Healesville Bushfire Impact Mitigation **Plan**

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This Plan was presented to and acknowledged by the Yarra Ranges Municipal Fire Management Planning Committee.

CONTENTS

1.

A PLAN for the HEALESVILLE COMMUNITY

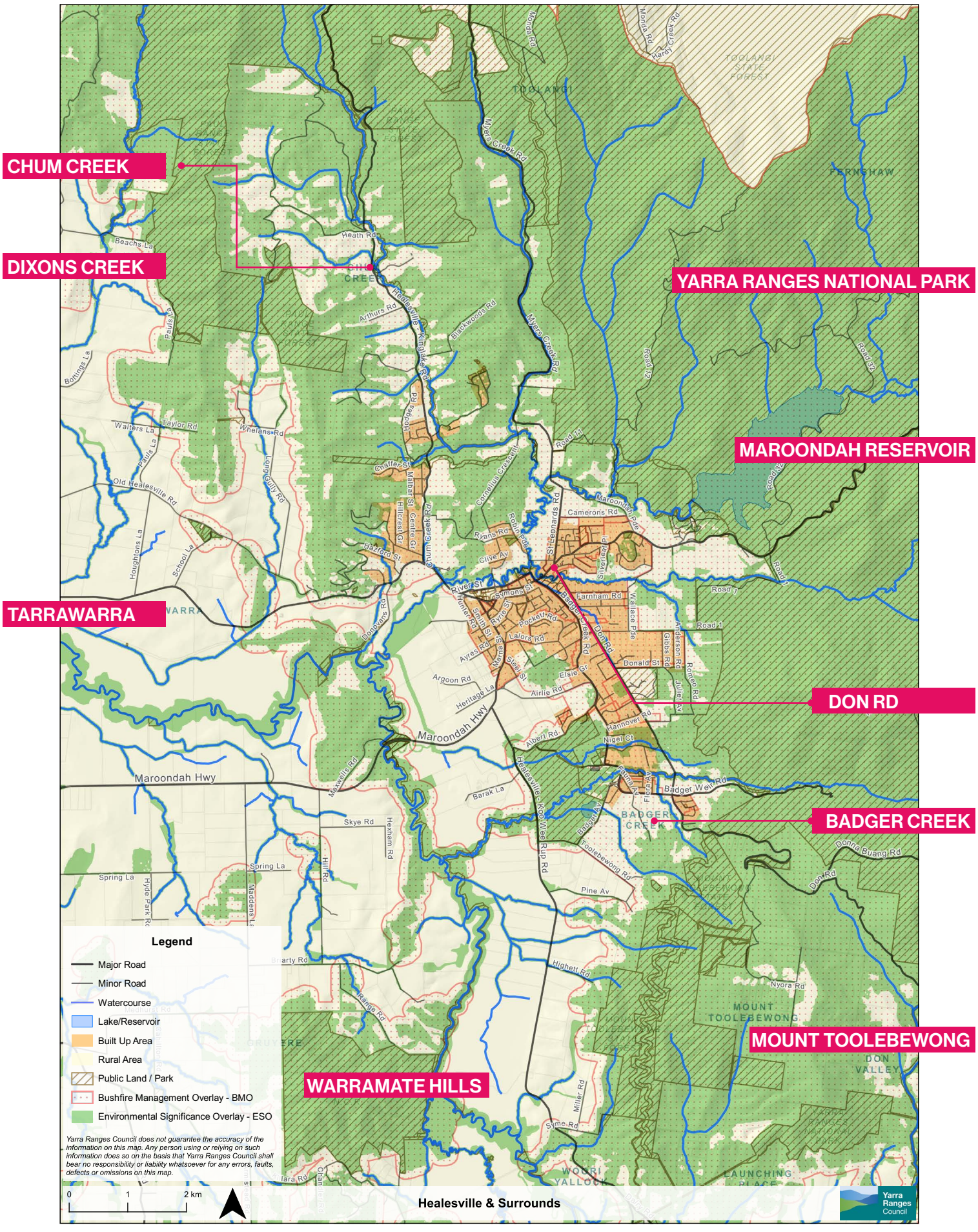
1.1 Introduction

The Healesville Community Emergency Group was established in 2017 under the then DELWP's (now DEECA) *Safer Together* program. A Bushfire Planning sub-group was established early 2023 supported by the Yarra Ranges Council's Emergency Management Team under a Federal Government *Preparing Australian Communities* grant, in liaison with the Country Fire Authority, Forest Fire Management Victoria and Traditional Fire Practitioners.

The project's purpose was to develop a community led and supported landscape management plan, based on the latest science on fire behaviour and ecosystem responses, to encourage individual and cooperative actions by land-owners and managers to reduce the severity of the impacts of bushfire on the communities of Healesville and its surrounds.

It is recognised that, whilst improved capacity for the rapid suppression of fires to reduce their impact on people, property and ecosystems will require a large increase in resources (personnel and equipment), this plan focusses on preventative actions that can be undertaken by land owners and managers.

HEALESVILLE & SURROUNDS MAP



1.2 Goal & Scope

GOAL The landscapes of Healesville and its surrounds are managed to minimise the impact of bushfire on people, property and ecosystems.

To meet this goal the plan covers postcode 3777 within the Shire of Yarra Ranges, includes private and public land and covers all types of landscape interventions, not just fuel reduction. The area covered by this plan is within the traditional lands of the Wurundjeri people of the Kulin Nation.

This plan is based on the following premises:

- The eucalypt forests of the Healesville district are fire-prone but adapted to natural fire regimes. Fire has a vital role in maintaining the diversity of many ecosystems and is a key factor in the life history of many species, both flora and fauna. The impact of fire varies with its intensity, the season and the state of the ecosystem at the time of the fire.
- Across Australia inappropriate fire regimes (too intense, too frequent, too large in scale) have contributed to major losses of biodiversity and is a listed threatening process for many declining species under the Fauna and Flora Guarantee Act.
- Settlements in the Yarra Valley are dispersed. Unmanaged grasses across modified landscapes and the proximity of many assets to bushland makes people and property very vulnerable to the impacts of bushfire. The Healesville district has suffered loss of life and assets on many occasions since the area was settled by colonists.
- Fires are started either by lightning over which we have no control or by human activities (arson, escaped burns, technological failures) which are potentially preventable.
- Climate change is increasing the frequency and scale of heat waves and droughts and the associated frequency and severity of bushfires.
- Application, to modified rural landscapes, of the Fuel Management Zones developed for forested public land, while focussed on keeping town centres safe, leave outlying settlements and agricultural enterprises vulnerable to bushfire.
- For millennia Aboriginal societies have managed fire-prone landscapes through the skilled use of fire to improve local amenity (safety, access) and productivity (food, fibre and medicines), maintaining a mosaic of biodiverse landscapes in early stages of succession, culturally recognised as healthy country. These indigenous land management practices provide a model for the management of landscapes around settlements in ways that support biodiversity while reducing the likelihood of fires starting, spreading and intensifying.
- The landscapes reported by the first European explorers and settlers were a mosaic commonly consisting of managed ecosystems and old-growth forests that were naturally less flammable than the disturbed landscapes of today.
- Voluntary participation in landscape management across private lands by informed landholders and community groups in combination with agency programs has long-term potential to be effective in reducing the impact of fire.

