wildfire has evolved over time, becoming more thorough around 1990). As may be expected, the Otway ranges have generally experienced a higher frequency of wildfire, with the areas inland of Anglesea, Aireys Inlet and Lorne, and near Carlisle River having the highest wildfire frequency. Significant wildfires have also occurred in areas of grassland to the north of the ranges. This map does not include planned burns.

A full list of significant wildfires in the District since records began is included in Appendix B. The list shows us that over the past 166 years large fires have been reasonably common across the landscape. These fires have been in response to different bushfire drivers and in the section below we will investigate these drivers and explore how they may have changed over time. We will consider implications for the future, acknowledging that what we can learn from the past may only tell us part of the story about what is likely to occur in the future.

How fires behave

Understanding how bushfires behave and how that influences the risk profiles for localities within the District is an integral part of understanding risk, and more importantly for building and communicating effective risk mitigation measures. The factors described in this section are based on a model put forward in; *A biogeographic model of fire regimes in Australia: current and future implications* (Bradstock 2010), where the key hierarchal bushfire drivers are identified as fuel biomass, fuel moisture/dryness, fire weather and ignitions. These are described below for our biogeographic area, including how each plays a part in the underlying risk.

These components – *fuel biomass (amount), fuel dryness, fire weather, and ignition* – can be thought of as dials (or switches); as soon as the dial is above 0 for all components at the same time, a bushfire can occur. As each of the dials are turned up, the greater the contribution that component plays in the behaviour of the fire. If any one of the dials is turned off, a bushfire will not occur.
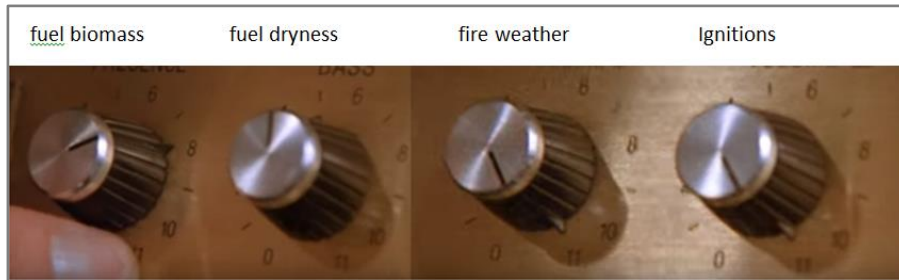
Fuel Biomass

To have any fire you need fuel, and for a bushfire, vegetation is commonly the fuel. This is the reason that fuel is at the head of the hierarchy. As discussed in the landscape section, there is a range of fuel types within the District, however at its most basic form the main fuel components are the grassland fuels which make up the majority of the planning area, and forest-type fuels covering about 25% of the District. Each community or asset is located in proximity to one or both of these broad fuel types, and the fuel type will underpin nature of the bushfire risk.

The greater the fuel load, and the more flammable the species, and the more favourable the structure of the fuel to burn – the further this fuel biomass dial is turned up and the greater its contribution to fire behaviour.

Factors associated with fuel biomass have some commonalities across the planning area; including:
- the majority of the fuel burns readily when available and
- the district has very large connected areas of both grassland and forest fuels, with the only major disruptions to this being the lake systems and the larger towns.
- many people in our communities live in close proximity to connected fuel and this is a major driver of the risk profile for each locality.

The grassland and forest fuel types also have attributes unique to each:
- different responses to climate result in different amounts of fuel present at any given time.
- fire intensity, rate of spread, and production of embers are all related to the fuel type.

The combination of these factors and the fuel load are important aspects in understanding risk and mitigation. The conclusion of this brief examination of fuel biomass is that this District has sufficient connected fuel to carry large, fast and intense fires across most of the District.

Fuel moisture

The next component to consider is the fuel moisture or dryness. Each fuel type (vegetation) has a different cycle of drying in response to the rainfall (long and short term), terrain and the structure of the vegetation. Drying cycles can be viewed at two levels and different fuels are susceptible in varying degrees to these influences. The first is the short term cycle based on the rainfall over recent periods, as this influences growing cycles and the moisture content of live vegetation and dead ground fuels. We have however, seen a number of devastating fires occur when not only short term drying of fuel occurs, but long term moisture deficits (consecutive dry years) are also in play leading to a drying of heavier forest fuels which then become more available to burn with the fire front. As the vegetation dries out the further this dial is turned up. Understanding when these drying cycles occur allows us to understand when fuel dryness/moisture component raises the potential bushfire risk.

Fire weather

When the elements of fuel biomass and fuel moisture together allow for conditions which could support a large scale damaging fire (ie are both above 0 on the dial), we then need to examine the next factor – fire weather. Bushfires can only exist in the presence of a weather stream that promotes intense fire and reduces our ability for suppression. In general terms, the aspects of weather that promote devastating fire include the temperature, humidity, wind strength and the atmospheric stability. The combination of these factors will define the potential of a fire. The Fire Danger Rating system, drawn from the Forest Fire Danger Index is a very useful way of understanding how weather influences fire risk.

Ignition

Finally, to have any fire there must be an ignition source. Analysis of ignitions in the district shows that they are widespread and generally are not a limiting factor to the development of devastating fire. That said, they are also an element for which fire mitigation strategies can be very important. Ignition control strategies currently employed by emergency services can be effective in reducing ignition probability.

Figure below shows a relative probability of ignition model developed by DELWP and the Otway District Bushfire Planning Collaboration for the Otway District for the purpose of refining bushfire modelling. This approach was adopted following examination of previous work which found that anthropogenic ignitions (caused by humans) were correlated with population density (Gill and Williams 1996), and on the understanding that human ignitions account for some 95% of all ignitions in the District.
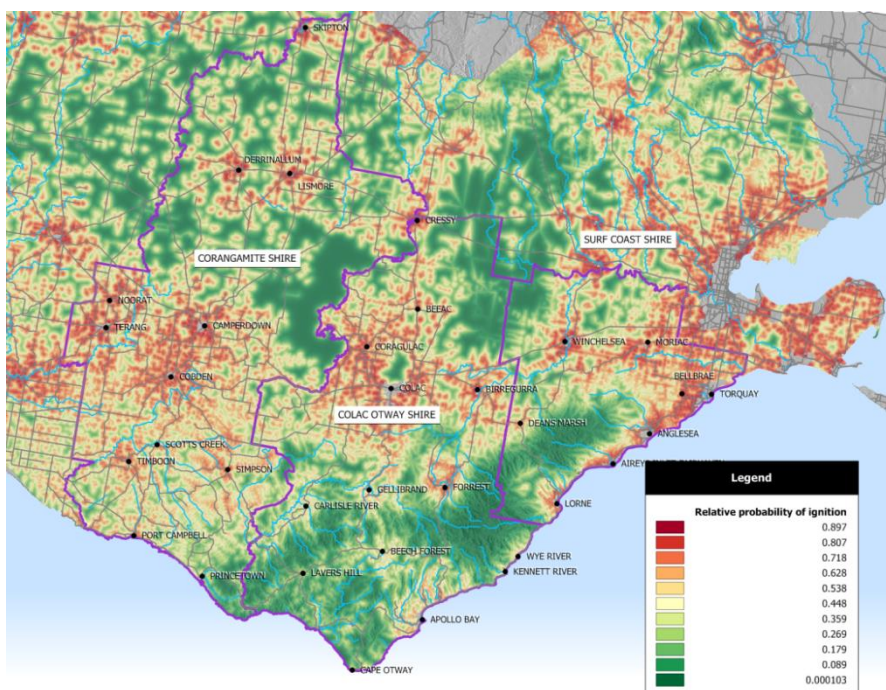
Figure 15 Relative probability of ignition

The model used a logistic regression function to spatially express ignition probability in association with population centres and different road classes. Historic ignitions selected for the modelling were based on ignitions that had the potential to become bushfires, independent of season.

The location of an ignition has an important role in the potential spread of a fire and its impact, and therefore the effect on communities. This is demonstrated through the use of modelled house loss emanating from different ignition points as shown in Figure below.

Figure 27 maps the location of ignitions which result in fires that cause house loss. Red indicates areas of fire ignition which generate the greatest modelled house loss, through to white, which indicate the areas of lowest house loss. It is based on analysis of the 10,000 modelled Phoenix Rapidfire simulations using a fire weather steam similar to Black Saturday.
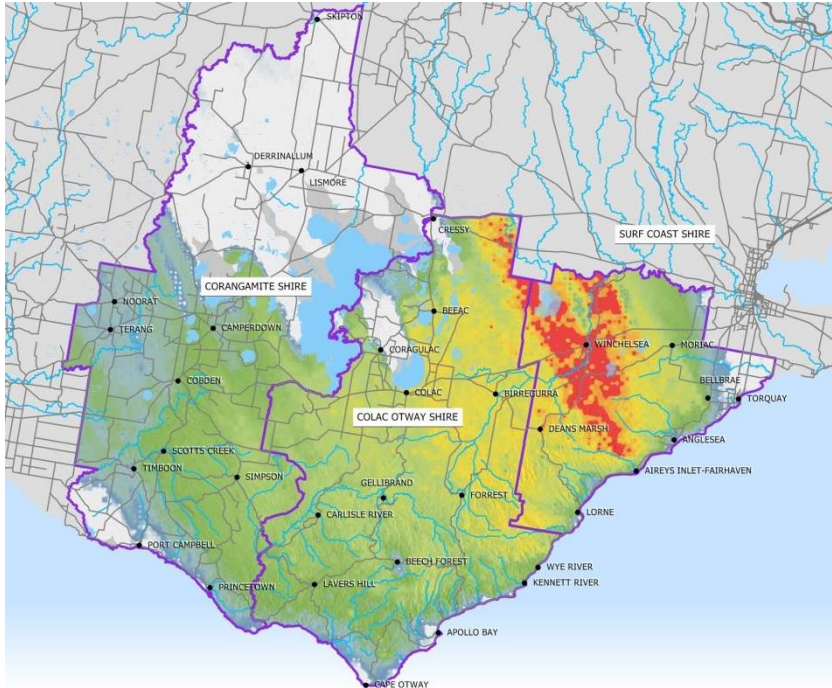
Figure 16 Locations in the District where fire ignitions generate modelled house loss.

Under modelling, Ignitions which occur in the red areas generate the greatest house loss and ignitions occurring in the white generate the least.

Source: (Department of Environment and Primary Industries 2014
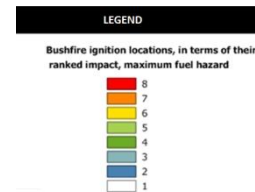
Figure below is a simple combination of the relative ignition probability (figure) and the potential damage (house loss) from an ignition location (figure). It serves to highlight areas in the District where both ignition probability is highest and potential house loss is highest showing us the higher risk areas for ignition.

Figure 17 Relative ignition damage risk index (house loss)

Note – the production of maps in this section is limited by the information available as inputs to modelling and by the modelling tool itself. They are based on the best info available at the time, acknowledging that accuracy will improve over time.
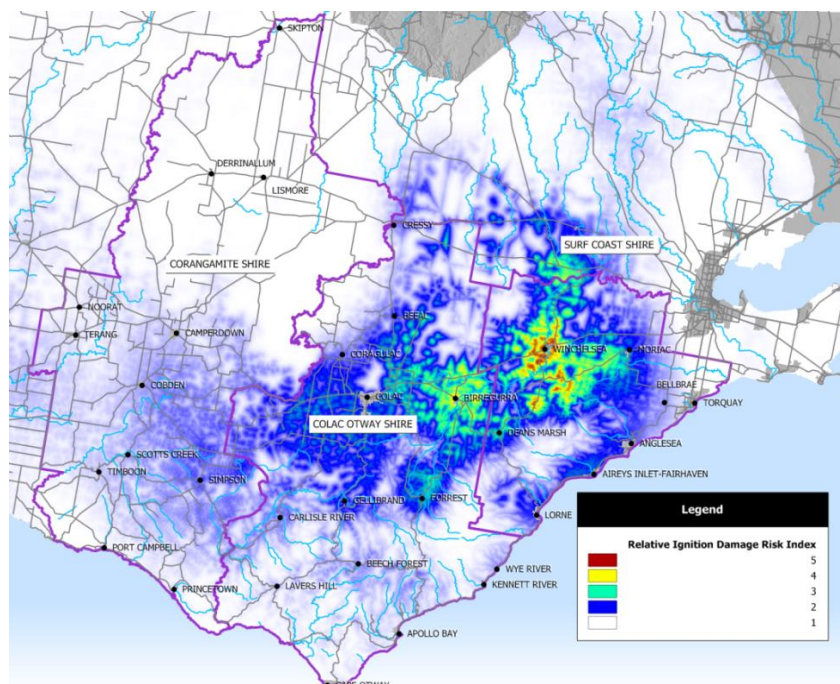
Risk based planning approach

This plan takes a risk based approach so that collectively, we can determine how to best direct our efforts and resources to minimise the impacts and consequences of fire on the things we all value. To achieve this we need a detailed understanding of the risk. In this section we focus on bushfire risk – which is the likelihood of bush fire causing damage.

