Fire and logging as a biodiversity threat with serious and potentially irreversible ecological consequences for the Rubicon State Forest

A combination of fire and intensive clearfell logging since 1980, and particularly since 2000, has created a predominantly young forest throughout the ash forests of the Central Forest Management Area. Compounded by the impoverishment of the understory by logging, this poses serious threats to the ecological integrity, processes and resilience of these complex and dynamic, biodiversity-rich mountain ecological communities, especially given the known trajectory of climate change and high risk of future landscape-level wildfires.

This report by RFPG[1] submits that any further logging of the Rubicon State Forest (RSF) as per the 2019 TRP, in particular its ash stands and mountain mixed species stands, will be contrary to the first two principles of the 2014 *Code of Practice for Timber Production* (the Code), and to a range of other mandatory Code provisions including:

- Clause 2.2.2.2, the precautionary principle,
- Clause 2.2.2.8 relating to wildlife corridors, and
- Clause 2.2.2.9 which obliges VicForests to "modify coupe size and rotation periods to maintain a diversity of forest structures throughout the landscape".

DELWP's Statement of Regulatory Intent (SoRI) for the regulation of timber harvesting recognizes that the Office of the Conservation Regulator (OCR) is obliged to assess compliance of the TRP with the Allocation Order. The SoRI states that:

> *OCR will . . . assess any proposed new or amended Timber Release Plan for compliance with the Allocation Order and advise VicForests on the outcomes of its assessment, requiring that any issues of noncompliance are rectified. (SoRI, p.9)*

Amongst other things, the Allocation Order requires VicForests to comply with the Code, including its mandatory long-term (strategic) planning provisions set out in section 2.1.1 and Clause 2.2.2.8, since the TRP is a key long term (strategic) planning tool. But the requirement for the TRP to comply with the Code is not restricted to the provisions specified as long-term (strategic) planning provisions, but must necessarily entail compliance with such other mandatory actions with broad-scale long-term impact, including Clauses 2.2.2.2 and 2.2.2.9.

In relation to the breach of the precautionary principle we are mindful of the findings by Justice Osborn on the precautionary principle in his My Environment case decision (MyEnvironment Inc v VicForests [2012] VSC 91, 14 March 2012).

[1] Shortly following this report will be several other reports of looming non-compliance with the Code relating to VicForests' proposed 2019 harvesting schedule for the Rubicon State Forest as provided to RFPG in July.

At para 268, His Honour found that:

> ***… it will be easier to identify a threatened breach of the precautionary principle when a specific action threatens direct serious or irreversible damage to an aspect of the environment of extreme sensitivity and/or novel qualities. The more generalised the threat and the more indirect and less immediate the damage to a sensitive aspect of the environment, the more difficult it will be to be satisfied that the precautionary principle requires abstinence from a particular action.***

Despite a highly skewed age class distribution and few old growth stands, the RSF still has very high conservation values as confirmed by figure 2.12 in VEAC's 2017 Report on *Assessment of Conservation Values in State Forests*. Due to the remarkable geology and geomorphology of the Cerberean Ranges, the RSF is, in fact, a biodiversity 'hotspot' containing many different ecoclines and forest types and a diversity of understorey assemblages within a relatively confined area.

Further fires over the next 20 years (which are likely) would kill more old growth stands and exacerbate the existing skewed age class distribution with seriously detrimental ecosystem consequences. If VicForests continues to log the remaining '39 regrowth ash stands in the RSF at anything approaching the extent proposed in the 2019 TRP, the precautionary principle will be breached.

Using His Honour's reasoning the breach of the precautionary principle will arise because the prospect of an even worse age-class distribution than currently exists is not a generalised or remote prospect of little consequence but rather threatens immediate and serious ecosystem damage. With the ongoing impoverishment of understorey species diversity as the result of past and current clearfelling[2], exacerbated by the increasing spread of blackberries in logged coupes, and the impact of global warming, the threat of serious and probably irreversible ecological harm is both immediate and of high magnitude.

In its latest *High Conservation Values Management Systems* document, VicForests proposes to improve protection of what it considers high conservation value areas. But coupe by coupe assessments conducted in isolation from each other and focusing on particular threatened species and habitat trees fails to properly address the wide ranging impacts of logging activities on landscape scale biodiversity and population trends of representative indicator species including pre and post logging. By examining individual coupes only without regard for surrounding 'landscape-level' considerations, VicForests' proposals fail to properly protect the area's high conservation values or to satisfy the requirements of Clause 2.2.2.2.

[2] For example, refer White, D. J. and P. A. Vesk (2019). "Fire and legacy effects of logging on understorey assemblages in wet-sclerophyll forests." Australian Journal of Botany **67**(4): 341-357.

In demonstrating the looming age profile catastrophe we focus on several different partitions of the RSF to show the impact of (i) the 2009 fire in combination with (ii) the heavy logging that has occurred in the RSF over the past 40 years overlaid with (iii) the impact of future logging (as set out in the 2019 TRP) and (iv) the risk of future landscape-level fire or fires in the coming decades.