Accordingly, this plan recommends a three-pronged approach to the mitigation of impacts from fire based on the best available science on fire behaviour and ecosystem responses:

- **Fuel reduction** close to assets and along strategic firebreaks
- **Landscape modifications** across open landscapes that slow wind speeds, provide ember traps and radiant heat shields to protect assets (buildings, infrastructure, pasture, crops, livestock)
- **Protection of regenerating forests** to allow them to mature to a less fire-prone and biologically more diverse state.

1.3 Structure of the Plan

Appropriate sets of impact-reduction strategies are proposed to cover the following three major land-use categories rather than the fuel management zones designed for use across public land to protect town centres:

All constructed buildings and infrastructure and a low-fuel space around them, wherever they are situated, including town centres, outlying settlements, rural properties.

OBJECTIVE 1

Houses and critical community facilities are designed, retrofitted and maintained with a low-fuel space around them to minimise the impact of bushfire on people and property.

All other assets in modified rural landscapes — pastures, crops, vineyards, orchards, plantations, livestock, golf courses, racecourses, parks.

OBJECTIVE 2

Modified rural landscapes surrounding Healesville are managed to reduce the likelihood of a bushfire igniting, to slow a fire's spread, reduce its intensity and improve access for suppression/firefighting with minimum impact on biodiversity and ecological function.

The woodlands, forests, wetlands, natural grasslands and the wildlife they support across both private and public land.

OBJECTIVE 3

Areas of natural ecosystems on public and private land throughout the landscape are managed to reduce the impact of fire in ways that (a) support biodiversity and ecological functions and (b) do not increase the fuel hazard.

1.4 Situation Analysis

The Landscape

This plan covers the catchments of Long Gully Creek, Chum and Myers Creeks, Watt's River, Grace Burn and Picaninny Creeks, Coranderrk (Badger) Creek and minor drainage lines flowing from the western slopes of Mount Toolebewong to the Birrarung (Yarra River).

The valley floors and foothills of these sub-catchments are largely cleared but contain remnants of original vegetation, especially along streams, while most of the upper catchments of the Watts River, Grace Burn and Coranderrk Creek to the east are forested water reserves and/or national park. The upper parts of the Long Gully, Chum Creek and Myers Creeks to the north and west and Mount Toolebewong to the south-east have private properties with intact forest, some properties bordering State Forests.

The forested lower slopes are predominantly vegetated with drier stringybark forest associations, with damp forest in gullies. Wet forests of Mountain Ash predominate in the Watt's and Grace Burn catchments and Cool Temperate Rain forest occurs in sheltered locations.

See the Healesville & Surrounds Map of the area covered by this plan - PAGE 5.

Climate and Weather

The area's climate is Cool Temperate with wet Winters and Spring and dry Summers. Annual rainfall increases from west to east as south-westerly fronts encounter the slopes of the Dividing Range. The BOM weather station at Coldstream has recorded a long-term average of 745 mm/a to 2021. Long term average rainfall for Badger Creek up to 1990 was 1006 mm/a. Recent local data for Healesville from 2014-2020 shows annual rainfall varying from 650 mm to 1150 mm averaging 800 mm, with January being the driest month, averaging 57 mm and October being the wettest, averaging 106 mm.

A Fire Restrictions period is usually declared early in Summer, the start date depending on the weather over the preceding Spring. Under wet La Nina conditions a start to the fire season may be delayed while El Nino and a run of drought years can require an early start to the declared period

Bushfire Risk Analysis

Fires are most likely to start under hot and dry north/north-westerly winds as high-pressure systems move across the state, exacerbated by late south-westerly changes which can spread a fire front.

Forested landscapes to the north and north-west of Healesville pose the greatest threat of impact from bushfires that start in or spread into inaccessible terrain, but the district remains vulnerable to spot fires that can develop into major fronts, fanned by strong winds, that can rapidly spread across open landscapes where dry grass is the primary fuel.

Ember attack is densest in and close to forest but spot fires can be ignited by glowing embers and burning firebrands many kilometres ahead of a fire front under the worst fire conditions — 33 km recorded in February 2009.

Bushfire History

Healesville has been threatened by bushfire in 1890, 1893,1895,1905 and 1926 and was ringed by fire in the week leading up to Black Friday in 1939 burning through Toolangi, Chum Creek and Badger Creek (Symmonds 1982).

In January 1962 there was a fire in the Christmas Hills, a house fire started a bushfire in Chum Creek and another spot fire that started in the Sanctuary's Coranderrk Bushland burnt most of that reserve and half the public area before spreading east to Mount Riddell and Mount Toolebewong and south to Woori Yallock with several fatalities. Several fires followed in April that year when burn-offs escaped in Long Gully, Myers Creek and Badger Creek (Broman 1992).

Not all of these 1962 fires are acknowledged in DEECA's fire history lists or maps.

The Ash Wednesday fires in 1983 did not directly impact the Healesville area, but demonstrated the catastrophic dangers of south-westerly wind changes in other parts of Victoria where a total of 47 people died and 2000 homes were lost.

The Black Saturday fires of February 2009 started with power line failures at Kilmore East and, driven by very strong hot north-westerly winds, at the end of the millennial drought and several days of mid 40's temperatures, rapidly spread through Kinglake causing devastation in Steels Creek, Dixons Creek and Chum Creek. In our area much of the damage and loss of life was caused by the late afternoon south-westerly wind change. That change saved Healesville from direct impact but spread the fire into the Maroondah Dam catchment where it burned for 3 weeks during which time the town was on constant ember alert, but without further loss of life or houses.

See Fire History Map of the area - PAGE 10.