Risk analysis across the District was undertaken in the lead up to the preparation of the plan. From this work several key risk criteria were selected as important measures of risk and were used to rank bushfire risk across all localities in the District:

- Bushfire simulation modelling – using Phoenix Rapidfire[2] modelling, data generated by DELWP from 10,000 simulated fires were assessed to determine for each town a broad range of fire-township interactions. From the analysis we selected the following elements to represent bushfire risk:
  - the frequency that modelled fires reached the town.
  - the potential scale of impact – we examined for each locality: average number of houses lost, total number of houses lost and number of times the fire impacted more than 20% of the town.
- The influence of landscape topography and vegetation on the potential for unusual fire behaviour and intense ember drops on each town (termed drop-zone).
- Access and proximity of each town to a large, open and permanently low-fuel space for last resort bushfire shelter – often a wide accessible beach.
- The relative need each town has for assistance due to age (younger or older) and disability.
- The relative degree to which tourism is a feature of each town, understanding that tourists are likely to be more vulnerable and large visitor numbers can pose additional risk – eg traffic issues.
- Other specific social or geographic features particular to each township or location

This analysis is the basis of the risk profiles presented in tables 7 to 10 below, and a more detailed description of each risk element is provided below. A table showing the modelled risk of all localities within the District, along with a more detailed description of risk elements is included as appendix C.

Identifying bushfire risk in the Otway District

A number of complementary approaches to identifying risk need to be considered in making determinations on priorities and treatments. They include bushfire modelling analysis and fire history examination, along with specialist and local knowledge.

The Victorian Bushfire Risk Profiles Report (Department of Environment and Primary Industries 2013) released by DELWP's predecessor in 2013, presented a method of using Phoenix Rapidfire modelling to test a number of different landscape fuel (vegetation) management scenarios – or planned burning – against a scenario in which there was no fuel management. Modelled house loss was used as a measure of bushfire risk. Not only could the different fuel management scenarios be compared against each other,

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[2] Phoenix RapidFire is a sophisticated bushfire simulation tool developed by Melbourne University, DELWP and the Bushfire CRC and used to model bushfire risk in Victoria. Phoenix uses information about weather, topography, vegetation and fire history to simulate (and predict) the spread and impact of bushfires. It helps us to understand bushfire behaviour – including flame height, ember density, spotting distance, convection column strength and intensity. – See more at: http://www.delwp.vic.gov.au/safer-together/science-and-technology#sthash.7YiRIiIR.dpuf

a risk reduction value could now be estimated; that is, the amount of risk reduced by each planned burn scenario could now be assessed and compared.

This risk reduction value helped us understand the benefit of proposed DELWP and CFA fuel reduction (broad scale planned burn) programs, and just as importantly it gave us an understanding of how much bushfire risk remains to be tackled using other risk reduction strategies. This component of the risk remaining after planned burning is known as the *residual risk*.

Bushfire risk profiles for District localities

Having a robust understanding of the nature of risk is the critical foundation for determining the best strategies and actions to reduce that risk. It is the basis from which agencies and communities can direct their efforts and resources to the most effective solutions.

The following series of tables show the relative bushfire risk of localities within the District, determined through application of the methodology summarised above, and detailed below. The first table takes a district wide approach, and subsequent tables are shire by shire. All risk ratings are ranked scores from 1 to 10 (except bushfire shelter which is 1 to 5), and those emanating from Phoenix are the risk of house loss, determined spatially. Importantly, evidence over time demonstrates that there is a strong correlation between house loss and life loss resulting from bushfire impacts (Blanchi R 2012).

It is important to note, that the bushfire risk analysis presented in these tables is undertaken through modelling, and while we have used the best tool and the best data available at the time of writing this plan, it is still modelling and must be treated as such. Other factors, such as fire history and local knowledge also need to be considered. For example, Pomborneit is an example of a locality which has experienced a number of fires which due to access are difficult to suppress.

Understanding the tables

The tables present a number of ways of looking at relative bushfire risk between localities in the District, and can be used to inform various lines of enquiry – depending on what you are most interested in. For example, you may want to know how often a modelled fire reaches the locality, but this will not indicate the degree of impact. Likewise, impact can be explored in a number of ways; from the average number of houses lost over the 10,000 modelled fires, to the relative number of times house loss in a locality exceeds 20% of the houses – which is likely to have a substantial impact on community as well as the individual house-holders.

It is difficult, and not particularly useful, to provide an overall risk ranking between localities as there are many ways of defining the risk. However, generally the higher the locality is on this table, the greater the overall risk. Values in the table are heat mapped to provide a quick visual reference – green is lower risk while red is higher. A worthwhile way to use these tables is to examine the full risk profile of each town in which you have an interest.

Working through the tabulated township risk profile, the first 5 columns represent information extracted from the work undertaken by DELWPs Barwon Otway Risk Landscape team to present different aspects of exposure and consequence. Outputs as derived during that process and have been given a relative ranking based on a number between 1 and 10, with 10 being the highest risk or consequence. Further information on the method can be sourced in the Victorian Bushfire Risk Profiles Report (Department of Environment and Primary Industries 2013).

Table 7 Corangamite Shire – bushfire risk profiles – relative and ranked risk assessed for localities

Locality	LG	No. of houses in locality	Ranked likelihood of fire reaching the town	Ranked average number of houses lost	Ranked total house loss / number of houses in town	Ranked likelihood of township experiencing substantial impact (>20% house loss)	Ranked Drop zone potential	Ranked access to large low fuel area (1 good, 3 poor, 5 none)	Ranked need for assistance Age/ Disability (total no. of people)	Ranked tourism factor
KENNEDYS CREEK	c	78	6	1	2	6	6	5	4	2
TIMBOON	c	825	8	2	2	3	4	5	7	4
PORT CAMPBELL	c	620	7	1	2	2	6	1	5	10
GELLIBRAND LOWER	c	83	4	1	2	4	6	5	4	4
JANCOURT	c	19	3	1	3	4	3	5	8	2
SCOTTS CREEK	c	168	7	1	2	3	3	5	5	2
CARPENDEIT	c	97	6	1	4	5	0	5	3	1
JANCOURT EAST	c&co	131	8	1	3	4	3	5	2	1
PRINCETOWN	c	260	7	1	2	3	0	3	4	7
WAARRE	c	13	4	1	3	4	4	5	1	1
GLENFYNE	c	85	5	1	2	3	4	5	3	1
SIMPSON	c	377	10	1	2	1	0	5	5	4
COBRICO	c	72	4	1	1	2	0	5	7	1
COWLEYS CREEK	c	26	4	1	2	2	3	5	3	1
COORIEMUNGLE	c	227	9	1	2	1	0	5	4	2
CAMPERDOWN	c	2149	2	1	1	0	0	5	9	3
CURDIEVALE	c	112	5	1	1	3	0	5	2	2
TERANG	c	1410	5	1	1	0	0	5	8	2
CURDIES RIVER	c	23	4	1	2	3	0	3	2	3
SKIPTON	c	459	2	1	1	1	0	5	6	3
NEWFIELD	c	52	5	1	2	3	0	3	2	2
PETERBOROUGH *	c	497	3	1	1	2	0	1	2	8
GLENORMISTON NORTH	c	68	2	1	1	2	0	5	4	2
TIMBOON WEST	c	34	4	1	1	3	0	5	2	1
BOORCAN	c	93	3	1	1	2	0	5	4	1
ELINGAMITE NORTH	c	58	5	1	1	2	0	5	3	1
LARRALEA	c	22	2	1	1	2	0	5	4	1
BRUCKNELL	c	74	5	1	1	0	3	5	3	1
DIXIE	c	75	3	1	1	1	0	5	5	1
ELINGAMITE	c	35	3	1	1	0	3	5	4	1
HEYTESBURY LOWER	c	34	3	1	1	3	0	5	1	1
NAROGHID	c	58	3	1	1	2	0	5	3	1
BOSTOCKS CREEK	c	62	2	1	1	2	0	5	3	1
BOOKAAR	c	121	3	1	1	1	0	5	4	1
GARVOC	c	251	3	1	1	2	0	5	2	1
NOORAT	c	196	3	1	1	0	0	5	5	2
DERRINALLUM	c	366	4	1	1	0	0	5	4	2
ECKLIN SOUTH	c	138	6	1	1	1	0	5	2	1
GNOTUK	c	55	2	1	1	1	0	5	4	1
KOLORA	c	139	2	1	1	2	0	5	2	1
COBDEN	c	1083	5	1	1	0	0	5	3	2
LISMORE	c	470	3	1	1	0	0	5	3	3
MANNERIM	c	77	1	1	1	0	0	5	6	1
NOORAT EAST	c	13	1	1	1	2	0	5	2	1
PAARATTE	c	20	5	1	2	1	0	5	1	1

* Peterborough as a locality contains only 60 properties within Corangamite Shire, the remainder are in Moyne Shire.

Table 8   Colac Otway Shire bushfire risk profiles – relative and ranked risk assessed for localities

Locality	LG	No. of houses in locality	Ranked likelihood of fire reaching the town	Ranked average number of houses lost	Ranked total house loss / number of houses in town	Ranked likelihood of township experiencing substantial impact (>20% house loss)	Ranked Drop zone potential	Ranked access to large low fuel area (1 good, 3 poor, 5 none)	Ranked need for assistance Age/ Disability (total no. of people)	Ranked tourism factor
WYE RIVER	co	396	6	4	9	6	7	3	3	10
LAVERS HILL	co	208	7	2	7	7	10	5	2	6
FERGUSON	co	32	7	1	7	7	8	5	5	6
FORREST	co	345	7	2	7	7	7	5	1	7
KENNETT RIVER	co	199	6	2	8	5	6	3	3	10
BARRAMUNGA	co	171	8	1	4	9	8	5	2	3
WEEAPROINAH	co	29	6	1	9	8	9	5	1	1
SEPARATION CREEK	co	147	4	2	8	5	7	3	2	9
BEECH FOREST	co	353	10	1	5	6	9	5	3	3
WYELANGTA	co	193	8	1	4	8	10	5	2	1
CHAPPLE VALE	co	124	7	1	4	7	10	5	4	1
GELLIBRAND	co	360	9	1	4	5	8	5	5	5
MOUNT SABINE	co	10	6	1	4	8	10	5	1	2
CARLISLE RIVER	co	396	10	1	4	8	7	5	1	2
TANYBRYN	co	73	6	1	5	8	7	5	1	2
GREY RIVER	co	14	3	1	7	4	7	3	3	9
KAWARREN	co	202	7	1	6	5	6	5	3	4
JOHANNA	co	153	5	1	5	4	6	3	4	8
SKENES CREEK NORTH	co	32	4	1	9	5	6	5	1	2
YUULONG	co	122	5	1	5	5	9	5	2	1
APOLLO BAY	co	2532	6	3	1	1	7	1	6	9
BARWON DOWNS	co	276	7	1	3	5	5	5	4	1
BARON GAROOK	co	260	5	1	4	4	5	5	5	1
GLENAIRE	co	151	5	1	2	3	7	5	5	3
WONGARRA	co	81	5	1	6	5	6	3	1	2
SKENES CREEK	co	406	3	2	3	2	6	3	4	6
IRREWILLIPE EAST	co	74	6	1	4	6	0	5	4	1
CAPE OTWAY	co	52	3	1	1	1	8	5	1	10
HORDERN VALE	co	62	2	1	2	2	9	5	2	4
IRREWILLIPE	co	146	8	1	4	4	0	5	5	1
JANCOURT EAST	c&co	131	8	1	3	4	3	5	2	1
MARENGO	co	379	3	1	1	1	5	1	4	9
MURROON	co	92	3	1	2	2	7	5	3	1
GERANGAMETE	co	122	6	1	3	4	0	5	2	1
PETTICOAT CREEK	co	10	2	1	3	2	6	3	1	4
WATTLE HILL	co	16	2	1	2	3	6	5	1	1
BARON GAROOK WEST	co	164	6	1	2	1	4	5	4	1
SUGARLOAF	co	17	2	1	3	2	6	5	1	1
SOUTH PURRUMBETE	co	83	4	1	1	2	0	5	4	4
BUNGADOR	co	53	5	1	3	3	0	5	2	1
YEODENE	co	92	4	1	3	3	0	5	2	1
COLAC EAST	co	248	1	1	1	0	0	5	10	2
BIRREGURRA	co	665	3	1	1	0	0	5	6	4
SWAN MARSH	co	129	5	1	2	1	0	5	3	2
YEO	co	80	2	1	1	0	4	5	4	1
EURACK	co	55	1	1	1	0	0	5	8	1
PIRRON YALLOCK	co	124	1	1	1	0	3	5	4	2
BEEAC	co	348	1	1	1	0	2	5	5	1