Figure 1: Areas in fire severity classes 1 (bright red) and 2 (dull red) in the Rubicon State Forest (yellow outline) and adjoining areas of the Marysville State Forest

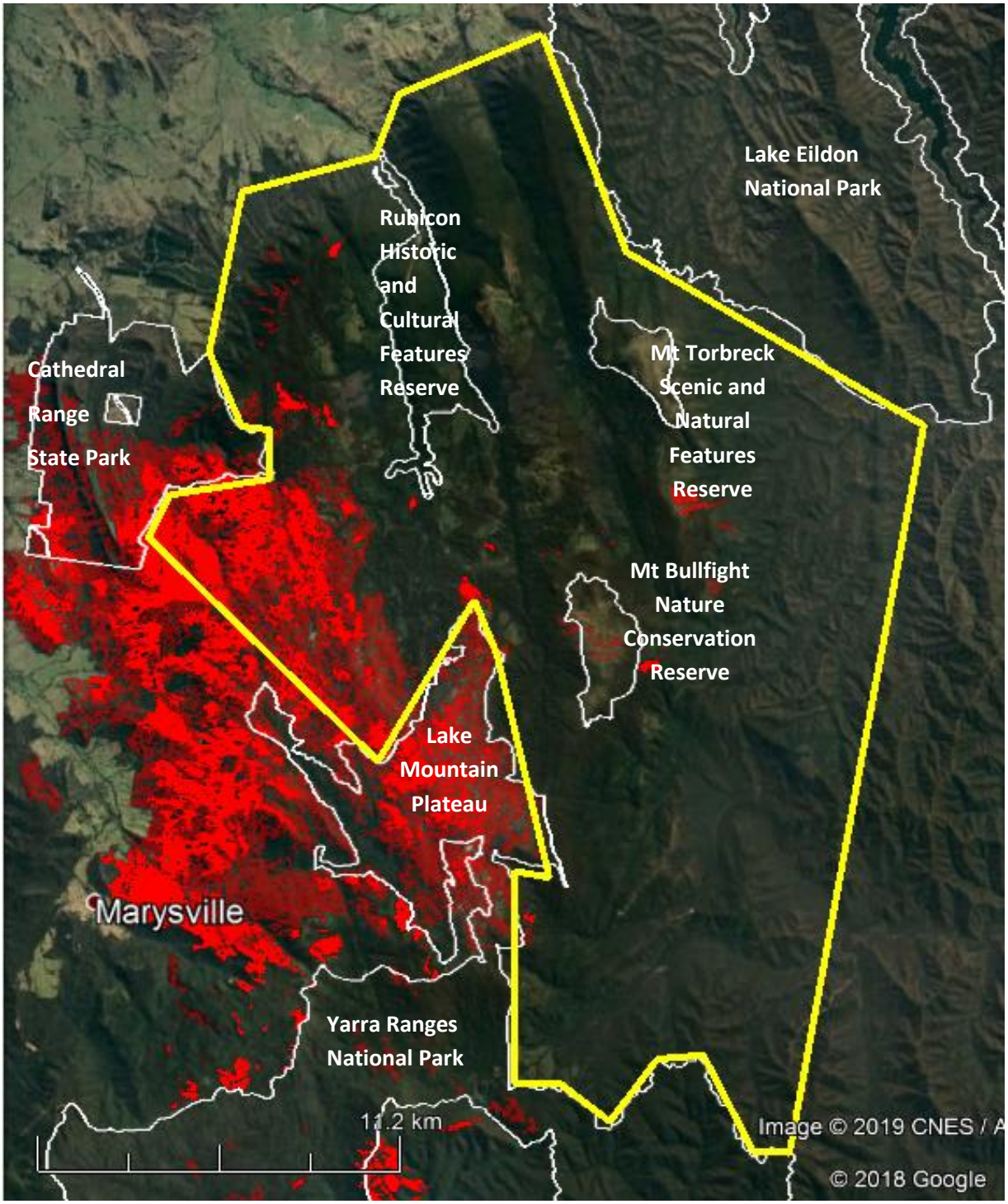


Figure 1 shows the areas in fire severity classes 1 and 2 in the Rubicon State Forest and adjoining areas. Where these severity classes occur in ash forests, VicForests has

assumed the forest is killed[3]. Within the RSF and the Marysville State Forest east of Lake Mountain (Steavenson and Upper Taggerty blocks) almost the whole area within these severity classes is ash forest.

Figure 2: As per Fig 1 but also showing areas logged since 1980 (mauve) and special protection zones (tan shading)