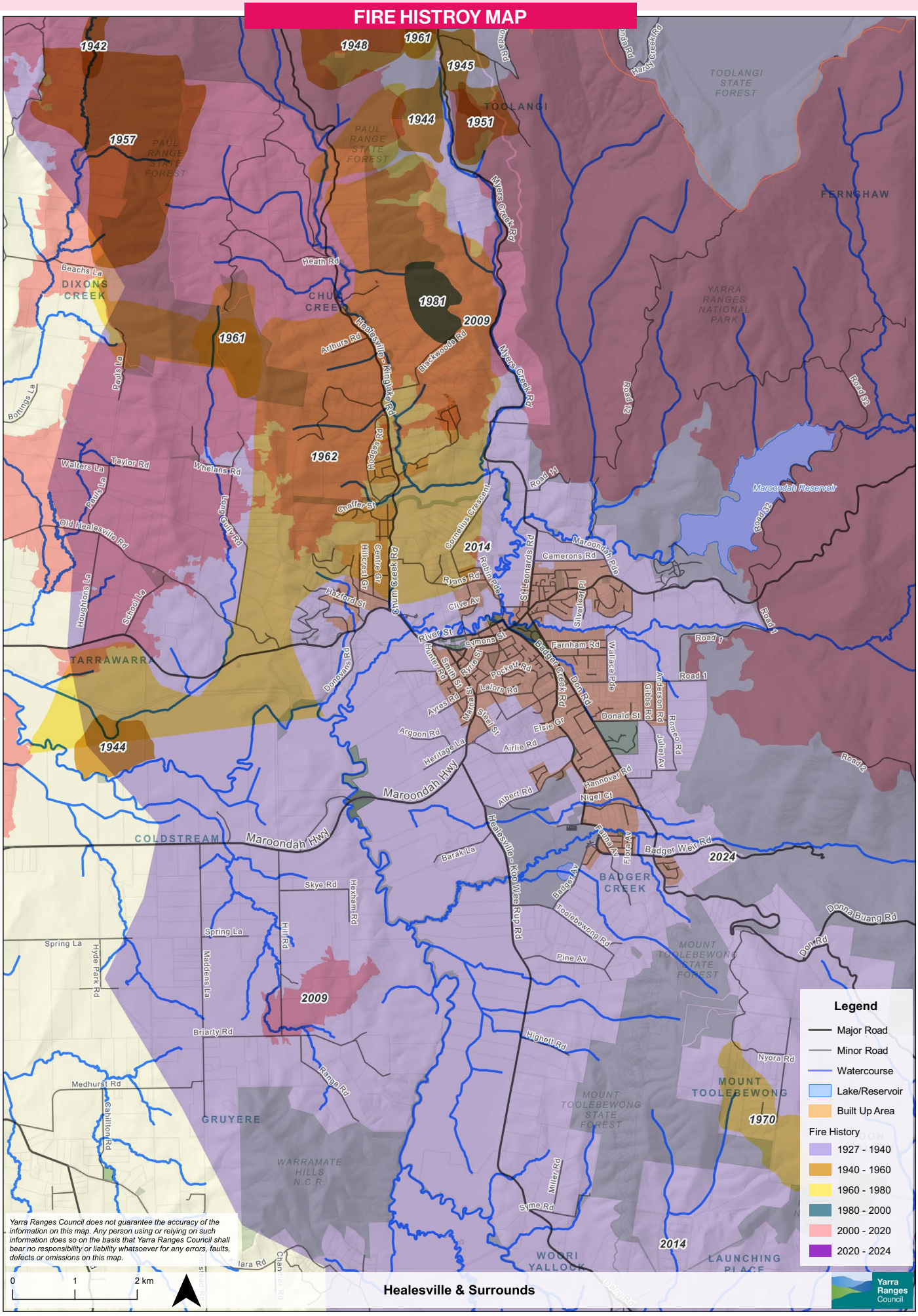
Threatened Species and Ecological Communities

Of the 21 broad ecological communities – Ecological Vegetation Classes (EVCs) occurring in the plan area, 5 are classed as *Vulnerable* (Riparian Scrub, Valley Grassy Forest, Swampy Riparian Woodland , Grassy Forest, Creekline Herb-rich Woodland), Damp Heathy Woodland is Depleted, Riparian Thicket and Blackthorn Scrub are *Rare* and 3 are *Endangered* (Riparian Floodplain Woodland, Cool Temperate Rainforest, Swampy Riparian Complex). Wet Forest (EVC 30), is considered of *Least Concern* by the Victorian government, but meets IUCN criteria for Critically Endangered status (Burns et al. 2015). See table in Appendix 1 for areas within postcode 3777 covered by each EVC.

In addition to ecological communities, endangered plant and animal species occur within the plan area. Endangered mammals include Eastern Bent-winged Bat, Southern Greater Glider, Leadbeater's Possum, and Spot-tailed Quoll. Endangered birds include Barking Owl, Sooty Owl, Grey Goshawk, White-throated Needletail, and Gang Gang Cockatoo. Endangered reptiles include Lace Monitor and Swamp Skink. Endangered amphibians include Brown Toadlet and Southern Toadlet. Endangered plant species include trees *Acacia nanodealbata*, *Eucalyptus fulgens*, and *E. yarraensis*; shrubs *Grevillea repens* and *Pomaderris vaccinifolia*, herbs *Dianella callicarpa* and *Tetratheca stenocarpa*, and the fern *Lindseae microphylla*. Endangered insects and other invertebrates are also present in the region.

Bushfires, logging and fuel reduction burns in forests destroy old, hollow-bearing trees and prevent their formation by reducing the likelihood of trees surviving to 100+ years of age (Mountain Ash need 120 years to start producing hollows). Loss of large hollow-bearing trees from native forests is a threatening process under Victoria's Flora and Fauna Guarantee Act. Hollow-dependent wildlife populations (Leadbeater's Possum, Greater Glider, Owls, Cockatoos) are directly threatened by lack of denning and nesting sites and increased exposure to fire and physical disturbance. A study of Gippsland forests by Bluff (2016) demonstrated that planned burns increased the collapse risk of hollow-bearing trees. Attached to that report are detailed management options for their retention.

FIRE HISTROY MAP



The Special Case of Zoos Victoria's Healesville Sanctuary

Healesville Sanctuary is a significant (Tier 1) State asset that is vulnerable to bushfires. Particular values and considerations for bushfire emergency preparation and response are:

- There are highly valuable populations of Critically Endangered fauna at the Sanctuary that form part of recovery programs for the species. Some (eg Helmeted Honeyeater, Lowland Leadbeater's Possum and Orange-bellied Parrot) could not be replaced if lost, and their loss would put survival of those taxa in the wild at risk, with extinction a likely outcome. The Sanctuary has important captive-breeding populations of 12 endangered species.
- The Australian Wildlife Health Centre is Victoria's largest wildlife hospital and treats about 2,000 cases every year. Its facilities and staff are bushfire response assets and Zoos Victoria is a Support Agency for wildlife emergencies under the Emergency Response Act.
- The Sanctuary is open every day of the year. The number of visitors can vary between a few hundred and over 6,000, with numbers generally lower (<1,000) on hot days. The level of bushfire awareness amongst Sanctuary visitors is likely to be low. Most visitors are from Melbourne but there is a strong proportion of international visitors who have no understanding of bushfire risk and management. They are particularly vulnerable to bushfires. The Sanctuary is closed on days rated as Catastrophic fire risk.
- The Sanctuary's Coranderrk Bushland Reserve is a significant remnant of potential Helmeted Honeyeater habitat.