Table 9   Surf Coast Shire bushfire risk profiles – relative and ranked risk assessed for localities

Locality	LG	No. of houses in locality	Ranked likelihood of fire reaching the town	Ranked average number of houses lost	Ranked total house loss / number of houses in town	Ranked likelihood of township experiencing substantial impact (>20% house loss)	Ranked Drop zone potential	Ranked access to large low fuel area (1 good, 3 poor, 5 none)	Ranked need for assistance Age/ Disability (total no. of people)	Ranked tourism factor
LORNE	sc	2744	9	10	6	5	9	1	5	10
BENWERRIN	sc	57	8	1	8	10	8	5	2	5
AIREYS INLET	sc	1309	3	7	3	2	6	3	6	8
BELLS BEACH	sc	95	5	2	10	5	5	3	4	7
ANGLESEA	sc	3484	6	5	2	2	8	1	8	8
JAN JUC	sc	2124	5	8	3	2	4	1	3	7
BELLBRAE	sc	509	6	2	4	5	3	5	6	4
BIG HILL	sc	44	4	1	6	4	8	3	2	7
EASTERN VIEW	sc	81	5	1	5	4	7	3	1	8
FAIRHAVEN	sc	608	2	3	2	2	6	3	2	8
MOGGS CREEK	sc	203	2	2	3	2	6	3	3	8
PENNYROYAL	sc	99	4	1	4	3	5	5	3	5
GHERANG	sc	179	5	1	5	4	5	5	3	1
WENSLEYDALE	sc	97	5	1	4	3	7	5	3	2
BOONAH	sc	27	4	1	4	4	7	5	1	1
TORQUAY	sc	8395	4	2	1	0	2	1	10	7
PARAPARAP	sc	106	5	1	3	4	0	5	4	1
WINCHELSEA SOUTH	sc	111	3	1	3	3	4	5	3	1
DEANS MARSH	sc	265	4	1	2	2	6	5	2	2
BAMBRA	sc	126	3	1	2	2	4	5	3	2
BARRABOOL	sc	108	3	1	2	1	4	5	4	1
GNARWARRE	sc	131	2	1	1	0	4	5	4	1
WINCHELSEA	sc	1353	4	1	1	0	0	5	7	1
BUCKLEY	sc	125	3	1	1	1	0	5	4	1
WURDIBOLUC	sc	62	3	1	1	0	3	5	3	1
MORIAC	sc	317	2	1	1	0	0	5	6	1
MOUNT MORIAC	sc	154	2	1	1	1	0	5	4	1
FRESHWATER CREEK	sc	227	3	1	1	1	0	5	2	2
MOUNT DUNEED	sc	665	2	1	1	0	0	5	5	1
INVERLEIGH	sc	818	3	1	1	0	0	5	2	3
MODEWARRE	sc	159	3	1	1	0	0	5	4	1
BREAMLEA	sc&g	134	1	1	1	0	0	3	1	6
OMBERSLEY	sc	79	3	1	1	0	0	5	3	1
CONNEWARRE	sc	543	1	1	1	0	0	5	3	1

Table 10 Detailed explanation of risk profile table

Table heading descriptor	Score Definition – all scores are mathematically ranked 1 to 10 from raw data, with the exception of access to large low-fuel area which is ranked from 1 to 5
LG	Local Government area (sc – Surf Coast Shire, cos – Colac-Otway Shire, c – Corangamite Shire)
No. Houses per town	The number of houses within the footprint of the locality.
Av number of houses lost (ranked) *	An average number of houses lost, drawn from the 10,000 simulated fires run across the landscape and how many houses burnt in the total simulation.
Total house loss / number of house In town (ranked) -	This column is based on the number of houses lost as a percentage of the total number of houses in the town. This column gives us an understanding of the vulnerability of the town/settlement. It also gives a basic understanding on how survivable the town would be to seek shelter in.
Likelihood of fire to cause substantial impact to town	This figure is a ranking based on the number of fires that impacted a township or settlement that caused more than 20% of the house to be lost. This figure gives an understanding of which places are impacted at the greatest frequency by highly damaging fires.
Ranked Drop zone potential	This analysis helps us to understand the factors that could contribute to a major ember drop zone and the potential for damaging winds associated with terrain, vegetation, and fire weather. This work is still in development, but it is worth is showing the ranked scale to help inform aspects of the risk profile. Understanding the potential here may have an important role to play, as the damaging nature of these effects were evident during Black Saturday.
Ranked access to a beach or large space of low fuel -	This element was included as a beach whilst not an ideal shelter in a major bushfire does provide an option for a number of towns that in effect could reduce the life loss potential compared to a township with no access.
Ranked need for assistance Age/ Disability (total number of people) -	This column is a simple representation of the number of people in a township or settlement that have either a disability, are less than 14 years old or more than 65 years old. This represents a component of susceptible people and research from Black Saturday found that not only these people, but the carers are at great risk from a major bushfire.(Blanchi R 2012)
Ranked Tourism factor	The degree to which the usual population of the town expands during the summer months, which also coincides with higher fire danger ratings – ranked As another major component of susceptible people, in some areas tourists form a substantial proportion of the population and this leads to those areas having a higher risk.

note; These rankings are indicative only. Modelling used provides information at a broad scale which may not pick up local factors or nuances.

Future refinement – Location based Risk Profiles

Risk Profile – Lorne

Localities; Lorne Township, Big Hill, Grassy Creek

Population; approx. 1,100 with an increase of up to 100,000 in peak tourist times (summer, school and public holidays and major events)

Local Government area; Surf Coast Shire

Landscape; gently undulating to the coast, surrounded by the Great Otway National Park

Fire history; the last significant fire through the area was Ash Wednesday in 1983, approximately 46 houses were lost in North Lorne

Victorian Fire Risk Rating; Lorne Interface, EXTREME, Big Hill – EXTREME, Lorne Township - VERY HIGH

Note; the terrain is generally undulating to steep and the surrounding tall canopy bushland contains high to extreme fuel hazard. There is potential for long distance spotting due to ribbon bark being carried forward.

Note; there are two Designated Places of Last Resort in Lorne, at the Foreshore and at Point Grey. Buildings in the main street and other beach areas may also provide a level of protection in a last resort situation.

Note; the population of Lorne increases up to a hundredfold in peak tourist times, including campers, day-trippers and international travellers. Holiday homes and accommodation make up 48% of the houses.

Access and Egress

The Great Ocean Road has winding conditions with limited slow vehicle turn out lanes and is subject to rock falls. Large trees that line the road in many sections could fall making the road impassable; it would only take one incident to cause traffic congestion. Inland roads are heavily treed and narrow and would also limit access and egress during an emergency.

Figure 18 Risk Profile

This town/location based tool is being developed as an option to the preceding tables to inform community about the specific risks of their locality in a succinct and clear way. Its purpose is to refine further and make clearer the information with additional commentary.

This tool is a sample only based on historical risk data. It would be expected that the risk assessment of an area/township would be dynamic over time based on treatments, for example, creating Strategic Fuel Breaks.

Case Study – Fairhaven; changing demographics, changing bushfire risk

This case study examines the implications of township and demographic changes on bushfire risk

We often look to the past to give us an understanding of what may happen in the future, and this approach has been used to explore some aspects of bushfire risk for coastal communities of the surf coast.

In 1983, the Ash Wednesday bushfires destroyed some 700 houses between Lorne and Anglesea. While it is possible that a similar fire could again impact these coastal towns, it is useful to understand that the towns have changed since 1983 and there is potential for bushfire impact to be considerably greater.

In this case study we look at the settlement of Fairhaven and how changed demographics and town planning have altered the risk profile. While Fairhaven has been selected in this instance, several towns along the surf coast have experienced similar changes and parallels can be drawn.

Key bushfire risk factors explored in this example include:
- number and density of houses,
- distance of houses to the bush, and
- proximity of houses to each other.

Overall increase in the number of houses

At the time of the Ash Wednesday fires, there were some 200 houses in Fairhaven, and by 2016 this number increased to over 500. Figure 21 shows this increase in the number and density of houses in Fairhaven.

The extra risk associated with having more houses, a higher population, and the potential for increased house loss is self-evident. However two other factors play an important role in bushfire and house loss in this town.
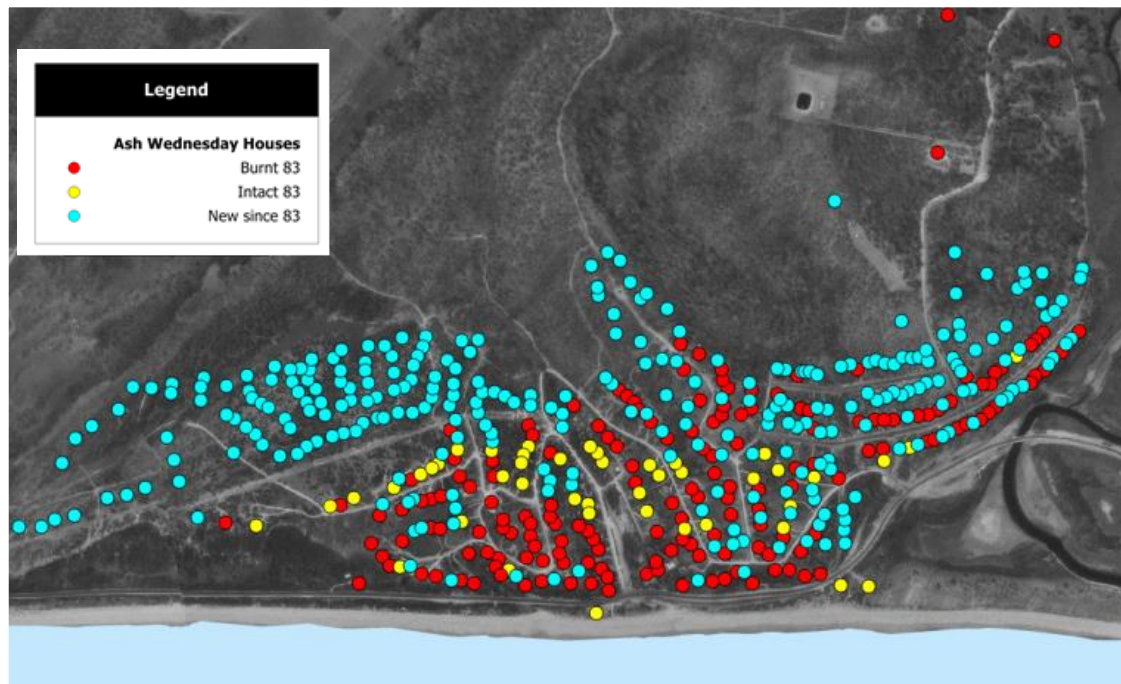

Figure 19 Dwellings in Fairhaven following Ash Wednesday fire
Red dots indicate houses that were burnt during the Ash Wednesday fire of 1983 and yellow dots indicate houses that remained intact. Blue dots represent houses that have been built since 1983, which are in addition to the houses re-built on the red-dot sites.

Distance between houses and the bush

The distance from a house to the bush is a key bushfire risk factor. Using the house loss ratios experienced in Fairhaven from the 1983 fire as they relate to the distance of a house to the bush, a theoretical house loss potential was developed for current house locations. This helps us consider the bushfire risk implications of an increased number of houses in close proximity to the bush.

Figure 21 and figure 22 (over page) show the change since 1983 in the number of houses in Fairhaven located in close proximity to the bush. Figure 2 compares the number of houses lost in Ash Wednesday to the potential for house loss today under a similar fire situation, assuming all other risk factors are equal with conditions that existed in the Ash Wednesday fire.
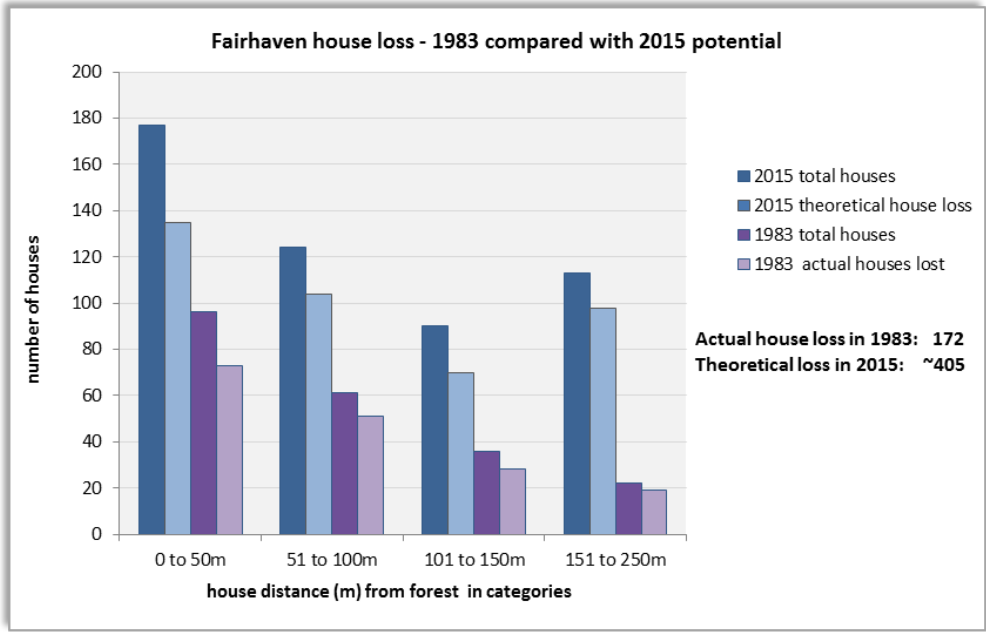
Figure 20

Fairhaven house loss in 1983 compared with 2015 potential

This compares the number of houses lost in the Ash Wednesday fires against the potential for house loss in 2015 under a similar fire scenario, due to changes in the proximity of houses to the bush (only).