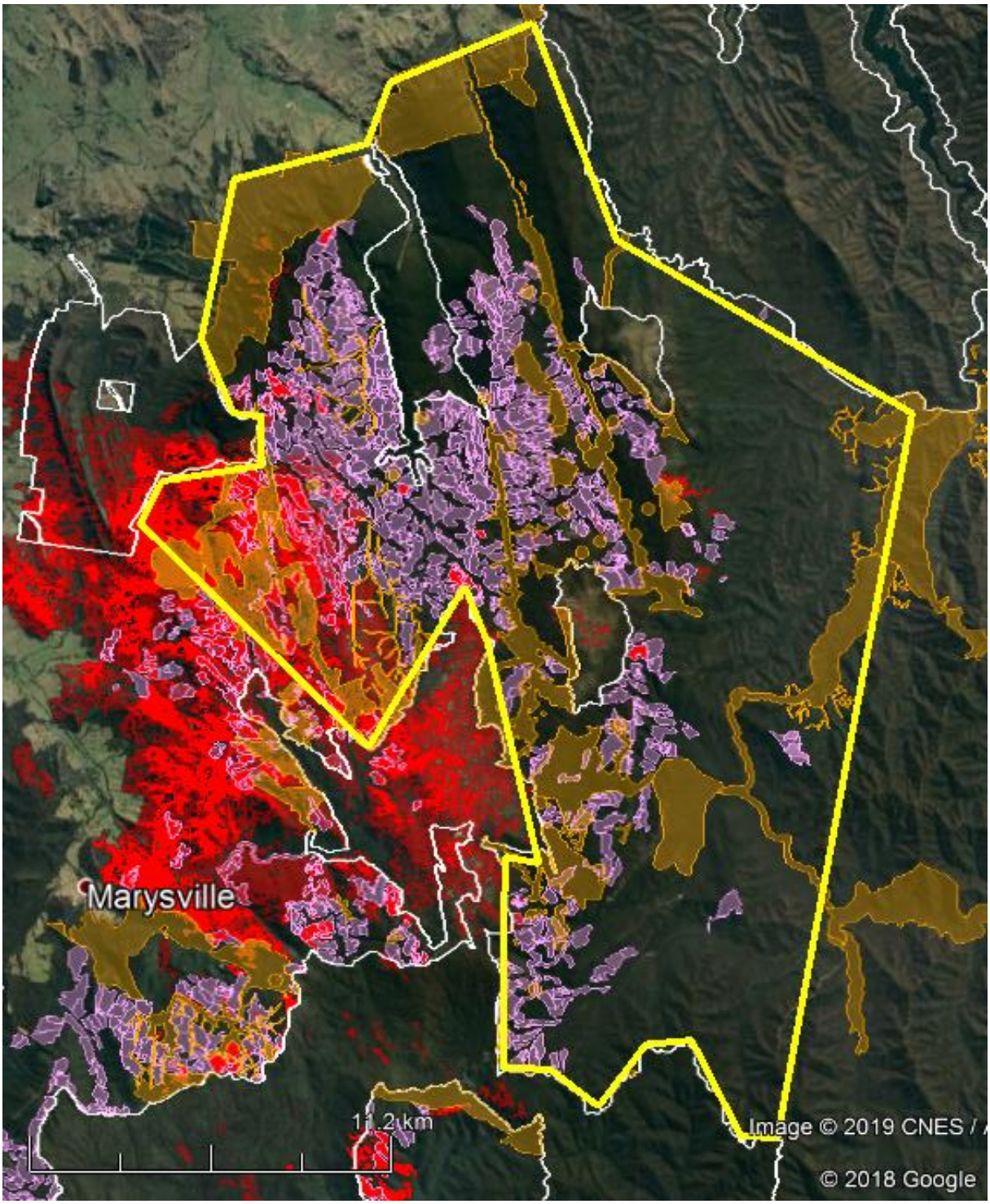


Figure 2 illustrates the extent of forest in the RSF and Marysville SF west of Lake Mountain (Steavenson and Upper Taggerty blocks) logged since 1980 or killed in 2009.

[3] Refer email from VicForests (Liz Langford) to RFPG of 6 June 2019

Figure 3: As per Fig 2 but highlighting the boundary of ash forest areas north of main Yarra Ranges NP (green outline), the special protection zones within it (tan shading) and unlogged coupes (gross area) on the 2019 TRP (white shading)