1.5 Implementation, Monitoring and Review

To assist in uptake of the plan HCEG will investigate the dissemination of resource materials through community outlets, environment and landcare groups, public forums, workshops and field trips.

An assessment of how the plan is being used is to be undertaken through a survey of community and stakeholder groups 12 months after finalisation and distribution of the plan. The plan may be reviewed and updated in the light of the survey results.

2.

GUIDELINES for PROTECTING BUILT ASSETS

2.1 Context

Over a period of 110 years (1901 - 2011) in Australia ~80% of fatalities and ~ 60% of house losses occurred within 30 m of forest (Blanchi et al 2014).

Ember attack often occurs well ahead of a major fire front and is a major contributor to house loss (Tolhurst and Howlett 2003). Embers can enter roof spaces through roofing gaps and open eaves, lodge in crevices and sub-floor spaces, ignite combustible materials adjacent to or under buildings and through broken windows. Fire fronts or radiant heat rarely start house fires and roof space fires may not take hold until after a fire front has passed through (Webster 2000).

State Government Vegetation Clearing Exemptions. Clearing of all vegetation is allowed without permit for 10 m from residential buildings and all understory vegetation may be cleared up to 30 m from residential buildings increasing to 50 m under a Bushfire Management Overlay. These exemptions apply to dwellings constructed or approved under permit before 10th September 2009. For buildings constructed after 10 September 2009 building or planning permit conditions apply.

YRC Planning Scheme. The majority of 3777 postcode comes under Council's Bushfire Management Overlay (BMO) which regulates the types of developments permitted in areas subject to impact by bushfire.

New buildings and major modifications to existing buildings greater than 50% must meet Bushfire Attack Level (BAL) ratings standards, including allowable vegetation within the defendable space (*www.yarraranges.vic.gov.au/Development/Planning*).

YRC Local Law. In residential areas in and around Healesville (zoned Bushland under the Local Law) Open Air Burning for fuel reduction or biosecurity is permitted on Mondays, Thursdays, Fridays and Saturdays, no burning during June and July. No fires may be lit without a permit during the Declared Fire Danger period or on Total Fire Ban days. Conditions apply (*www.yarraranges.vic.gov.au/myneighbourhood*).

PREPARE YOUR PROPERTY FACT SHEET
www.cfa.vic.gov.au
/plan-prepare/how-to-prepare-your-property/clearing-trees-and-vegetation.

NO FIRES may be lit without a permit during the Declared Fire Danger period or on Total Fire Ban days.

2.2 Mitigation Measures for Buildings and Their Surrounds

Design and Retrofit Measures:

There are many actions that landholders can take to improve the survival of their buildings in the event of a bushfire. These are primarily aimed at reducing the risk of embers entering buildings or the risk of fuels immediately adjoining buildings catching fire which then spreads to the building itself.

Some examples are:

- Install a raised water tank on leeward side of buildings to provide gravity fed water
- Where possible have a large pond or pool on the fireward side of building
- Establish perimeter sprinklers and roof sprinklers supplied by a stand-alone water supply independent of mains power
- Seal all gaps in roofing materials and box in all eaves to prevent embers entering the roof space
- Use paving or gravel near walls, not woody mulch
- Clear all flammable materials within the 10 m zone around buildings and minimise flammable vegetation in the 30/50 m zone
- Remove tall shrubs in front of windows and all vegetation in contact with buildings
- Install shutters or wire screens on all windows to reduce risk of glass shattering
- Plant fire-retardant shrubbery and trees as radiant heat shields and ember traps beyond the 30 m zone and install irrigation to prevent excessive leaf drop in hot and dry conditions.

Prior To and During Each Fire Season:

- Remove leaf litter from gutters
- Clear dry grass, leaves, twigs and bark from the ground within 50 m of buildings
- Prune lower branches of any flammable trees and shrubs to 2 m within the 30/50 m zones
- Cut back branches over-hanging roofs
- Remove all flammable materials (firewood piles, door mats, etc) adjacent to buildings
- Keep lawns closely mown and irrigated
- Remove or rake mulch to create gaps in un-irrigated gardens to reduce risk of spot fires spreading
- Check irrigation systems and fire pumps to ensure they are working.

Join or start a Community Fireguard Group.
CFA facilitation is available to set up and support new groups.

2.3 Resources — Some Useful Resources for More Detailed Guidance on Appropriate Mitigation Measures:

Bushfire Resilience Webinars
www. bushfireresilience.org.au

CFA 2021.
Your Guide to Property Preparation.

Community Fireguard Handbook. CFA.
Contact email for further information:
yarra-summerprograms@cfa.vic.gov.au

Living in the Bush: Bushfire survival plan workbook. CFA.
See chapter 2 'Preparing your property for bushfire'.

Landscaping for Bushfire: Garden Design and Plant Selection. CFA.
www.cfa.vic.gov.au
/plan-prepare/how-to-prepare-your-property/landscaping]

The Complete Bushfire Safety Book. Webster, J. 2000.
Random House, Sydney.
See chapters 5 - 8.

Essential Bushfire Safety Tips, 3rd Ed. Webster, J. 2021.
Melliodora Publishing, Hepburn.
2nd ed updated in 2012 after the 2009 Black Saturday fires, re-published in 2021.
See chapters 4 - 9.

3.

GUIDELINES for PROTECTING RURAL ASSETS

3.1 Context

Major fires in our region demonstrate the following patterns:

- Prevailing winds under fire weather conditions in the Yarra Valley will generally be north to north-westerly initially and then south-westerly following a change, but local wind patterns can be influenced by topography and fires move faster up slopes.
- Fires can create their own weather systems under extreme conditions. The fires that occur on these extreme days are those that result in most loss of life and property.
- South-westerly wind changes that turn narrow fire fronts, burning under a northerly or north-westerly wind, into broad ones, can have major impacts on life and property as happened in the Yarra Valley on Black Saturday 2009.
- Spot fires can develop many kilometres ahead of a fire front, catching people unaware. They can quickly develop into large fires that threaten life and property in their own right, or coalesce with other spot fires or with the main fire front.

Grass fires can travel much faster than bush fires across open country (*www.thebushfirefoundation.org/grassfires-rural*). Wind speed is a factor that can be modified by appropriate shelter belt and windbreak plantings across open landscapes.