In the Ash Wednesday fire, 172 houses were lost at Fairhaven. As at 2015, it is estimated that 405 houses in Fairhaven are close enough to the bush to be destroyed by a fire similar to that of Ash Wednesday.

House to house ignition

Another key bushfire risk factor has changed considerably since 1983, and this could further increase house loss for towns like Fairhaven. House to house ignitions can occur when houses are located relatively close together. As experienced in the Wye River/ Separation Creek fire on Christmas day 2015, this can be a significant house loss factor.

Learnings from the Wye River/Separation Creek fire show that much of the house loss in these towns was

due to house to house ignitions – where one house became involved in the fire and the heat or flames from that house fire ignited a neighbouring house. Houses located closer than 12 metres have an increased chance of ignition from a neighbouring house (Leonard et al. 2016). Figure 3 compares the approximate distance between houses in Fairhaven in 1983 and in 2015, and we can see that many more houses are within 12 metres of each other – 57% in 1983 increasing to 85% in 2015.

Figure 21

Changes in the distance between houses (approximate) in Fairhaven, between 1983 and 2015
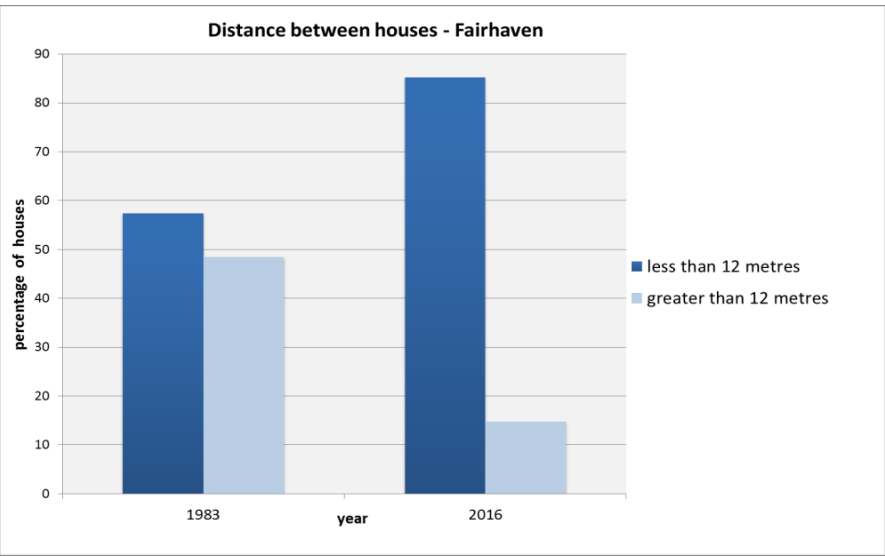
Implications

The pattern of increasing house numbers and density, along with locating houses close to the bush and to each other needs to be understood as a bushfire risk factor across towns of the Otway coast, as it has the potential to result in significantly greater house loss.

This is critical, as evidence collected about bushfire impacts in Australia over time show a strong correlation between house loss and life loss – generally for every 17 houses lost, one life is lost (Blanchi et al. 2012).

Case Study – Wye River and Separation Creek house loss learnings

This case study examines some aspects of house loss in Wye River and Separation Creek resulting from the 2015 Christmas day fire; it explores the importance of township and domestic fuels in the bushfire risk equation, and provides insights into how impacts from the recurrence of a similar fire could be reduced.

Understanding a township's individual characteristics and how they influence its bushfire risk profile is critical; it allows us all to determine the most effective ways of tackling risk to transition towns to being more fire adapted and resilient and in the face of future emergencies. The 2015 Christmas day bushfire that impacted the communities of Wye River and Separation Creek, as devastating as it was, allow us to examine the factors which contributed to the higher than expected house loss which occurred.

This case study, drawn from the house loss surveys and the report describing the house loss findings (Leonard 2016), looks at three of the key factors:

- township ground fuel,
- town steepness and,
- storage of household items.

Township ground fuel

Generally, we might expect a fire front to travel through bush and reach a town to cause damage by direct flame contact, radiant heat and ember attack. However in the case of the 2015 Separation Creek and Wye River fire this did not occur. Instead, embers generated from the main fire started a relatively small number of spot fires within the town which then developed and spread through the fine ground fuels of the town (mainly leaves, twigs and low vegetation).

These ground fires generally travelled against the prevailing wind, back towards the main fire under the influence of the slope and the pull of winds generated by the convection column of the main fire. Often only about 40cm high, the ground fires were then able to ignite susceptible heavier fuels such as houses and structures, and in turn, they were able to ignite close neighbouring houses and structures.
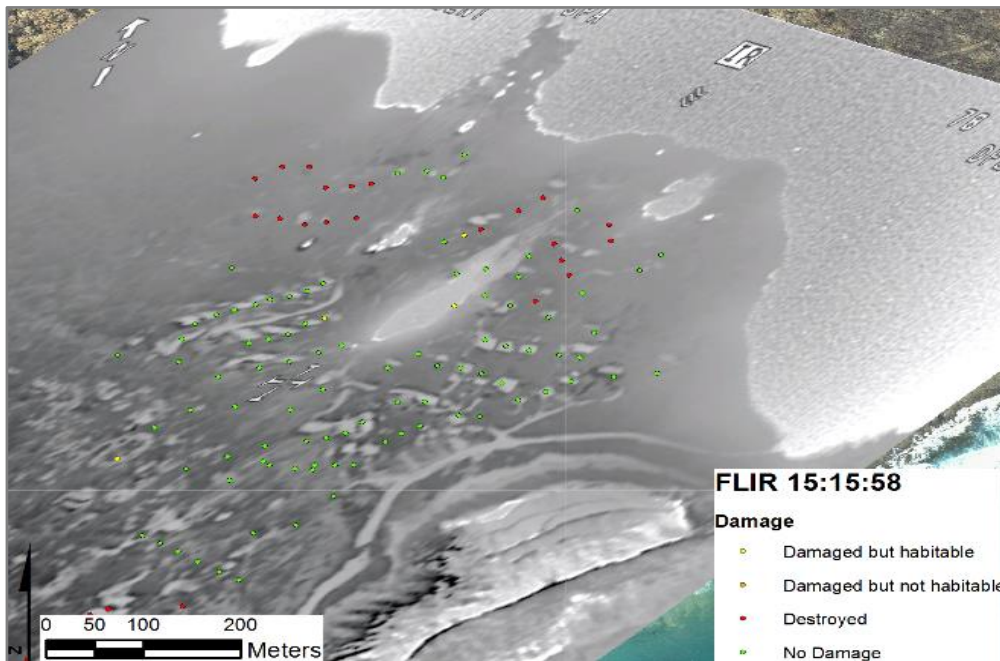
Figure 22

FLIR (forward looking infrared) image showing spot fires in Separation Creek (source: cited in Leonard 2016)

We can see from figure 29 – an infrared image of the fire at 3:16 pm on Christmas day – a number of ember generated fires had developed within Separation Creek (light areas indicate fire), and were travelling back toward the main fire front. This highlights the first of the characteristics that contributed to the loss;

the townships consisted of a largely connected fine fuel layer that allowed fire spread throughout the town and ultimately right up to the structures. The towns essentially burnt from within experiencing limited impact from the fire front itself (Leonard 2016).

Terrain steepness – retaining walls and under-house storage

There are a number of compounding features associated with the steepness of the towns' terrain which increase their vulnerability, and here we will look at two.

Retaining walls for slope stabilisation, by necessity are a feature of both towns. Commonly, these are built of timber – some of pine and some of hardwood figure 30 – and by their nature are in contact with the ground and associated fine fuels.

The slope of the towns dictate that many of the houses are largely elevated, which allows for storage of heavy fuel items under the building as can be seen in figure 31.

Figure 23   Remains of a retaining wall near a house

Figure 24   Heavy fuel stored under a house

In addition, many houses did not have ember-proof under-floor areas, and this allowed access for embers which ignited fuel under the house, generating enough heat and flame contact to ignite the house above.

These two features enabled the surface fire to easily transition from burning fine ground fuels to ignition of heavier fuel – the retaining walls, items stored under or near buildings, and directly to the buildings; all contributing to house loss.

Learning

While there are other elements that contributed to house loss, the three factors briefly discussed in this case study are distinctive features of Wye River and Separation Creek – they serve to remind us that individual towns need individual solutions.

The learning from this is multifaceted: it teaches us not only about future risk mitigation in these towns, but more importantly, how understanding the hazard is critically important and how developing bespoke solutions for each township *with their communities* is the future of fire management and a focus of the strategic directions and actions of this fire plan.

Case Study – Wannon Water's enhanced protection of a critical asset

This case study examines how Wannon Water took a deeper look at what's needed to ensure a critical piece of infrastructure – the Gellibrand main pumping station – could continue to provide essential water services to communities if it is impacted by fire.

The Gellibrand Pumping Station provides the primary water supply to the extensive North Otway urban water system. Water pumped from the Gellibrand River via the pump station is transferred to more than 50,000 people, including the major regional centre of Warrnambool and several significant exporting dairy manufacturers and food processors. If the facility were to be taken off-line due to bushfire impact, the water stored in the system could only maintain this important supply for less than three weeks.

The Gellibrand pumping station is a critical asset and is recognised as being of State and National significance in the Victorian Fire Risk Register.

This case study looks at how Wannon Water systematically worked through a detailed understanding of the risk to their asset; including the potential likelihood and consequences of bushfire impact, and how the risk could be effectively mitigated.

Identifying the risk and potential impact

Wannon Water initially identified the bushfire risk to the pumping station through the Victoria Fire Risk Register process, and determined that the nature of the risk and the potential consequences required a more detailed examination. Wannon water set about fully understanding how this asset was placed in the bushfire risk landscape and how susceptible to fire it may be.

A risk assessment to test mitigation options was undertaken by DELWP using Phoenix Rapidfire modelling. This was considered along with an earlier report by Terramatrix and evidence from the Black Saturday fires in 2009, where similar facilities were impacted. Together this information built a picture of the vulnerability of the pumping station, should it face a similar bushfire situation, and the most effective mitigations options.

Figure 25 and 26 Damage to a water pumping plant which occurred during the 2009 Black Saturday fires

Identifying the potential consequences

While understanding the risk posed from bushfire was the first part of the analysis, developing a detailed understanding of the potential consequence should the asset be impacted took this risk analysis to a whole new level. Factors such as the demographic and economic reliance on the facility and how the asset contributes to community function were examined.

With the importance of the asset fully understood, attention turned to an assessment of options to have the station operable following bushfire impact. Investigations included opportunities for temporary replacement, and timeframes for replacement or repair at varying levels of damage.

Developing effective tailor-made solutions

Wannon Water, armed with a comprehensive picture of the risk and consequence environment, was then able to identify and develop effective, tailor-made risk mitigation strategies and measures to provide water security for the communities they serve.

These included:

- Ember proofing vents and windows, and other bushfire attack level improvements,
- Cross tenure fuel management, including planned burning.
- Onsite fuel Management
- Wannon Water has commissioned a replica electric switchboard; multiple switchboards built within a shipping container. The shipping container can be moved and then used at a number of high risk sites.

Figure 27 and Figure 28

Examples of Gellibrand pumping station risk mitigation works:

-Ember proofing vents and windows

Learnings

This fire plan seeks to enhance the protection of assets which are valued by communities along with those that provide important community services. This work led by Wannon Water illustrates a process that could be replicated – at varying levels of detail – for many of the high value assets within the District. It would provide a much better understanding of the risk to important assets and of the potential consequences should fire impact. This would provide a sound basis from which to develop more effective, bespoke risk reduction measures.