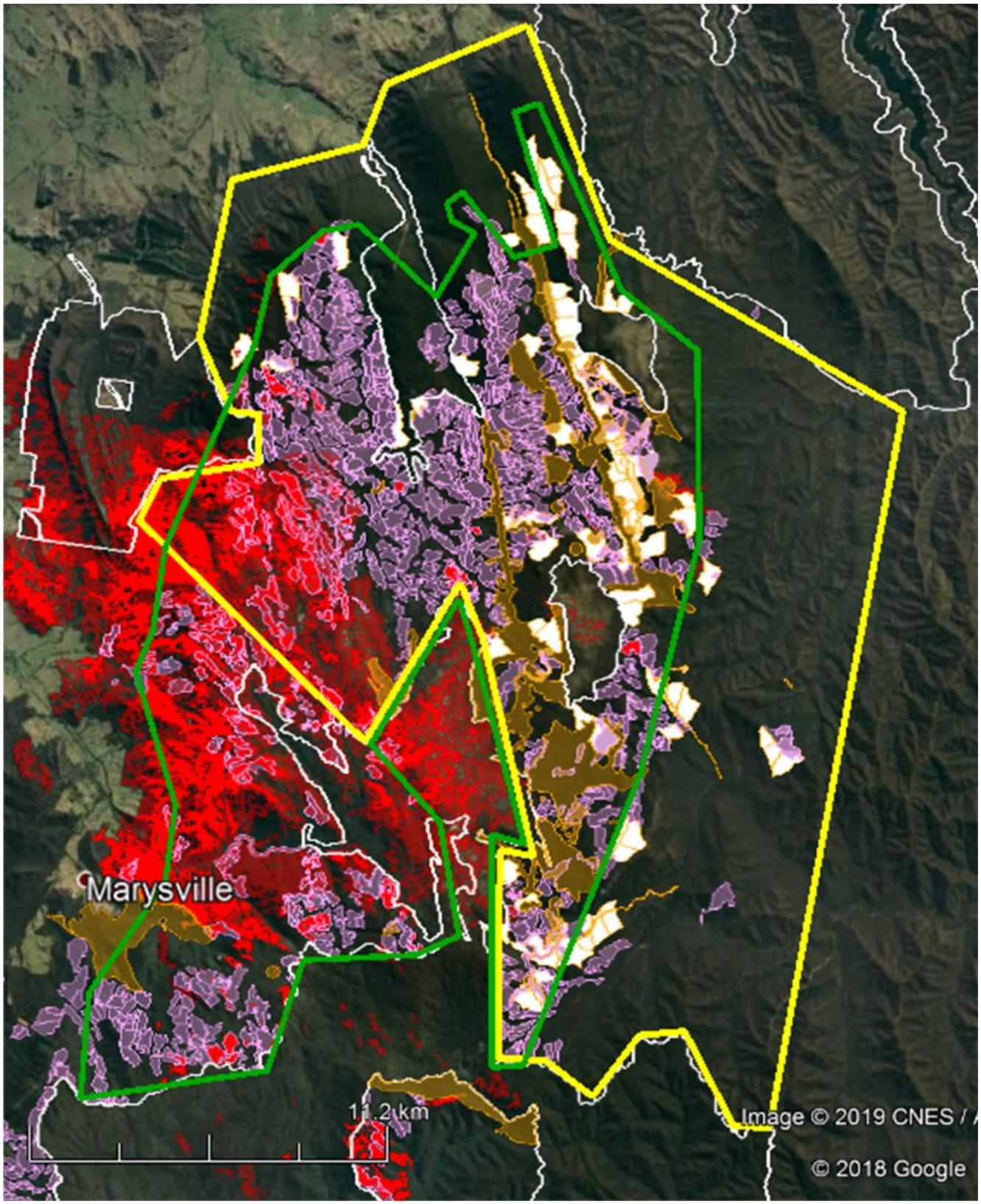


Figure 3 depicts the extent of ash forest in the RSF and Marysville SF west of Lake Mountain (Steavenson and Upper Taggerty blocks) logged since 1980 or killed in 2009 as well as the 76 unlogged coupes on the TRP, 60 of which are ash. The net harvest

area of these 60 ash coupes totals almost 900 ha, in a gross coupe area of 2,200 ha. The total area bounded by the green outline amounts to 33,600 ha.

In assessing the prospect of future destructive fires we have relied on VEAC's 2017 *Fibre and Wood Supply Assessment Report* which states, inter alia, that:

> *The modelling approach attempts to quantify the risk that bushfires pose to the 1939 ash regrowth in the Central Highlands. The results indicated that it is highly unlikely that the entire 1939 resource would be lost over the next 20 years due to its spatial distribution and varying risk of bushfire across FMAs.* ***The risk to the 1939 resource is not spatially uniform, with the greatest risk in the Central FMA****.*
>
> *Across a range of simulations using historical fire data and a landscape fire succession model, it was* ***found that the mean proportion of Central Highlands broadly and the 1939 resource specifically that can be expected to burn is 20 per cent or less over the next 20 years****. While loss of 20 per cent of the 1939 ash regrowth would impact sustainable wood supply levels, it would be unlikely to eliminate the native forest industry.*

From an ecological perspective, this heightened risk for the Central FMA must be considered in the light of the 2009 fire and its impacts on forest age.

To highlight the biodiversity threat from further fires in an area with an already highly skewed age class distribution, we have analysed one scenario that, absent radical action, could well unfold over the coming decade. For forests comprising eucalypts with lifespans measured in centuries and which take well over a century to form high quality arboreal animal habitat, a heavy preponderance of very young age classes with an impoverished understorey clearly places the current TRP at odds with Code principle #1 ('that biological diversity and the ecological characteristics of native flora and fauna within forests are maintained'), and with Code Clauses 2.2.2.2 and 2.2.2.9.

To assess the degree to which consideration was given by VicForests to these matters in formulating the current TRP, we sought, through our lawyers, a 'statement of reasons' for its various elements. Since our request was denied we cannot make such an assessment but if, in developing the TRP, VicForests failed to consult relevant experts on these matters, it will also have breached Code Clause 2.2.2.3. This is clearly a matter that THCU must assess.

While our analysis uses VicForests and DELWP data provided to us, various data short-comings mean that the situation may well be much worse than our analysis reveals.

For example, as discussed by VEAC in its *Fibre and Wood Supply Assessment Report* the baseline age class data and growth rate data on which VicForests relies for all its projections – the Statewide Forest Resource Inventory – is now 17-27 years out of date. This means that the available timber resource is likely to be overstated.

In addition, data provided to us by VicForests which we have used in this analysis may substantially understate the extent of ash forest killed in the Central FMA in the 2009 fires. VicForests' *2010 Annual Report* states (p8) that:

> *In 2009–10, VicForests spent considerable effort in determining an operational and economic level of harvest across the entire forest estate following the 2009 bushfires. The fires killed about 13,000 hectares of high-quality ash forest. Of this, about 7000 hectares were stands of a harvestable age. Of those stands, VicForests has salvaged about 1600 hectares. Our analysis indicates that existing harvest levels can be maintained for the medium term.*

Yet the age class (decade of origin) data supplied to us by VicForests in June 2017[4], indicates that in the Central FMA - the only FMA in the Central Highlands seriously impacted by the 2009 fires - there is only 10,173 ha in the 2000-2009 decade of origin class. Yet data held in the DELWP 'forest explorer' database indicate that in the same decade, 4,803 ha of ash forest in the Central FMA was logged other than salvage logging. Subtracting 4,803 from 10,173 implies that only 5,370 ha was killed – a far cry from the assessed 13,000 ha of ash in State Forest that was killed as reported in VicForests' 2010 Annual Report.