Multi-purpose shelter belts that moderate winds also benefit livestock, crops and pastures, provide habitat for wild life, bee fodder, firewood, posts and poles for farm use (Holmgren 1994). Tree planting on farms needs to be done carefully so that fire risks are properly managed (Lindenmayer et al 2022).

Tall dense shelter belts are more effective at slowing wind speeds than porous ones and longer belts reduce the influence of winds eddying around their ends. Winds can be moderated for a distance 15 - 20 times the height of the trees in the belt (Bird, et al 2007, Turner 2020). Windbreaks should be multi-rowed and sloped on the windward side to help lift winds rather than blocking them to, reduce turbulence.

Low flammability native plants, either indigenous or non-indigenous, such as smooth-barked gums and naturalised wattles, can provide wildlife habitat and ecological function. These can be useful in reducing the impact of fires when used in shelter belts located between intact native vegetation away from assets and exotic plantings nearer to and around assets.

Responsible property management benefits neighbours but lack of appropriate management increases threats from fires on and beyond property boundaries. Community Fireguard and Landcare groups enable local cooperative management of these risks.

YRC Local Law — Open Air Burning Rural Properties. Fuel reduction or biosecurity burning is allowed without permit at all times except during the declared Fire Danger Period or on Total Fire Ban days. Conditions apply (yarraranges.vic.gov.au/myneighbourhood).

CFA requirements — CFA tanker road access requirements are set out in CFA-BMO-Access_March 2023.pdf (*www.cfa.vic.gov.au*). Water tanks must be fitted with a CFA coupling.

YRC Vegetation Management

Council has several programs relevant to bushfire planning:

- Roadside fuel reduction through removal of "woody weeds" and slashing ahead of the fire season. Slashing of roadside vegetation has a short-term benefit in reducing fuel loads ahead of each fire season but can eliminate native plants and encourage weedy grasses.
- Revegetation through the Ribbons of Green program which provides plants to improve habitat for wildlife on properties larger than 1 ha. This program is sensitive to the need to not increase fire risk, eg not planting within 50 m of buildings.
- Firestick. Traditional cultural burning is being promoted within the shire. It has very high potential as a land management tool with multiple benefits — embedding of traditional cultural approaches to caring for country, biodiversity support and fuel reduction. Adapted low impact ecological burning with fuel reduction as a priority and improved biodiversity as an outcome may be an option for roadsides.
- Biolinks. Plans to develop a biolinks program arising from the 2023 Nature Plan will need to minimise potential increased fire risk, eg by pursuing multi-purpose plantings in conjunction with shelter belts and windbreaks and avoiding roadside plantings that can compromise roads as strategic firebreaks.
- Revegetation on public land. Council supports community groups and environmental volunteers to improve habitat on public land.

Other Revegetation Programs

Funding through Melbourne Water, Birdlife Australia, Eco Vineyards, Landcare Victoria and other state and federal grants is available to landowners for revegetation of habitat. As above, these plantings need to ensure an appropriate balance between habitat improvement and bushfire risk. As these programs are rolled out the need for good coordination between program deliverers and compliance officers will increase. Support for community groups to provide educational and training opportunities (workshops, field days) would ensure that all benefits and risks are fully understood.

3.2 Mitigation Measures for Modified Landscapes Beyond the Building Envelope

Roadside Management

- Avoid plantings of trees or tall shrubs of the highly flammable Myrtaceae (eg. *Kunzeas*, *Caliistemons* and *Leptospermums*) under power lines.
- Reduce existing Burgan (*Kunzea leptospermoides*) as well as hazardous trees under and near powerlines.
- Maintain patches of high quality remnant vegetation but, where appropriate, alternate these with low-fuel patches to reduce rapid fire spread, as follows.
- Manage degraded patches of native vegetation with low intensity planned burning to keep fuel levels low and encourage biodiversity. Avoid slashing which encourages weed invasion.
- Use less flammable native plants such as Dianellas and Lomandras in roadside revegetation to create low-fuel patches that can provide strategic firebreaks.
- Maintain close-mown verges in the immediate vicinity of built assets adjacent to roadsides.
- Along disturbed rural road-sides retain existing low-flammable naturalised natives such as Cootamundra Wattles (*Acacia baileyana*) where they pose little risk of spreading to bushland.
- Along road-sides adjoining bushland where there is dense post-bushfire regrowth reduce the number of stems of shrubs and tree saplings that create elevated fuels to create low-fuel gaps, leaving selected saplings to replace canopy trees as they senesce.

Private Property

- Construct shelter belt/windbreaks to slow fires that are spread by the prevailing winds associated with bad fire conditions. These should be planned with an understanding of local fire behaviour but will generally be with an east-west orientation. Dense shrubs and small trees on the windward side should be permanently protected from browsing to prevent tunnelling of wind below the belt, with tall trees providing stock shelter and grazing on the lee side.
- On larger properties protect and/or restore native vegetation in shelter belts well away from assets.
- Closer to built assets establish green firebreaks to trap embers and block radiant heat using low-flammability natives such as Boobialla (*Myoporum insulare*), Muttonwood (*Myrsine howittiana*), non-invasive exotic evergreens with shiny, reflective leaves such as Camellias and Photinias, and deciduous species. Consider using deciduous species that can be managed for stock fodder.
- Locate ecological restoration plantings as wildlife corridors in ways that minimise the potential impact of fires, eg away from roadsides and built assets.
- Provide strategic mineral firebreaks (roads, paths, ploughed strips) to interrupt fire spread and provide access for suppression. Where appropriate incorporate existing features such as dam walls. Fuel breaks parallel to prevailing winds can help slow the lateral spread of fires that enter rural properties.
- In conjunction with shelter belts, over the fire period, maintain closely grazed pastures close to built assets, large enough to enable stock to avoid radiant heat.
- Provide adequate and reliable water supplies for irrigation close to assets and for the suppression of fires when they occur — tanks on all buildings and, where the terrain is suitable, construct small dams across gullies to provide water collection points for fire-fighting across the property.
- Consider the construction of swales (shallow ditches on contour) to intercept and spread overland flows of rainwater runoff, particularly above the head of gullies, to improve the hydration of pastures and reduce gully erosion. Support these with check dams and/or leaky weirs (hay-bales, etc) in the gullies to trap silt and slow water flow.
- Provide incentives for landowners to create and maintain wetland patches that can provide green firebreaks as well as filters for farm storm-water run-off.

3.3 Resources — Some Useful Publications and Websites for More Detailed Guidance on Appropriate Mitigation Measures and Fire Preparedness:

Shelterbelts for fire protection. Bird, R. 2010. Victorian Landcare and Catchment Management 49: 18-20.