Understanding the key limiting factors and the exposure to the ongoing use of the facility

This type of detailed analysis could be fed back into the Victorian Fire Risk Register where it is readily available to Incident Controllers for decision-making in the management of a wildfire incident, and where it can be used to inform agency fire risk mitigation works programs.

Victorian Fire Risk Register – Bushfire

The Victorian Fire Risk Register – Bushfire, is a database of important assets requiring risk reduction action, compiled by Municipal Fire Management Planning Committees and managed by the CFA. The VFRR – B includes an extensive list of assets, their risk rating and a list of mitigation works. .

This list is largely based on a group assessment of the asset and gives a good basis on which to make decisions. As future work into risk is developed and strategic directions from this and other plans provides a finer understanding of risk at specific sites, the VFRR should be reviewed to ensure the more detailed risk understanding is recorded and to maintain consistency.

This is particularly important in determining risk mitigation strategies. It is envisioned that as more detailed assessment of settlements and townships occurs that a more detailed assessment of VFRR assets will follow, and this information will be used to update the database be available information during suppression activities to aid planners and operations officers.

An example of a more detailed asset listing this is provided in the case study on Wannon Water's pumping station which illustrates the need for finer detailed analysis for some assets and for more specific mitigation measures.

Structural and chemical fire risk assessment

This Plan recognises that at the time of writing, a risk assessment for structural fire and hazardous material risk assessment in the built environment is being developed by the MFB, as project leaders, and consequently this Plan is predominately focused on bushfire risk.

The fire and hazardous material Project will include key asset identification, and other available site and incident statistical information. Once this guidance is finalised, this Plan will be updated to accommodate it. The fire and hazardous material risk assessment will give consideration to likelihood factors, such as structural and chemical fire history (number and type) across the municipalities and across the relevant industry, and the potential consequences of those occurrences (death, injury, economic and property loss).

Consideration will be given to high risk premises and assets, for example (for life risk) nursing homes, aged care facilities and institutional care facilities, (and for property loss risk) commercial and industrial premises. In terms of chemical fires, consideration will be given to high risk premises such as chemical manufacturers, or high chemical use industries, chemical transport industries, fuel suppliers and any other industry identified following a comprehensive risk assessment process.

This risk assessment will ultimately form part of the township fire safety/resilience plans; a key deliverable of this Strategic Fire Plan.

Critical assets within each Shire are listed in the Victorian Fire Risk Register – Bushfire Reducing Bushfire Risk.

Monitoring, evaluation and reporting

Works Planning

A simple, annual process proposed to develop work plans for each MFMPC is outlined below.

Project identification and initiation phase

1. Convene an annual works program development meeting for each MFMPC or schedule time in a standard meeting.

    a. Recap important parts of the Plan:
        - Purpose
        - Aim and Objectives
        - Strategic Directions

    b. Review the Strategic Action List

    c. Select and define actions for the annual works program from the Strategic Action List:
        - consider previous or current programs to be ongoing, developed or adapted.
        - select priority actions to be undertaken over the next 12 months
        - allocate project lead and support; broadly scope resource requirements and timelines
        - Actions should also consider aspirational projects
        - Implement through the Work Plan Matrix

Project planning phase

1. Following this plan development; if appropriate, the lead agency should consider developing a simple project charter to identify project objectives, resources, timelines, milestones reporting arrangements, etc.

2. Projects are collated into a Work Plan Matrix

Project Delivery Phase

1. Projects delivered in accordance with the work plan matrix/ project charter

2. The annual works program shared within and across the MFMPCs of the Otway District. Selected projects shared across relevant communities.

3. Progress on annual works programs is a standing agenda item at each MFMPC meeting and the lead agency provides an update report which is recorded in the Work Plan Matrix

Project Closure Phase

1. At the annual planning meeting of each MFMPC end of year progress report and a brief program evaluation undertaken to capture key learnings and inform the new work plan – some projects will be ongoing.
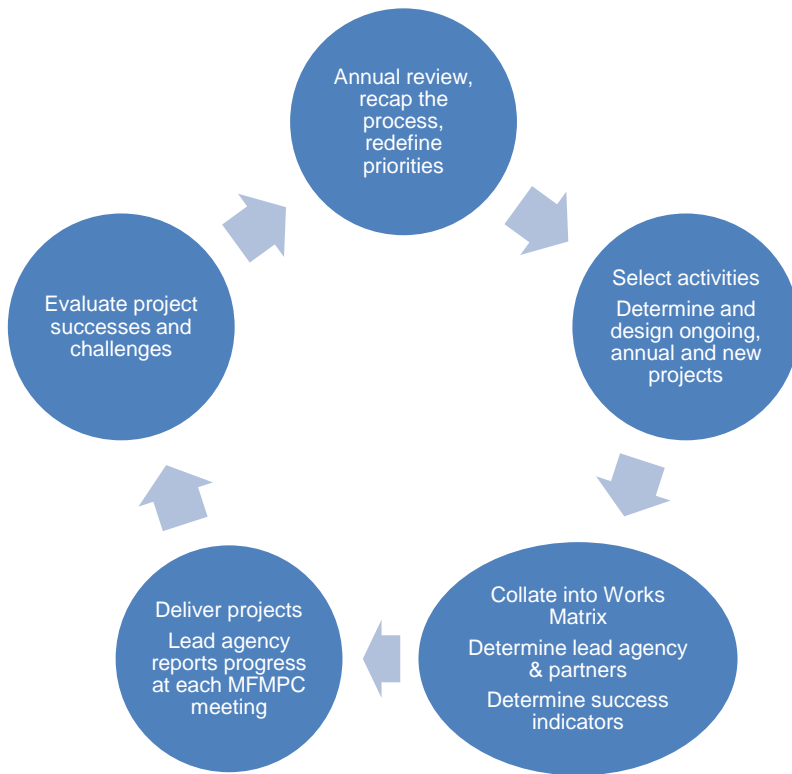
Actions and Monitoring Plan – The Work Plan Matrix

Each Municipal Fire Management Planning Committees develop an annual work and monitoring plan of priority actions taken from the strategic directions.

Multiagency Workplan Matrix for ....Shire

ref	Strategic Direction	Project Description links to SD	Lead (Agency and name)	Support	Project status Ongoing Annual New	Success indicators	May 2019	August 2019	November 2019	March 2020

Action Report 2017-20

The Municipal Fire Management Planning committee for each Otway shire developed a work plan identifying their objectives and actions aligning to the strategic directions.

Key actions delivered 2017-20 include;

Township Planning

- Township safety Sub Plans developed for each high risk township in the Otway district
- These Plans incorporated into and informed by community engagement Community led initiatives in EM planning were responded to and supported eg Simpson, Forrest, Wensleydale, Apollo Bay.
- Township planning and engagement aligned with the Department of Environment Land Water and Planning 'Safer Together' and 'Community Based Bushfire Management' programs.
- Multiagency Township/Local Response plans developed for high risk townships in Colac Otway and Surf Coast Shire

Public Bushfire Shelters

- Identification and designation of new Bushfire Place of Last Resort (BPLR) sites in high risk townships
- Maintenance of existing sites and enhancement of sites where possible
- Upgrading of signage and communications for all BPLR sites across the Otway district

Community Engagement

- Multiagency community engagement program planned and delivered in high risk towns
- Including preseason information and education, fuel management programs, community led planning, and capturing community assets and values

Vulnerable People

- Community engagement sessions targeting tourist and accommodation provider groups
- Place based engagement providing resources for low income families (Go Bag items)

Evacuation planning

- Continue to support and contribute to the development, trial and application of modelling components to inform evacuation planning for the Great Ocean Road

Assets and Values

- Applying and refining bushfire modelling approaches to improve accuracy of assessment of bushfire risk. -ongoing

Fuel management

- A multiagency, tenure complementary fuel management plan across the three shires which outlines a risk-based strategic approach to fuel management – in progress
- State government funded Strategic Fuel break project delivered in coastal townships in the in Surf Coast Shire and now extending to Colac Otway Shire.

Public Facilities

- Construction, renewal and refurbishment of public facilities including the Aireys Inlet Hall and Timboon Hall

Statutory planning and Council strategic planning

- Align council planning objectives and directions with those required to meet bushfire safety requirements – in progress

References

Ashton, P, Nagel, C, 2015. Otways Drop Zone Analysis – Draft Report. Otway District Bushfire Planning Collaboration,

Barwon South West Regional Fire Sub Committee, 2016. Barwon South West Regional Strategic Fire Management Plan.

Blainey, G (2013) 'A history of Victoria.' (Cambridge University Press:

Blanchi, R, Leonard, J, Haynes, K, Opie, K, James, M, Kilinc, M, De Oliveira, FD, Van den Honert, R (2012) 'Life and House Loss Database Description and Analysis: Final Report.' (CSIRO:

Bradstock, RA (2010) A biogeographic model of fire regimes in Australia: current and future implications. *Global Ecology and Biogeography* 19, 145-158.

Department of Environment and Primary Industries, 2013. Victorian Bushfire Risk Profiles. Victorian Government,

Department of Environment and Primary Industries, 2014. Strategic bushfire management plan Barwon Otway bushfire risk landscape. Victorian Government Department of Environment and Primary Industries, Melbourne.

Department of Environment Land Water and Planning (2016) 'Safer Together,.' Available at [Accessed 20 October 2016].

Emergency Management Victoria, 2014. State Bushfire Plan State of Victoria, Melbourne.

Gill, AM, Williams, JE (1996) Fire regimes and biodiversity: the effects of fragmentation of southeastern Australian eucalypt forests by urbanisation, agriculture and pine plantations. *Forest Ecology and Management* 85, 261-278.

Leonard, J, Opie, K, Blanchi, R, Newnham, G, Holland, M, Authority, CF (2016) Wye River/Separation Creek Post-bushfire building survey findings.

State Government of Victoria, 2012. Victorian Emergency Management Reform White Paper. Victorian State Government,

State of Victoria, 2018. Vulnerable people in emergencies policy. Department of Health and Human Services

Appendices

Appendix A – Strategic Directions

SD1. Develop and implement place based bushfire safety planning in targeted high risk towns or settlements.

Considerations

- Use a risk based approach to assist determining priorities for township/settlement bushfire safety plan development, including the Bushfire Risk Engagement areas concept defined in the BSW Regional Plan and undertake this planning in accordance with priorities and as opportunities arise.
- Use the broad landscape risk of a community i.e rural/farmland, coastal, small/large settlement as a basis for talking about risk and finding synergies across different communities
- Have as their foundation, a detailed and rigorous bushfire risk analysis to determine higher and lower risk areas within towns (and identification of safer areas)
- Work with communities to identify values and assets which are important to protect, and incorporate relevant VFRR-B assets.
- Incorporate the principles of community-based planning – where the appetite for risk and the selection of risk mitigation measures (including township fire adaptability) will be strongly influenced by informed communities.
- Work with community leaders and groups, including CFA Brigades in each high risk town or settlement, to develop locally relevant and tailored programs informing communities on the detail and nature of bushfire risk for their towns and options to reduce that risk.
- Build-in increased protection for vulnerable and susceptible people, including tourists and visitors.
- Consider other hazards for inclusion in township plans where appropriate.
- Take a shared responsibility approach to identifying risk reduction responsibilities for all relevant agencies and for communities.

SD2. Seek to enhance the provision and management of public bushfire shelters; Bushfire Place of Last Resort – Neighbourhood Safer Place (BPLR-NSP)

Considerations

- Apply a risk–based approach to assess the relative need and priority for public bushfire shelters across the landscape and within each shire footprint
- Continue to undertake assessment of formal and informal public shelter options, identify significant gaps and issues, recommend actions to mitigate priority risks
- Work with high risk communities to determine their priorities and needs for public bushfire shelter establishment and management, and explore appropriate bushfire shelter options. Consider the unique needs and situation of each community i.e. provisions for horses, large influx of tourists etc.
- Link with, recognise and create synergies with township bushfire safety planning.
- Support community group efforts to analyse bushfire shelter options, and where appropriate to make application for support to establish or improve public bushfire shelters.
- Consider where appropriate development of operating guidelines for the management of BPLR-NSP during an event or threat.
- Seek to influence the development of design guidelines for BPLR-NSP, including enclosed or hybrid BPLR-NSP.

Business as usual projects

- Undertake annual assessments of each BPLR – NSP, implement identified procedures and update the BPLR-NSP plans for each Shire.

- Identify and assess potential new BPLR-NSP in accordance with any community or priorities of the bushfire shelter plan, and establish BPLR-NSP that meet community, CFA and Council requirements. Include local CFA brigades in the assessment and designation of BPLR-NSP

SD3.   Develop and implement a community engagement and education plan.