Analysis

We have estimated the proportion of remaining 'intact' ash forest now and in the future by analysing:

a) logging history and shapefile data published by DELWP uploaded to Google Earth combined with TRP data published by VicForests (Method 1), and
b) TRP data published by VicForests and decade of origin provided by VicForests to RFPG (Method 2)

Method 1 examines the situation across the entire ash forest landscape north of the main Yarra Ranges National Park, while Method 2 just looks at the situation in State Forest, including special protection zones.

Method 1

The first in step in Method 1 is to estimate the ash forest area within its overall extent across the Cerberean Ranges as follows:

ash forest area boundary	33,600 ha	green outline
snow gum woodland on Mt Bullfight & Mt Torbreck	-600 ha	Google Earth image analysis
170 km of roads	-1,000 ha	Assume roads 6m wide
rainforest	-2,000 ha	from SPZ shapefile analysis
ash forest area	**30,000 ha**	

[4] Refer email from VicForests (Liz Langford) to RFPG (Nick Legge) of 9 June 2017

The second step is to eliminate double counting of areas that were logged ahead of the fire and then killed by it. This is done on the basis that all the ash forest in block 285 (Cathedral) and block 311 (Upper Taggerty) was killed in 2009 and any salvage logging outside these blocks classed as fire-killed rather than logged.

The third step is to adjust for forest within logged coupes retained due to slope restrictions or as streamside buffers, or to protect historic sites such as timber tramway relics, or for biodiversity reasons such as old growth patches or leadbeaters possum reserves. These areas are mostly small patches or narrow strips surrounded by clearfelled forest and so cannot serve the same ecological function or have the same biodiversity values as 'intact' forest. The 2017 and 2019 TRPs indicate that around half of each ash coupe on average is retained, although it is unlikely that such high retention levels prevailed in the 1980s and 1990s. Accordingly a retention fraction of 30 per cent has been applied for coupes logged in these decades. While this method is relatively crude, it would not be difficult for VicForests and/or DEWLP to analyse the spatial data they hold to reliably distinguish 'intact' from 'fragmented' stands using defensible ecological criteria.

The result is set out in Chart 1 below.

Chart 1. Origin profile of ash forest (incl. parks and reserves) on Cerberean Ranges (incl. Rubicon State Forest and Steavenson and Upper Taggerty blocks in Marysville State Forest) projected to 2022 based on 2019 TRP (total area = 30,000 ha)

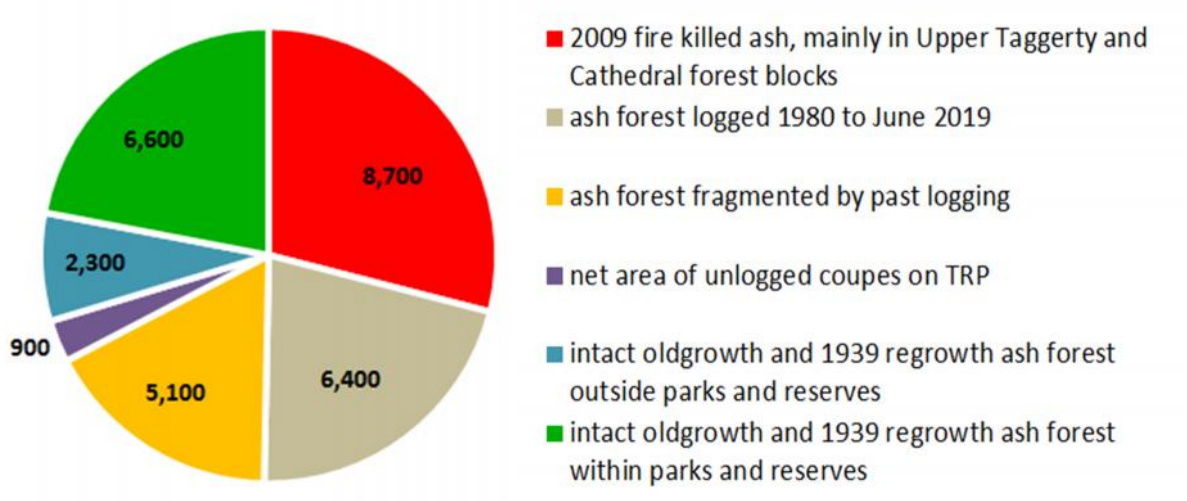


Chart 1 (which makes no allowance for future fires) shows that once the coupes on the 2019 TRP are all logged, only 30 per cent of the ash forest on the Cerberean Ranges will be 'intact forest' mostly in parks and reserves.

Chart 1 obscures the fact that most of this intact forest is east of Snobs Creek (half of block 288, plus block 289) and south of Mt Bullfight (southern part of block 287, plus blocks 290 and 312), although this can be seen in Fig 3. Fig 3 shows that the area includes some large special protection zones and until now has been less heavily although this is set to change under the current TRP.

However the TRP still includes 15 coupes with a net harvest area of 300 ha west of Snobs Creek. A similar analysis to that seen in Chart 1 has been conducted for the area east of Snobs Creek and north of Mt Bullfight and this is set out in Chart 2 below.