Your Guide to Farm Fire Safety. CFA 2022.

Bushfire Fuel Management Guide for the Protection of Townships and Settlements. www.safertogether.vic.gov.au ›pdf_file

How to prepare your property. CFA 2023. www.cfa.vic.gov.au /plan-prepare/how-to-prepare-your-property.

Planting Trees for Living Firebreaks. Thamo, A. 2020. www.smalltreefarm.com.au /Trees-as-Living-Firebreaks.pdf

Essential Bushfire Safety Tips, 3rd Edn. Webster, J. 2021. Melliodora Publishing, Hepburn. (chapters 16, 18)

Natural Asset Farming: Creating productive and biodiverse farms. Lindenmayer, D.B., S.M. MacBeth, D.G. Smith, and M.L. Young. 2022. CSIRO Publishing, Melbourne

Bushfire Resilience Webinars www. bushfireresilience.org.au

The Complete Bushfire Safety Book. Random House, Sydney. Webster, J. 2000. (Chapter 7, but note some recommendations around prescribed burning are now out-dated)

Turner, D. 2020. www.thecrossingland.org.au /wp-content/uploads/2020/08/Fire-Retardant-Shelterbelt-Design-Notes-for-SE-Australia-by-Dean-Turner.pdf.

Some recommendations are specific to south coastal NSW.

4.

GUIDELINES for PROTECTING NATURAL ECOSYSTEMS

Remnant bushland, bushland reserves, riparian corridors, public forests, water catchments.

4.1 Context

Fire Ecology

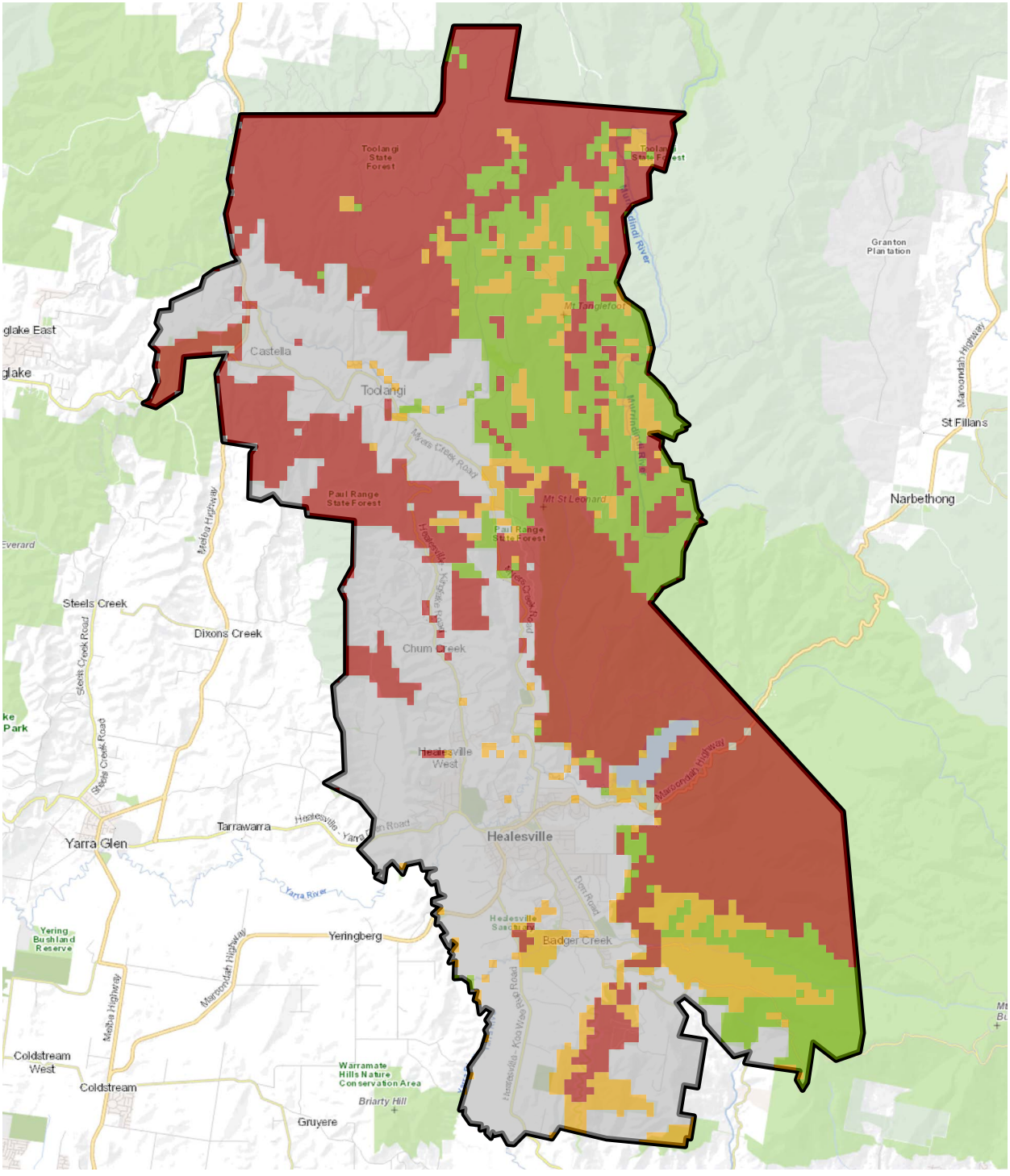
Scientific research over recent decades has shown that:

- Plant communities have varying tolerances to fire. Fire frequencies that are too high or too low threaten Victoria's biodiversity by changing the composition and structure of vegetation communities. Tolerable Fire Intervals (TFIs) have been assigned to broad plant communities in Victoria to guide the frequency and severity of planned burns to ensure ecological sustainability, with a caveat that "A precautionary approach must be taken in all considerations of recommended tolerable fire intervals when deriving ecological fire plans" (Cheal 2010). Appendix III shows the fire history with large areas below minimum TFIs. Appendix IV summarises ecological information in relation to fire for all of postcode 3777.
- Elevated fuels and the nature of the vegetation, not surface litter mass, influence the rate of spread and intensity of fires under the worst fire conditions (Zylstra et al 2016).
- Old growth forests are less flammable than regrowth forests (Taylor et al 2014, Furland et al 2021, Wilson et al 2018). Locally, post-colonisation fire regimes (bushfires and prescribed burning), in combination with large-scale post-logging regeneration burns and post-fire salvage logging, have significantly changed both the structure and floristics of our native vegetation. They have severely depleted levels of long-unburnt forests, impacting hollow-dependent wildlife (Lindenmayer et al 2015) and increasing their vulnerability to fire due to elevated fuel levels in the regenerating forests (Lindenmayer & Zylstra 2024). Whilst many birds can exploit post-fire successions, small mammals are more vulnerable and reptiles are more diverse and abundant in long-unburnt forests (Dixon et al 2018).
- Current hazard reduction in bushland using prescribed burning reduces the likelihood of fire for a brief period only (Penman & York, 2010, Collins et al. 2023) with fuel loads increasing and, depending on the vegetation type, remaining at elevated levels for 5 - 25+ years until self-thinning of dense regrowth begins to reduce that fuel load (Clarke 2020, Zylstra, et al 2022). Lindenmayer and Zylstra (2024) summarise the evidence documenting and explaining the mechanisms underpinning the pulses of flammability that follow disturbances.