Considerations

- Take a risk-based approach where possible, where agencies collaborate with each other and with communities to determine the needs and priorities for engagement and education across the district, including full integration within the Bushfire Risk Engagement areas.
- See agencies collaboratively identify key messages and focus areas for community engagement so that the package of engagement activities is thoroughly considered, most relevant to local communities, and holistically delivers community needs in a logical sequence.
- Include attention to the special requirements of vulnerable and susceptible people, including tourists and visitors and for events.
- Provide for engagement activities and risk information and risk mitigation options which are based on a sound understanding of fire risks for each town and are locally relevant
- See agencies working together and with communities and local brigades to deliver the plan, using the expertise and resources available across the District.
- Deliver consistent and coordinated messaging.
- Link with, recognise and create synergies with township bushfire safety planning
- Work with communities that show an appetite and maturity to get involved in community led fire planning including responding to or creating community led initiatives find synergies and utilize learnings between similar communities
- Take into account risk appetite of the community, history and past engagement.

SD4.   Tourist, visitor and other vulnerable groups' bushfire risk reduction

Considerations

- Consider an Events and Attractions Risk Mitigation Plan (or review existing). Planning will undertake a detailed risk assessment for targeted attractions and events (or collate and review those already prepared) and ensure appropriate principles and standards are applied to risk mitigation across the three shires.
- Continue identify options to target bushfire risk reduction for tourists and visitors
- Be aware of and support the development of individual business Bushfire Plans.
- Link with, recognise and create synergies with township bushfire safety planning

SD5   Evacuation planning – continue to investigate and contribute to the development of evacuation planning for the Great Ocean Road Region.

Considerations

- Be based on an understanding of the nature of potential risks that evacuation may respond to, including areas, sequence and likely timing of impacts.
- Understand the capacity of the road network for evacuation, including potential for road closure/blockages.

- Understand the potential community response to a call to evacuate, including numbers of people involved, compliance, likely timelines and evacuation routes and destinations.
- Support the development of evacuation modelling and apply modelling as it is developed to underpin evacuation plans.
- Be cognisant of and link to regional and municipal arrangements for evacuation and relief.
- Review evacuation in use by agencies to ensure consistency, and improve interagency understanding and operability.
- Ensure the special requirements of vulnerable and susceptible people are fully considered and provided for. In this context, tourists and visitors are included in the category of susceptible people.
- Provide suitable options for evacuation destinations within towns where feasible (based on robust township risk stratification), understanding that it may not be possible to move large numbers of people out of towns with limited access and egress within available time.
- Ensure evacuation planning is fully informed by, and connected with Township bushfire safety planning (where undertaken). For effective evacuation, these plans should be synergistic and guide a multiagency approach to evacuation planning and response.
- Where feasible, enhance evacuation processes and relief centre plans/protocols to accommodate pets, as there is a growing body of research which identifies that people may refuse to evacuate if they cannot take or adequately provide for their pets and companion animals.

SD6. Continue to identify and review priorities for the protection of assets and values, and determine and review treatments.

Considerations

- Continue to work with industry groups to increase risk understanding and improve the effectiveness of risk mitigation activities
- Where required, establish a lead agency to coordinate treatment for priority critical infrastructure (for example, Mt Cowley).
- Work with communities to identify assets and values which are important to protect and explore treatment options and their palatability with relevant communities. For towns which undergo township bushfire safety planning, this will be undertaken as part of the planning process. Community input will shape asset protection priorities and methods.
- Identify critical assets that require more detailed planning, including more in depth understanding of susceptibility, community impact and recovery requirements, and ensure this information is used to undertake targeted asset preparation and response and update the VFRR
- Continue to push for construction, renewal or refurbishment of public buildings to meet the relevant standards and best practice protocols for bushfire safety, this includes vegetation management, building location, design and materials, and use. It should align with advice given to residents about building for bushfire safety.
- Before undertaking construction, renewal or refurbishment, work with the community to investigate whether the facility is needed, if it is the right facility in the best location and how it is ranked in relation to the construction, renewal or refurbishment of other community facilities.
- Business as usual projects
- Undertake periodical reviews of assets listed in the Victorian Fire Risk Register –Bushfire, and regularly examine the need to add, modify or remove assets on this list. Explore options to enable VFRR-B information to be more useful and more available to access during a bushfire event or threat.

SD7. **Fuel management – collate, prepare and review fuel management strategy to help ensure landscape fuel management is integrated with township and wildfire interface fuel management, and takes a tenure-complementary approach**

Considerations

- For each Shire footprint develop a map of sites where treatments are undertaken or may be undertaken and prioritise these in logical zones or types.
- Take a strategic risk-based approach to identify, analyse and prioritise significant fire risks that can be adequately reduced by carrying out identified fuel management treatments. Consider DELWP's SBRASS outcomes as part of the process.
- Be informed by an understanding of what values and assets communities want to protect and how communities want to protect them.
- Include an analysis of the protection of identified critical assets, such as those listed in the VFRR-B
- Take a tenure-complementary approach, as far as is practical and in the context of existing State fuel management plans.
- Integrate fuel management objectives and activities across agencies and align with greater landscape programs – for example that undertaken in the Great Otway National Park and the Otway Forest Park.
- Ensure that cultural values, high value natural resources and ecosystem resilience are protected in the process of fuel management.
- Take a coordinated approach to obtaining native vegetation removal exemptions or approvals for fire management purposes over multiple parcels of land, and promote simplification of the process.
- Align fuel management objectives and works across agencies, so that programs delivered on the public land estate (eg DELWP and PV planned burning and asset protection zone establishment) are supported by programs on municipal, other crown land and private land (eg roadside, railway, local reserve and private land fuel risk reduction). Alignment should be both geographic and temporal, and should include targeted community engagement that provides integrated multiagency messaging.
- Link with, recognise and create synergies with township bushfire safety planning and provide for any township fuel management priorities identified through township planning.
- Align fuel and vegetation management objectives within organisations – for example: ensure statutory planning requirements for revegetation on subdivisions also achieve bushfire risk management objectives; and ensure township character plans fully consider bushfire risk objectives.
- Update and incorporate the Surf Coast Strategic Fuel Management Plan into fuel management planning and into Township Bushfire Safety Plans as developed.

SD8. **Statutory planning and Council strategic planning – align council planning objectives and directions with those required to meet bushfire safety requirements.**

Considerations

- Continue to look for opportunities for statutory planning instruments and directions to align with our contemporary and growing understanding of requirements to improve bushfire safety.
- Identify and enact opportunities to change planning schemes to improve bushfire safety outcomes. Consider aspects such as settlement boundaries, housing density, vegetation requirements, and asset protection zones.
- Link statutory and strategic planning with Township Bushfire Safety Planning and recognise and create synergies between the plans.

- Ensure Township character plans accommodate bushfire safety requirements and are consistent with Township Bushfire Safety Plans.
- Consider the need to adjust planning overlays in light of the consequences of fire in the landscape – for example following a bushfire, some areas may become more landslip prone and this needs to be recognised and influence future planning and development.

Appendix B – Definitions and abbreviations used in this plan

Abbreviations

CFA	Country Fire Authority
COS	Colac Otway Shire
CS	Corangamite Shire
DEDJTR	Department of Economic Development, Jobs, Transport and Resources
DELWP	Department of Environment, Land Water and Planning
DFFH	Department of Families, Fairness and Housing (previously DHHS)
DoT	Department of Transport
FDR	Fire Danger Rating
FFDI	Forest Fire Danger Index
FLIR	Forward looking infrared
MEMP	Municipal Emergency Management Plan
MEMPC	Municipal Emergency Management Planning Committee
MERI	Monitoring, evaluation, reporting and improvement
MFMP	Municipal Fire Management Plan
MFMPC	Municipal Fire Management Planning Committee
MFPP	Municipal Fire Prevention Plan
NSP	Bushfire Place of Last Resort – Neighbourhood Safer Place
PPRR	Prevention, Preparedness, Response and Recovery
PRPR	Primary Responsible Person Representative
RSFMP	Regional Strategic Fire Management Plan
SCS	Surf Coast Shire
RSFMPC	Regional Strategic Fire Management Planning Committee
SES	State Emergency Services
VBRC	Victoria Bushfire Royal Commission
VFRR	Victoria Fire Risk Register
WMO	Wildfire Management Overlay

Definitions

Bushfire	Unplanned fire occurring in grassland, heathland, woodland or forest
Drop Zone	An area that has the potential to experience extensive ember attack during a bushfire, due to landscape factors.
Fire Danger Rating	The Fire Danger Rating predicts how dangerous a bushfire would be if one occurred. It is strongly influenced by the Forest Fire Danger Index and the Grassland Fire Danger Index
Forest Fire Danger Index	A numeric site measure of predicted or actual environmental factors describing the degree of danger of fire in Australian forests.
Landscape	In the context of this plan it refers to the land and all it contains within the Otway Planning District, including the shires of Corangamite, Surf Coast and Colac-Otway
Residual risk	That bushfire risk remaining after broad scale planned burning is completed

Appendix C – List of recorded significant fires in the District since 1851

The fires that have been included in the list below because they have been of a large size or have caused notable damage or human life loss, and had detailed information recorded as part of a historical document. Some smaller more recent fires have been included where there was potential for that fire to have caused significant damage had conditions been different; this seeks to highlight the ongoing risk.

Table 11   List of significant recorded fires in the Otway District since 1851

Date	Description of significant fires	Surf Coast	Colac – Otway	Corang -amite
1851 **6 February**	Black Thursday. The "Fires covered a quarter of what is now Victoria" including "The Pyrenees, the Loddon country, the Wimmera, Colac, the "far west", the Portland country, Mount Gambier, the country between Geelong and Ballarat. Not one house in ten survived in the Barrabool Hills"	✓	✓	
1881 **March**	Bushfires 'raged' between Colac and Gerangamete and near Birregurra and the Otway Ranges.	✓	✓	
1886 **4-5 January**	Otway & Heytesbury regions, including Colac		✓	✓
1889 **January**	Bushfires around Lorne for several days. The coach from Birregurra to Lorne 'passed through fires nearly all the way from Deans Marsh to Erskine House'.	✓		
1890 **January**	forest between Deans Marsh and Lorne 'ablaze for two to three days'. The fire was reported as about half a mile in width.	✓		
1891 **14 February**	Black Saturday' fires 'raged all over the colony', including Mount Duneed and Coast districts, and Birregurra and Winchelsea districts. The fires skirted the coast line between Jan Juc and Lorne. Jan Juc was just saved by a wind change.	✓		
1893 **28 February**	Bushfires 'raged with great fierceness' between Winchelsea and the Coast. Fire approached the Anglesea River and encroached on township allotments on the west side of the river	✓		
1898 **February**	Bushfires from Cape Otway forest extended to Anglesea, which was at one stage 'threatened with complete extinction' by the fires. The Anglesea Hotel was 'swept out of existence by the fiery fiend'. The same fire got within 'dangerous proximity to Torquay'. Lorne was also threatened.	✓	✓	
1901 **February**	Extensive fires reported at Birregurra and in the Geelong region. Several people lost their lives in the Birregurra fire. Jan Juc was also threatened by fire.	✓	✓	
1905 **January**	Extensive fires occurred throughout the Geelong area and between Jan Juc and Anglesea. Record temperatures of 107.8 – 110.5 in the shade.	✓	✓	
1908 **January**	Bushfires across the State, including around Jan Juc, Modewarre and Anglesea. The fire caused 'wholesale destruction' at Anglesea, with seven houses destroyed.	✓		
1912 **January**	Extensive fire at Aireys Inlet. Two cottages destroyed.	✓		
1914	Otway Ranges – Beech Forest and 'forest south of Colac'		✓	
1919 **1 February- March**	"Three people died when bushfires consumed Otway forests. Bushfires were widespread for six weeks and many with 100 homesteads burnt and about 500 people left homeless." Bushfire at Anglesea, with five houses destroyed. The Lorne saw mill was destroyed.		✓	