Chart 2. Origin profile of ash forest (incl. parks and reserves) on Cerberean Ranges west of Snobs Creek and north of Mt Bullfight (incl. Steavenson and Upper Taggerty blocks in Marysville SF) projected to 2022 based on 2019 TRP (total area = 21,400 ha)

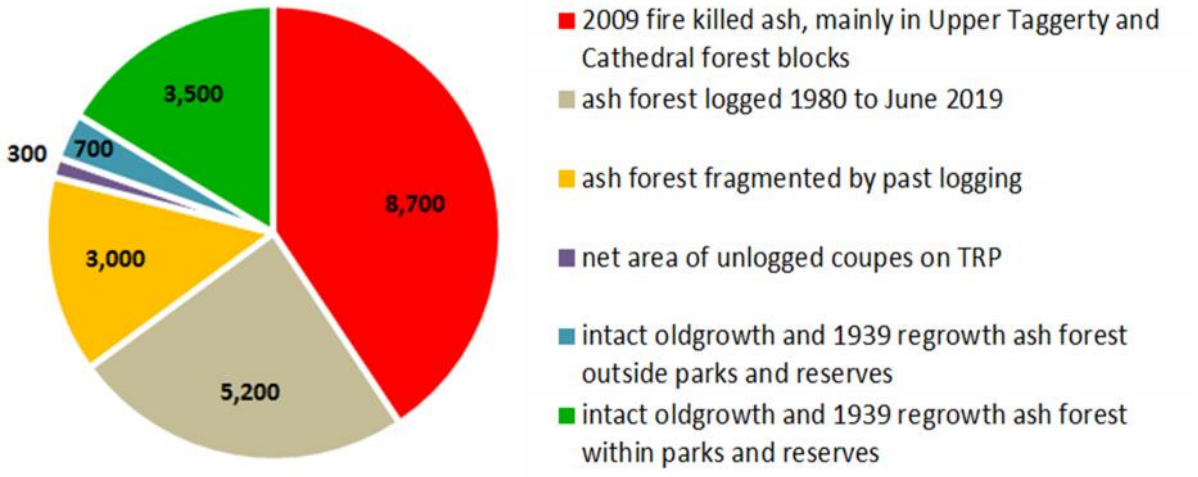


Chart 2 (which makes no allowance for future fires) shows that once the coupes on the 2019 TRP are all logged, only 21 per cent of the ash forest on this part of the Cerberean Ranges will be 'intact forest' older than 80 years, with only a sixth of this (700 ha) in State Forest outside special protection zones. This is a far cry from an ecologically appropriate distribution for trees whose life span is measured in centuries. Even more alarmingly, the data show that as a result of both the 2009 fires and the extensive logging that has occurred since, almost half the area of ash forest is now under 20 years of age.

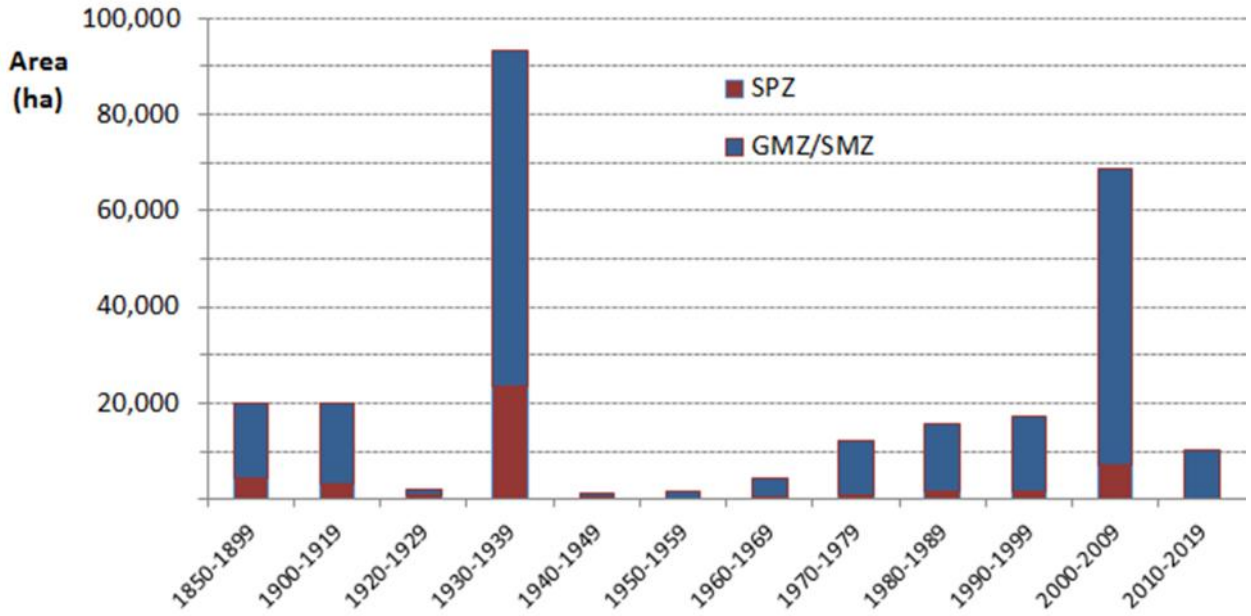
The largest of the block of intact forest is on the Blue Range and this makes it an ecological imperative that the unlogged TRP coupes here (Snifter, Goblet, Onyx, Haywire and Chitty Chitty Bang Bang) remain unlogged. The fact that logging of this area (block 286, Rubicon) has left no wildlife corridor joining the Blue Range with the Rubicon Historic Area (contrary to Code Clause 2.2.2.8) provides an additional reason for the coupe Onyx to remain unlogged. The remaining coupes all have significant biodiversity values – including potentially being part of a sooty owl roost and hunting area – while Chitty Chitty Bang Bang and Snifter also have significant visual qualities that would bring them under the Code's 'landscape sensitivity' provisions.