HEALESVILLE & SURROUNDS MAP

Tolerable Fire Intervals in 3777 area

FOREST FIRE MANAGEMENT VICTORIA



Legend

Postcode

Postcode 3777

FAME_TFI

TFI 2024

No TFI information

Within TFI

Below Min TFI

Above Max TFI

<all other values>

0 2.5 5

Kilometers

N

1:110,000

Spatial Reference
Project Coordinate System: **GDA2020 Vicgrid**
Geographic Coordinate System: **GDA2020**
Datum: **GDA2020**
Projection: **Lambert Conformal Conic**

Spatial data is sourced from the Victorian Spatial Data Library (VSDL).
Map produced by Forest Fire Operations Division Port Phillip November 2024

- Less than 2% of Victoria's old-growth mountain ash forests are left (Lindenmayer et al 2015). Indigenous cultural burning in these ash forests was unlikely to have been widespread pre-colonisation (Lindenmayer & Bowd 2022, Lindenmayer et al 2024). They are now at risk of collapse and need less fire rather than more into the future (Lindenmayer & Taylor 2020, Lindenmayer, Taylor & Bowd 2022). Lindenmayer and Zylstra (2023) argue for improved methods of rapid fire detection and suppression to give these forests time to develop the fire-inhibitory properties of older, less-flammable stands, through natural thinning.
- Bushfires and hot prescribed burns result in dense regrowth of short-lived wattles (Acacia spp) that are prominent in post-fire successional stages. Though these leguminous species can contribute to elevated fuel levels for a short period Denham (2023) argued they are best left to contribute to post-fire regeneration and allowed to die out naturally.
- Regrowth forests transpire at greater rates than old-growth, reducing water yields in catchments (Vertessy et al 2001). This is relevant to the management of local water catchments for community benefit and informs Melbourne Water's focus on access and early suppression of fires rather than fuel reduction.

Fire Impact on Ecosystems

Fire can impact natural ecosystems both positively and negatively.

- In some plant communities, eg heathlands, adapted wildlife species rely on the pulses of productivity of the seral stages following disturbance, however such communities are not a concern in our area.
- The accumulation of litter in forests forms a protective layer for soils and its decomposition is critical to the recycling of nutrients (Sayer 2006). Litter mass increases in the absence of fire until equilibrium between accumulation and decomposition is reached (Olsen 1963). In our eucalypt forests litter is habitat for fungi, invertebrates and terrestrial invertebrate feeders such as lyrebirds and antechinuses. Fires which remove this litter layer expose soils to erosion and have significant short term impacts on litter-dependent biota.
- As well as removing surface litter fires of all severity have longer term impacts on biodiversity and ecological function by burning hollow logs, stumps and tree hollows, depriving wildlife of critical habitat and exposing survivors to increased predation immediately post-fire, effects being directly related to the scale of the disturbance. Whilst some species are able to exploit post-fire regeneration others may not be able to recolonise for decades (eg Dusky Antechinus, which feed in leaf litter, take up to 10 years to re-occupy burnt areas (Baker & Mutton in Baker & Gynther 2023). Recolonisation of burnt areas can be aided by the close proximity of unburnt patches which serve as biotic refuges.

Fire Impact on People and Assets

- Fuel reduction measures close to assets have most effect in reducing the likelihood of a house catching fire (Price et al 2012). Fuel reduction away from assets has little influence on the likelihood of assets being lost (Florec et al 2020, Gibbons et al 2020). See Clarke 2020 for a summary of relevant research.
- Smoke from bushfires, prescribed and regeneration burns impacts (a) the respiratory health of residents and (b) the wine industry as smoke contaminates ripening fruit and taints that vintage.

Effects of Fuel Management Practices on Fire Severity

- **Prescribed Burning.** In a study of the 2009 Black Saturday Victorian fires Gellie & Mattingley (2013) found that under severe and catastrophic fire weather conditions, in heat-wave desiccated forests, relatively small (30-300 ha) and disjunct prescribed burning blocks more than 2 - 4 years old had minimal impact on reducing the spread, spotting, intensity, and the final size of fires which either overran or bypassed most if not all recent fuel treatments. Under high to very high fire weather conditions only prescribed burns less than 3 years of age and with a size more than 600-1000 ha, located on flat or undulating terrain, had any significant effect on reducing the severity of these extreme fires.
- **Mechanical Thinning.** The efficacy of thinning depends on fire severity, the type of forest and its age and can lead to elevated fire severity (e.g. soon after thinning for crown burn and in older forests for crown burn/crown scorch) and hence have opposite effects to those intended from such activities (Taylor et al 2021). Ecosystems are best protected to allow natural thinning over time to reduce fire risk (Zylstra et al 2022).

Restoration of Indigenous Land Management Practices

- Lindenmayer and Bowd (2022) argue an urgent need for close working partnerships between First Nations land managers and Western scientists to develop appropriate site-specific uses of fire, for multiple benefits.

4.2
Mitigation Measures for Areas of Natural Bushland.

Private Property

- In remnant bushland patches near assets rake litter 2-5 m from around large old trees, particularly stringy-barked and ribbony-barked eucalypts and all trees with hollows.
- Create fuel breaks by raking and wind-rowing litter across contours for 10-20 m inside boundaries of intact vegetation. Contouring reduces ignition risk and minimises erosion.
- In areas with high elevated fuel loads (tall grass, shrubs, suspended bark and twigs) near assets create patches of low fuel through low-intensity autumn burning if that option is available under an approved community program.
- In high risk areas with high fuel loads, beyond the 50 m limit which is allowed for clearing native vegetation around residences, consider strategic understorey vegetation thinning to 100 m (may require a permit).

Public Lands

It is recognised that the following recommendations for public forests, based on recent science, will require a change in approach by land management agencies, a significant re-allocation of resources and increased funding.