Date	Description of significant fires	Surf Coast	Colac – Otway	Corang -amite
1919 24 November	120,000 ha Otway Ranges and Grampians		✓	
1920 February	Bushfires around Anglesea (for several days), between Mount Moriac and Aireys Inlet, between Lorne and Anglesea, at Wensleydale and between Jan Juc and Anglesea.		✓	
1926 February	Bushfires at Lorne, Eastern View, Aireys Inlet, near Jan Juc, around Wensleydale, Sections of the Great Ocean Road and in other areas throughout the State. At least 29 people died across Victoria.	✓		
1926 March	Bushfire between the Otway Coal Mine and Bambra. Fires in the Otway Ranges endangered pine plantations at Anglesea.	✓		
1931 February	Bushfire commenced near the pine plantation at Anglesea and swept through the bush between Anglesea, Bellbrae and Torquay. Extensive fire between Wensleydale and Bambra.	✓		
1932 January-February	Widespread fires. Reports of fires include: Beech Forest and Cape Otway near Lorne, Aireys Inlet & Benwerrin.	✓	✓	
1936 April	Fires in Geelong and neighbouring districts. A fire with a seven mile fire front threatened the township of Anglesea, with neighbouring pine plantations damaged. Also fires in the Otways and other parts of the State.	✓	✓	
1937 November	Bushfire threatened settlement at Eastern View and swept towards Fairhaven.	✓	✓	
1938 December	Fire burning for several days around Eastern View threatened several cottages and the golf course.	✓		
1938 February	Bushfire along the west side of Anglesea river threatened the township of Anglesea. Also fires towards Aireys Inlet, at Big Hill, Benwerrin and Pennyroyal.	✓	✓	
1939 13 January	Towards the end of a long drought, numerous fires burning separately in various parts of the state joined and peaked in severity on – "Black Friday". The fires affected almost every section of Victoria, including the Otways. "The findings of the Royal Commission that was held following the fires were highly significant in increasing fire awareness and prevention throughout Australia." Lorne was threatened and sixteen houses were destroyed. Hundreds of people sought the safety of the beach. Also fires between Aireys Inlet and Anglesea and extensive grass fire at Moggs Creek.	✓	✓	✓
1940 March	Fires in southern parts of the State, including Torquay where one life was lost, 86 houses and various buildings destroyed and heavy loss of stock and grass.	✓	✓	✓
1944 14 January-14 February	Major fires across Western District destroyed more than 500 houses with 15-20 fatalities. Geelong was ringed by fires in Moriac, Modewarre, Bellbrae and Mount Duneed to the edge of Torquay. The townships of Derrinallum, Berrybank, Cressy as well as the areas of Vite Vite, Mingay and Duverney were severely affected by a large fire as it burnt to the south. Grass fires near Hamilton, Dunkeld, Skipton and Lake Bolac burned about 440,000 hectares in eight hours	✓	✓	✓
1947 January	Wide spread fires at Anglesea. Fire leapt the Anglesea River and threatened to destroy the township. The fire raced through the centre of town and destroyed two homes, several buildings and a number of boats. Anglesea Fire Brigade building was set on fire three times. The main street was 'strewn with fallen power and telephone lines'.	✓		
1957 5 September	Fires at Anglesea and Aireys Inlet with 2,428 hectares burnt.	✓		
1961	500 acres and 300 sheep were lost at Modewarre in a deliberately lit fire.	✓		

Date	Description of significant fires	Surf Coast	Colac – Otway	Corang -amite
1962 16 January	Otways (2,024 ha)		✓	
1965 21 February	Otways (12,000 ha).		✓	
1965 March	Over 8,000 acres burnt and one house and several buildings destroyed at Big Hill – Eastern View.	✓		
1965	A large fire in the stony rises area from Convict Track on the Emu Creek to Crawford's Road at the Lismore – Skipton Road burnt about 500 Ha.			
1966 November	Otways – Modewarre, Wurdale, Anglesea (15,000 ha).	✓	✓	
1966 March	Bushfire destroyed 14 houses at Anglesea, with property damage of $100,000.	✓	✓	
1968 11 January 6 February	Colac Gellibrand road, 10 miles south of Colac, Barangarook threatened (810 ha) (11 Jan) also a fire on north side of Lorne (1215 ha) (6 Feb). large fire in the Lorne area occupied 27 brigades for four days. Over 5,000 acres burnt and several buildings destroyed.	✓	✓	
1969 January	Fires burnt over 2,000 hectares at both Bellbrae and Gnarwarre. Multiple fires in southern and central Victoria.	✓		
1976	A fire of about 7000 ha burnt on the east side and up to Lake Corangamite, and is believed to have caused damage at the Stoneyford Wreckers			✓
1977 12 February	"Widespread fires occurred across the Western District of Victoria, mostly in grasslands This included the Cressy (Wallinduc or Werneth) fire: 42,000 ha.in which 3 people lost their lives. In Cressy 10 houses were destroyed along with 2 halls, a garage and fuel depot. The State school and tennis centre at Werneth were destroyed and a large number of outbuildings. Large fire in the Lorne area occupied 27 brigades for four days. Over 5,000 acres burnt and several buildings destroyed. Pura Pura – Derrinallum area, fire burned 18700Ha of pasture, 42,200 sheep, 1291 cattle, 13 houses, 159 other buildings and 910 km of fencing. Mingay – Lismore fire burned 1800 Ha of pasture, 2000 sheep, 7 buildings and 68 km of fencing. The town of Lismore was saved by a last minute wind change. All of these fires originated from power lines.	✓	✓	✓
1980 March	Fire within two kilometres of Anglesea township, with about 400 hectares burnt. Source of fire was smouldering peat moss from fire several weeks earlier.	✓		
1981 October	Fairhaven evacuated due to fire. Three houses were lost and others damaged. The fire was started by a controlled burn.	✓		
1982 January	There was a fire at the Anglesea camping ground. Twenty caravans, 13 tents, two prefabs and two annexes were destroyed.	✓		
1983 16 February	"Ash Wednesday". Over 100 fires in Victoria, with the Otway ranges severely affected. The Otway fire originated at Deans Marsh (in what is now Surf Coast Shire) and resulted in 3 deaths and around 41000 ha burnt (mainly forested country) and 729 houses lost	✓		✓
1994 November	A fuel reduction burn adjacent to Moggs escaped which resulted in 200 hectares of bush being burned, with one house destroyed and 25 damaged.	✓		
1998 March	Yeodene peat fire – repeated outbreaks over a number of years were contained close to the site, however in 1998 an outbreak escaped the site and burnt over 300 hectares, being stopped on the Barwon River flats.			

Date	Description of significant fires	Surf Coast	Colac – Otway	Corang -amite
2001 2 February	"Wingeel Plains Fires" (2000 ha).		✓	
2002 September	Chapple Vale (786 ha).		✓	
2005 11 January	The "Carranballac" fire destroyed large areas of crops, some stock, hay and pasture but there was no loss of human life or buildings.			✓
2006	Stony Rises fire destroyed over 3,000 ha of pasture and hay reserves during a drought season which impacted heavily on land owners' recovery from the fire (Moores road fire)			✓
2008 December	A tanker overturned and caught on fire on the Great Ocean Road, Big Hill killing the driver causing road closure and major traffic diversions.	☐		
2009 9 February	The 2009 Black Saturday Weerite-Pomborneit fire destroyed 1500 ha of pasture, crops, fodder reserves and some infrastructure. The Geelong-Warrnambool rail line was damaged and power supplies to local residents cut.			✓
2014 February	Schoulers road fire (400ha) burnt over a number of weeks, with containment very difficult due to the stony rises terrain.			✓
2015 25 December	The townships of Wye River and Separation Creek lost 106 houses. The fire was started by lightning in inaccessible country a week prior. The total fire burnt over a number of weeks and when finally extinguished the fire had burnt 2260 hectares.		✓	
2018 17-18 March	South West Complex fires – started by dry lightning – 26 residences and 66 outbuildings destroyed, with 2,995 livestock lost. The total area burnt by the fires included 9,725 hectares in Terang, 3,666 hectares in Gazette, 4,031 hectares in Garvoc, 6,725 hectares in Camperdown, 79 hectares in Cobrico Swamp and 28 hectares in Lake Elingamite. Underground peat fires continued to burn over a long period creating suppression challenges and impacting air quality and community health.		✓	

Appendix D – Bushfire Places of Last Resort/ Fire Refuges

Bushfire Places of Last Resort – Neighbourhood Safer Places (NSP):

A 'Bushfire Place of Last Resort' also known as a 'Neighbourhood Safer Place' (NSP) is a place of last resort when all other bushfire plans have failed. Your safety or survival at one of these locations is not guaranteed.

Things to know about Bushfire Places of Last Resort – Neighbourhood Safer Places (NSP):

- It does not replace a well thought out and practised plan. Going to a *Bushfire Place of Last Resort* should be your last resort when your plans have failed.
- It may be that your home or one of your neighbours' offers better protection than an NSP.
- Travelling to an NSP when there is a bushfire can be extremely dangerous, there is no guarantee that you will be safe doing so.
- Sheltering at an NSP may not prevent death or injury from fire, embers or radiant heat.
- You should only use an NSP when your primary bushfire plan has failed or cannot be implemented.
- There is no guarantee that CFA or other emergency services will be present during a bushfire.
- No special facilities will be provided for people with special needs, including those requiring medical attention.
- NSPs have limited capacity and may be uncomfortable.
- You may be on your own, emergency service agencies may not be able to assist you at an NSP.
- Food, drinks and provision for animals will not be provided.

Locations of Bushfire Places of Last Resort – Neighbourhood Safer Places in the Otway District

Locations in each Shire are listed below. Maps and further information for each site can be found on the relevant Shire Website

Colac Otway Shire

Township	Location	Address
Apollo Bay	Foreshore	Great Ocean Road between Nelson Street and Moore Street
Barwon Downs	Barwon Downs Parkland	1595 Birregurra-Forrest Road
Beeac	Beeac Park	Corner of Main Street and Wallace Street
Beech Forest	Gravel area next to Beechy Hotel	Beech Forest – Lavers Hill Road
Birregurra	Birregurra Park – Grassed area at northern corner	35-39 Main Street and Strachan Street
Cressy	Cressy Community Hall	41 Yarima Road, corner of Lyons Street

Corangamite Shire

Township	Location	Address
Skipton	Skipton Recreation Reserve	Osborne St, Skipton
Derrinallum	Part of Derrinallum Recreation Reserve	Hamilton Hwy, Derrinallum
Lismore	Part of Lismore Recreation Reserve	Seymour St, near Heriot St, Lismore
Timboon	Timboon and District Hall	53 Bailey St, Timboon
Port Campbell	Port Campbell Foreshore	Cairns St, Port Campbell
Camperdown	Manifold St Avenue	Manifold St Avenue from Bath St to Cressy St, Camperdown
Noorat	Noorat Recreation Reserve	McKinnons Bridge Rd, Noorat

Surf Coast Shire

Township	Location	Address
Aireys Inlet	Bottom shops car park area	Great Ocean Road (opposite Inlet Crescent)
Anglesea	Shopping strip car park area	Great Ocean Road (between Camp Road and McDougall Road)
	Riverbank	Great Ocean Road (opposite Minifie Avenue)
Deans Marsh	Martian's Café car park	Corner Birregurra-Deans Marsh and Deans Marsh-Lorne Roads
Jan Juc	Bob Pettitt Reserve	Sunset Strip (between Wattle Court and Domain Road)
Lorne	Lorne foreshore	Mountjoy Parade (opposite Williams Street)
	Point Grey picnic area and car park	Great Ocean Road (between Mountjoy Parade and Hird Street)
Moriac	Newling Reserve/Moriac Community Centre	grassed area at the rear of the building on Hendy Main Road (between Deppeler Avenue and Cooks Lane).
Mount Moriac	Mount Moriac Recreation Reserve, western half of No.1 Oval (Main)	755 Reservoir Road (between Ervins Road and Drewry Lane)
Winchelsea	Shopping complex car park	Corner Willis Street and Princes Highway

Community Fire Refuges (CFRs)

Community Fire Refuges (CFRs) are only activated and opened once there is significant fire in the local area. Community Fire Refuges offer a last resort shelter option if you cannot leave the area in the event of a fire.

CFRs are purpose-built or modified buildings that provide protection from radiant heat and embers. They are designed to be a last resort option where nearby residents or visitors can seek shelter if they are trapped by a significant fire. The presence of emergency services is not guaranteed at a community fire refuge. Safe travel to and from the site cannot be guaranteed.

Locations of Community Fire Refuges in the Otway District

Colac Otway Shire

Township	Location	Address
Lavers Hill	Otway Country Fire Authority (CFA) Fire Station	8-14 Lavers Hill-Cobden Road Lavers Hill

Corangamite Shire

None

Surf Coast Shire

None

Appendix E – Hazard tree identification and notification procedure

The Electricity Safety Act 1998 (Vic) (Electrical Safety Act) provides that a municipal council must specify, within its Municipal Fire Prevention Plan:

(a)   procedures and criteria for the identification of trees that are likely to fall onto, or come into contact with, an electric line ('hazard trees'); and

(a)   procedures for the notification of responsible persons of trees that are hazard trees in relation to electric lines for which they are responsible.

Under the Electrical Safety Act, the person responsible for maintaining vegetation and clearance space around power lines is referred to as the 'responsible person'.

The procedures outlined in this section of the Strategic Fire Management Plan seek to address these requirements.

Each responsible person should have its own internal procedure regarding the steps that will be taken when it receives notification of a potentially hazardous tree.

What is a hazard tree?

According to the Electrical Safety Act, a hazard tree is a tree which 'is likely to fall onto, or come into contact with, an electric line'.

The Electricity Safety (Electric Line Clearance) Regulations 2010 further provide that a responsible person may cut or remove such a tree 'provided that the tree has been assessed by a suitably qualified arborist; and that assessment confirms the likelihood of contact with an electric line having regard to foreseeable local conditions.'