While the situation east of Snobs Creek (ie on the Torbreck Range) and east of Lake Mountain may not yet be as dire as the situation to the west, under the TRP the logging proposed here will ensure the near elimination of last vestiges of broadly intact areas of older forest within the RSF as well as destroying the ecological integrity (and tourist value) of the Snobs Creek Valley and the area north of Cambarville.

Method 2

To give some context for this approach we turn first to the state-wide picture. Chart 3 reproduces the 'decade of origin' data for ash stands in state forest provided to RFPG by VicForests in 2017 which includes logging seasons up to and including 2015-16.

Chart 3: Ash stands in State Forest in Eastern Victoria by decade of origin (VF data)



The two obvious features of Chart 1 are the substantial area of 1939 regrowth and the substantial area originating in the decade 2000-2009 as a result of the three large landscape-level fires in that decade.

But the apparently reassuring extent of 1939 ash regrowth remaining is wide of the mark. In particular, it masks the fact that much of this area has been fragmented by past logging and so is of lesser value as habitat, including failing to serve as refugia for all species or provide effective wildlife corridors.

In order to better reflect ecological values and also make a plausible estimate of the age class profile and that could well prevail in 2030, it is necessary to adjust the data on which Chart 3 is based. Three adjustments have been made.

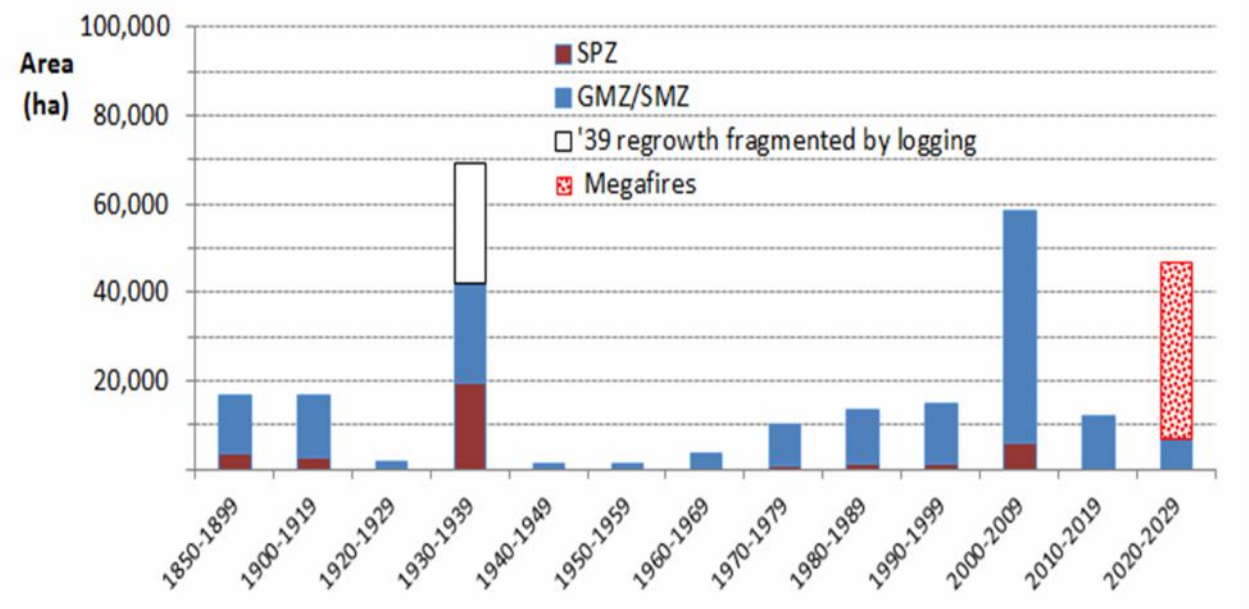
First, the total areas of ash forest of 1939 regrowth in GMZ/SMZ zones have been further partitioned into unlogged forest within logged coupes ('fragmented') and unlogged areas ('intact') using the method described above.

Secondly, an allowance for projected logging from now to 2029-30 has been made based on VicForests' 2017 Resource Outlook. While the Resource Outlook only projects log volumes, rather than annual harvest area, this shortcoming is readily overcome by applying an annual yield factor – in this case an average yield of 167 m3 of D+ ash sawlogs per ha - to derive annual harvest area.

The third adjustment assumes the killing of a further 15 per cent of total ash forest in megafires in the decade 2020-29. The reduction in estimated areas is applied in proportion to the existing size of age class cohorts. The loss of area in each age class column in the chart is matched by the appearance of forest area in the 2020-29 column (segment labelled 'megafires'). It should be noted that the assumption of only 15% of the forest estate burning in the decade 2020-29 – given the heightened fire risk for the Central FMA highlighted by VEAC – may be conservative

The resulting projected age class distribution is shown in Chart 4 below.