- Further develop resources for early detection and suppression of fires to reduce the frequency and scale of their impacts on ecosystems that are likely under forecast climate change scenarios. These resources will need to be at a scale that returns fire regimes as close as possible to the historical ones, to which our ecosystems are adapted, in order to avoid major loss of biodiversity.
- Along access roads maintain strategic firebreaks in a low-fuel state by removing/reducing mid-storey elevated fuels/shrubs, hazardous and suspended bark and twigs, thinning tree saplings, periodic low-intensity burning to keep ground fuels at minimum levels, but retain canopy trees and selected replacement saplings to reduce wind funnelling.
- Avoid disturbance of regenerating forests beyond strategic firebreaks to allow them to self-thin and mature naturally to produce taller canopy trees with reduced elevated fuels and more stable and moister litter layers.
- Use low-intensity burns away from assets and strategic firebreaks, only where needed to improve biodiversity, at scales that create a mosaic of habitats at varying levels of maturity to allow rapid recolonisation of burnt areas and only where it is practical to protect hollow-bearing trees by raking litter away from their bases.

5.

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6.1 APPENDIX 1

Ecological Vegetation Class and Fire Ecology Information for Postcode 3777.

See next page for a summary of the data.

EVC Number and Name Note: 58.1% within Highlands Southern Fall Bioregion 41.2% within Highlands Northern Fall Bioregion 0.7% within Victorian Alps Bioregion	**Area of EVCs within postcode 3777 (Hectares)**	**Conservation Status***	**Tolerable Fire Interval** **Minimum Low Intensity** **(years)***	**Tolerable Fire Interval Minimum High Intensity (years)***	**Tolerable Fire Interval Maximum (years)***	**Sustainable Burn Rate **** Fire Cycle (Low Intensity)	**Recruitment Strategy** (Reference:- DSE EVC/Bioregion Benchmark for Vegetation Quality Assessment) (See Summary below)	**Fire Response** (Source:- DEECA, Risk & Evaluation Team, Port Phillip, 2024) (See Summary below)
16 - Lowland Forest	1978.39	Least Concern	8	25	60	34 years	Continuous	Fire Dependent
17 - Riparian Scrub/ Swampy Riparian Woodland Complex	242.29	Vulnerable	15	20	90	52.5 years	Continuous	Fire Sensitive
18 - Riparian Forest	1149.69	Least Concern	30	30	150	90 years	Continuous	Fire Sensitive
20 - Heathy Dry Forest	746.83	Least Concern	10	15	45	27.5 years	Episodic /Fire	Fire Dependent
22 - Grassy Dry Forest	330.25	Least Concern	10	15	45	27.5 years	Continuous	Fire Dependent
23 - Herb-rich Foothill Forest	4238.83	Least Concern	15	15	150	82.5 years	Continuous	Fire Dependent
27 - Blackthorn Scrub	0.5	Rare	12	20	80	45.5 years	Continuous	Fire Influenced
29 - Damp Forest	10027.39	Least Concern	25	25	150	87.5 years	Continuous	Fire Sensitive
30 - Wet Forest	10324.08	Least Concern***	80	80	300	190 years	Continuous	Fire Sensitive
31 - Cool Temperate Rainforest	844.62	Endangered	80	80	N/A	N/A	Continuous	Fire Sensitive
38 – Montane Damp Forest	132.08	Least Concern	25	25	150	87.5 years	Continuous	Fire Sensitive

39 – Montane Wet Forest	229.28	Least Concern***	80	80	300	190 years	Continuous	Fire Sensitive
45 - Shrubby Foothill Forest	1211.17	Least Concern	25	25	150	87.5 years	Episodic/Fire	Fire Sensitive
47 - Valley Grassy Forest	11.03	Vulnerable	10	25	100	55 years	Continuous	Fire Dependent
56 - Floodplain Riparian Woodland	45.42	Endangered	10	30	N/A	N/A	Episodic/Flood	Fire Sensitive
59 – Riparian Thicket	228.22	Rare	30	30	150	90 years	Continuous	Fire Sensitive
83 - Swampy Riparian Woodland	24.5	Vulnerable	20	30	150	85 years	Continuous	Fire Influenced
126 - Swampy Riparian Complex	525.32	Endangered	20	30	150	85 years	EVC126 Benchmark unavailable	Fire Influenced
128 - Grassy Forest	72.54	Vulnerable	10	25	100	55 years	Episodic/Fire	Fire Dependent
164 - Creekline Herb-rich Woodland	35.45	Vulnerable	15	15	150	82.5 years	Continuous	Fire Dependent
793 - Damp Heathy Woodland	232.19	Depleted	10	15	45	27.5 years	Episodic/Fire	Fire Dependent
Water Body – Man Made	176.66	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	O/A Total 32,806.73							
* Source:- DEECA, Risk & Evaluation Team, Port Phillip, 2024								
** Source:- DSE, Yarra Ranges Landscape Management Unit Fire Ecology Assessment Update 2012/2013								
***Note:- The Mountain Ash ecosystem is classified as Critically Endangered under IUCN Red List Criteria								

6.2 APPENDIX DATA SUMMARY

Summary of the Ecological Vegetation Class and Fire Ecology data presented previouse pages 28-29.0 for Postcode 3777.

Fire Response Summary for Ecological Vegetation Classes within Post Code 3777

75% of 3777 EVCs are Fire Sensitive. Fire Sensitive EVCs have not evolved with fire as a significant re-occurring process. Plant species existing within this EVC category lack adaptations to positively respond to fire and species mortality is high even if fire intensity is low. 23% are Fire Dependent. Fire Dependent EVCs are those where fire is an essential part of EVC development and the benchmark / key fire response species have evolved adaptations to respond positively to fire and to facilitate fire spread. 1.6% are Fire Influenced. This category includes EVCs that lie within the transition zone between Fire Dependent and Fire Sensitive EVCs. The EVCs in this fire response category contain plant species that are generally sensitive to fire but they also include some plants that respond positively to fire. (Reference: *www.researchgate.net/publication/228452939_Ecological_Fire_Management_in_North_East_Victoria*).

Recruitment Strategy and Ecological Burning Summary for Ecological Vegetation Classes within Post Code 3777

Over 90% of 3777 EVCs have a Continuous Recruitment Strategy. A Continuous Recruitment Strategy is where on-going recruitment of woody life forms would be expected to continue in between disturbance events. Fire is not usually required to promote recruitment in EVCs that exhibit a Continuous Recruitment Strategy. The Victorian Government (DSE) recommends the consideration of ecological burning as a management tool only in Ecological Vegetation Classes (EVCs) where regeneration is dependent on episodic fire events. An episodic/fire Recruitment Strategy is where no recruitment can reasonably be expected in the absence of such a recruitment event. (Reference:- DSE 2009, Standards for Management - Ecological Burning, BushBroker Information Sheet No. 14.

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