Due to legal requirements which require a clearance space be maintained around an electric line, hazard trees are usually located outside the regulated clearance space. Despite being outside the clearance space, the tree may still have the potential to contact the line due to its size or because of a structural fault or weakness which renders part, or all, of the tree likely to contact or fall onto the line.

Who is responsible for a hazard tree?

Under the Electrical Safety Act, the person responsible for maintaining vegetation and clearance space around power lines is referred to as the 'responsible person'. This includes responsibility for keeping the whole or any part of a tree clear of the line.

Under the Electrical Safety Act, responsibility is allocated between distribution businesses and other owners of electricity infrastructure, land owners and occupiers, public land managers such as municipal councils.

Municipal councils are responsible for trees on public land within their municipalities, for which they are the land manager, where these are also within a Declared Area for the purposes of the Electrical Safety Act. Primary responsibility for vegetation clearance and management within the municipality, for areas which are not within a Declared Area, will usually fall to the relevant electricity distribution company.

Responsible persons within Colac Otway Shire, Surf Coast Shire, Corangamite Shire

There are a number of organisations that have responsibility for line clearance in the three Shires, including:

- Powercor for trees affecting all sub transmission and distribution powerlines operating at 66,000 volts, 22,000 volts and low voltage with the exception of trees covered by Other Responsible Authorities.

- SP Ausnet: for all transmission lines (on towers) within the Shires

- The Colac Otway Shire, Surf Coast Shire, Corangamite Shire Councils , for trees on public lands which are managed by the Shire and where road reserves are located within the Declared Area (for the purposes of the Electrical Safety Act);

- Parks Vic: for trees affecting powerlines on land managed by Parks Vic; and

- Foreshore Committees of Management: for trees affecting powerlines on land managed by the committee.

Other relevant information

Responsible persons, other than private persons, must have an electric line clearance management plan in place for areas for which they have responsibility *(refer Electricity Safety (Electric Line Clearance) Regulations 2010)*

Individual Clearance Vegetation Management Plans that outlines vegetation management under powerlines.

Procedures and criteria for identifying hazard trees

In the course of everyday duties, potentially hazardous trees may come to the attention of staff or volunteer members of the entities with representation on the Municipal Fire Management Planning Committee (MFMPC), staff of the distribution business(es) or other persons, including members of the public.

There are a range of factors which may indicate that a tree is a hazard tree. That is, a tree which is likely to fall onto, or come into contact with, an electric line. Some of these factors will be obvious when looking at the tree but many may only be apparent when the tree is assessed by a person with specific expertise and training, such as an arborist.

The following criteria may be used to assist in identifying a hazard tree:

- The size of the tree suggests that it is likely to come into contact with the electric line, for example because it appears to be encroaching or growing into the line clearance space.

- There is an excessive lean on the tree, or branches hanging off the tree and the tree is in proximity to an electric (power) line.

- The size or appearance of the tree suggests it could come into contact with the line including under foreseeable local conditions.

If a potentially hazardous tree is identified, the notification procedure outlined below should be followed. Where a responsible person becomes aware of a potentially hazardous tree for which they have responsibility, they must follow their own applicable internal procedure and the notification procedure described below does not apply.

Procedures and criteria for notifying hazard trees

To ensure that information regarding potentially hazardous trees is captured in an efficient manner and, as appropriate, referred to the responsible person for action, the following procedure for the notification of hazardous trees should be followed:

- The person with responsibility for the highest percentage of lines within the municipality ('the primary responsible person') is the person to whom potentially hazardous trees should be reported.

- The primary responsible person (or their representative) is referred to in these Procedures as the primary responsible person representative (PRPR).

- Where any person becomes aware of, or receives a report of, a potentially hazardous tree within the municipality, this should be referred to the PRPR. Where the MFMPC becomes aware of, or receives a report of, a potentially hazardous tree within the municipality, this must be referred to the PRPR.

- Reports of potentially hazardous trees must be provided to the PRPR for action as soon as practicable. Reports must include, at a minimum:

  o The name and contact details and any relevant qualifications where known of the person making the report

  o As much detail as possible about the location of the tree (including, where known, GPS coordinates, details of numerical/name plate on nearest pole, name of nearest road or crossroads, closest landmark, whether tree is on private land or road reserve etc.)

  o A description of the tree (including, if known, the genus and species of tree)

  o The primary reasons given for the tree being identified as potentially hazardous (eg. tree is in proximity to an electric line AND there is evidence of structural weakness and/or excessive lean and/or appears to be encroaching into line clearance space etc.)

  o An indication of whether or not urgent action is required.

- The PRPR must take all necessary steps to advise the person responsible for the tree that it may be hazardous.

Primary Responsible Person Representative (PRPR)

For the purposes of this part of the Plan, the primary responsible person is Powercor.

All reports of hazard trees to Powercor should be made on the '*Municipal Hazard Tree Notification Form*' which is located on the Powercor Website https://www.powercor.com.au/media/3690/council-tree-hazard-notification-form.pdf

https://www.powercor.com.au/media/1214/council-tree-hazard-notification-form-2011b.pdf

Procedures for Notification of Responsible Persons

Where a potentially hazardous tree has been reported to the PRPR, the PRPR should follow the procedure outlined below.

Step 1	Report provided to PRPR.	
Step 2	PRPR to determine who the responsible person is in relation to the reported tree. (If necessary, the PRPR can seek assistance from Energy Safe Victoria for this step.)	
Step 3	Is the responsible person the primary responsible person?	**Yes =>** applicable internal procedure for referral and assessment of potentially hazardous tree to be followed.
		No => proceed to Step 4.
Step 4	Did the report indicate that urgent action is required?	**Yes =>** the responsible person should be notified as soon as possible, and by no later than the close of the next business day after the notification is assessed.
		No => the PRPR must advise the responsible person of the existence and location of a potentially hazardous tree in accordance with the timelines below.*

* The PRPR should put in place mutually agreed arrangements for the manner in which it passes on reports of potentially hazardous trees to responsible persons.

Reporting Timelines

The PRPR should provide reports to the relevant responsible person as soon as practicable.

In circumstances where:

- the potentially hazardous tree is located within a high bushfire risk area (as per s.80 of the Electrical Safety Act) and the potentially hazardous tree is reported during the fire danger period declared under the Country Fire Authority Act 1958 (Vic); or

- the report indicates that there is an imminent danger that the tree will contact or fall onto lines as a result of minor environmental changes;

- the potentially hazardous tree must be referred to the relevant responsible person for action as soon as possible, and by no later than the close of the next business day after the notification is assessed.

Each responsible person (other than the primary responsible person) must provide the PRPR with contact details of the person (position title) to whom reports should be provided. It is the responsibility of each responsible person to ensure that the PRPR is provided with up-to-date contact details.

Register

It is recommended that the PRPR maintain a register in which all notifications are recorded together with the date of receipt of the notification and the date the notification was reported to the responsible person.

It is recommended that responsible persons also maintain a register of notifications received of hazardous trees for which they are the responsible person.

PRP Consultation

The MFMPC notes that the Primary Responsible Person (PRP) was consulted in relation to the development of these procedures.

Flow chart showing work flow for hazardous trees near powerlines
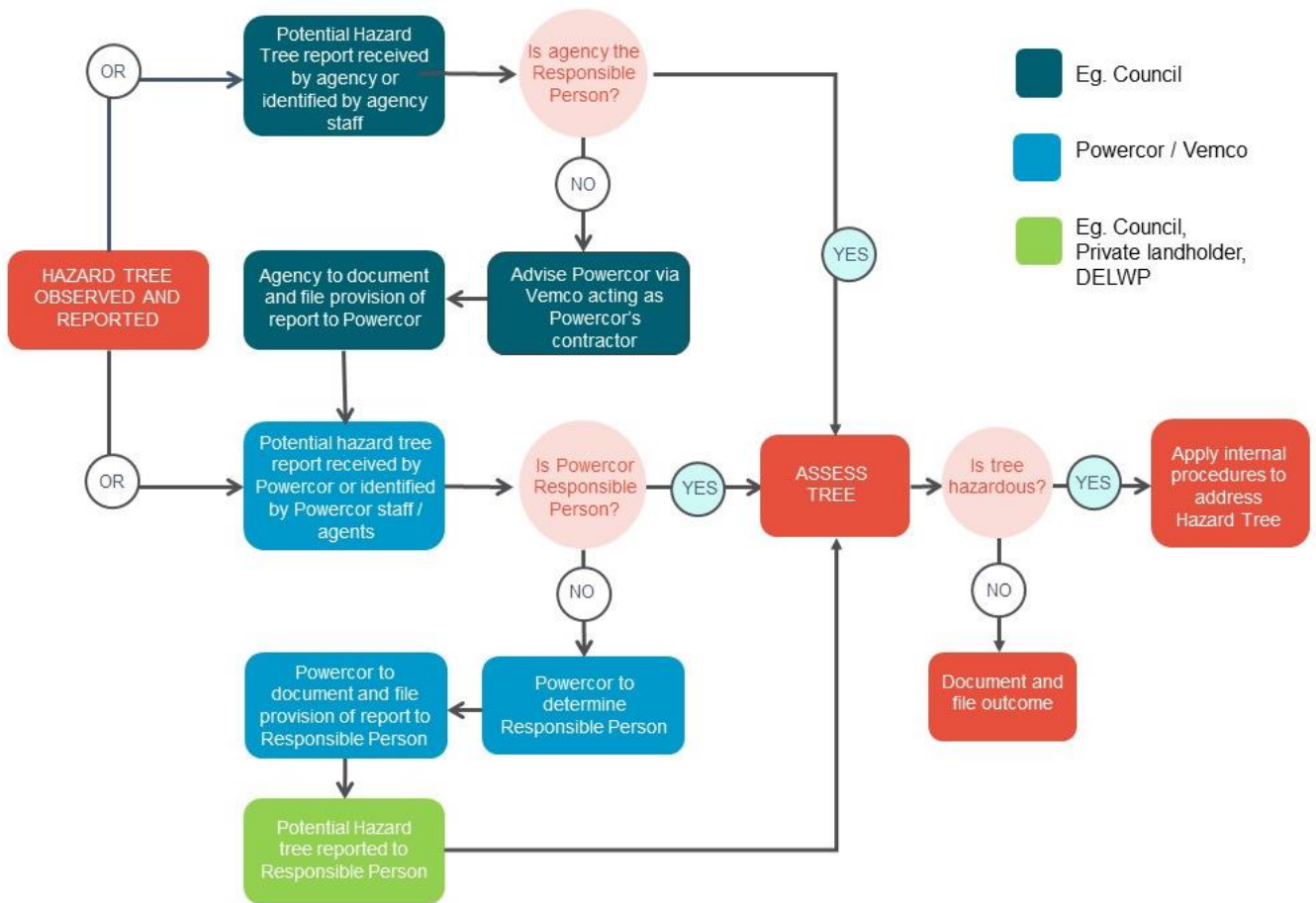
Appendix F – Strategic Fire Management Roads

Defining Strategic Fire Management Roads

Strategic Fire Management Roads are divided into two basic function groups and a basic priority category associated with each group that indicates the strategic importance, risk and financial and management contribution of the agencies.

1. **Linear breaks or disruptions**
   The strategy for these fire roads is for lineal breaks in the travel paths of going fires. These roads should aid with strategic operational control of fire.

   Category 1 – These roads are selected by the Municipal Fire Prevention Committee as the highest priority strategic roads. These roads are to be fully supported, both administratively and economically by Shire, CFA and Department of Transport, to meet the standards listed previously.

   Category 2 – These roads are considered important at a local context and may be supported if funding and time allows.

   Category 3 – These roads are a lower priority but may have some local strategic value, they may be supported through permits, but are unlikely to have any financial or operational assistance.

2. **Access and egress, ignition control**
   The strategy for these roads is to aid safer access and egress to and from a fire for both fire management vehicles and the public. . The ignition control factor is to limit ignitions and help control fires associated with roads.

   Category 1 – These roads are selected by the Municipal Fire Prevention Committee as the highest priority strategic roads for access and egress. These roads are to be fully supported, both administratively and economically by Shire, CFA and Department of Transport, to meet the standards listed previously. They are likely to have specific fuel and hazard tree standards over and above normal road maintenance.

   Category 2 – These roads are considered important at a local context, they will be slashed and may be have additional hazard tree work undertaken, over and above normal road maintenance.

   Category 3 – These roads are a lower priority but may have some local strategic value, they will be maintain as part of normal road maintenance regime

3. **Fire Access Roads**
   These are roads that may not be part of the normal road manager maintenance schedule. These roads or access ways will be kept to a trafficable condition, for a 4x4 13 tonne CFA or FFV fire truck during the fire season for prevention and suppression purposes.