Chart 4: Ash stands in State Forest in Eastern Victoria by decade of origin, based on VF data, projected to 2030 and including provision for 15% loss due to megafires



In order to better visualise the future facing the Rubicon State Forest, the equivalent transformations, based on the same data sources, have been applied to the Central Forest Management Area (Chart 5 below).

Chart 5: Ash stands in State Forest in the Central FMA by decade of origin (VF data)

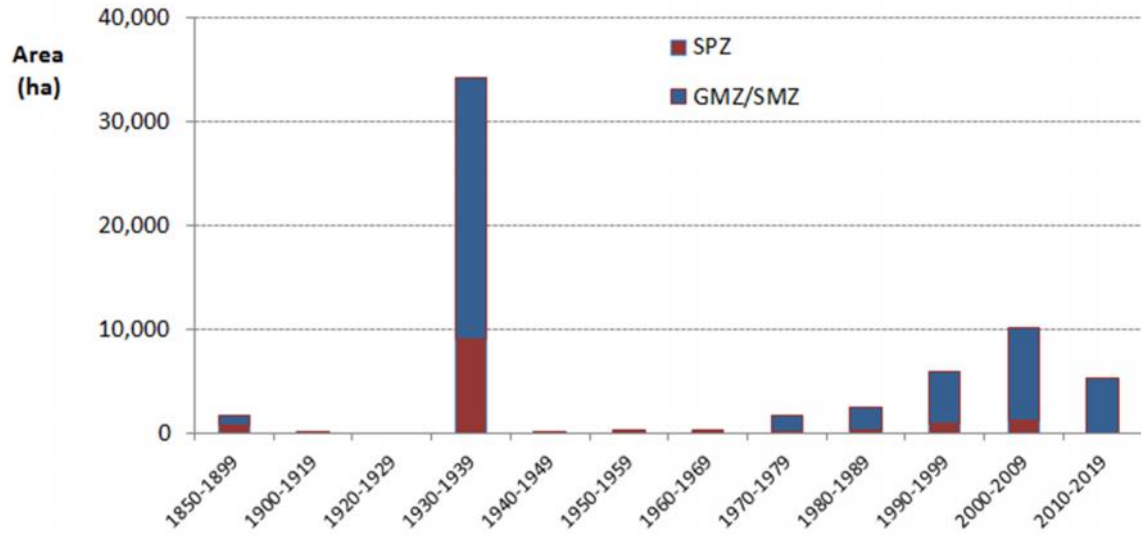
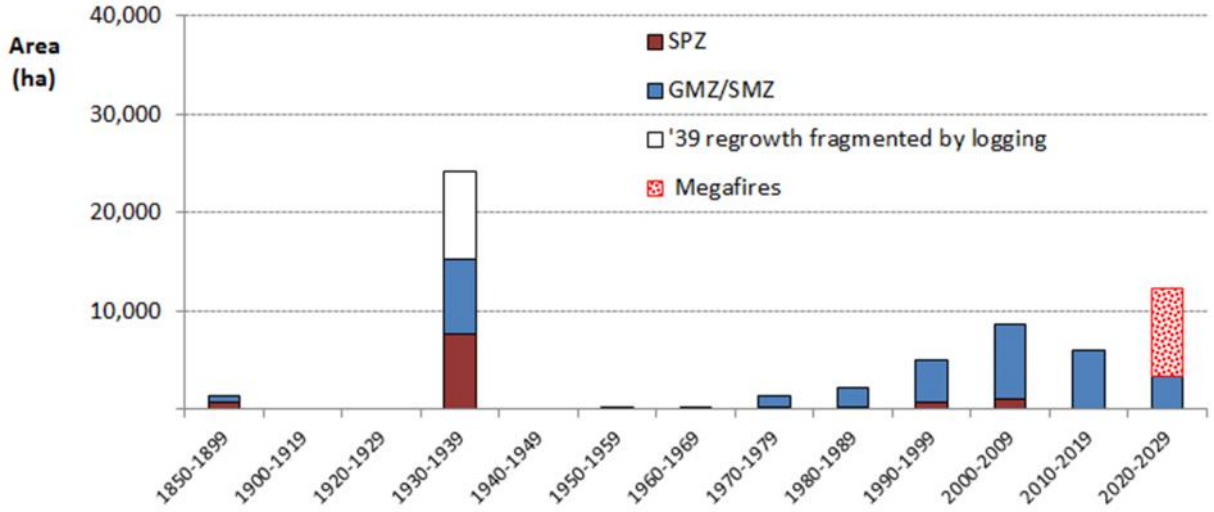


Chart 6 applies the three transformations described above to the Central FMA data with the result shown in Chart 6 below.

Chart 6: Ash stands in State Forest in the Central FMA by decade of origin, projected to 2030 and adjusted for fire



To appreciate the RSF circumstances applying to the one of the two most heavily logged parts of the RSF, the next analysis uses a more recent age class profile provided to RFPG by VicForests.

This analysis covers two forest blocks, Cathedral and Rubicon, these also being the two areas of the RSF most heavily impacted by the 2009 fire. The extremely skewed age class distribution seen in Chart 5 is immediately apparent, but should logging continue and another fire occur, the situation will be catastrophic as is seen in Chart 6.

Such a threat unquestionably brings the precautionary principle into play.

Chart 5: Ash stands in Blocks 285 and 286 in Rubicon State Forest by decade of origin (VF data)

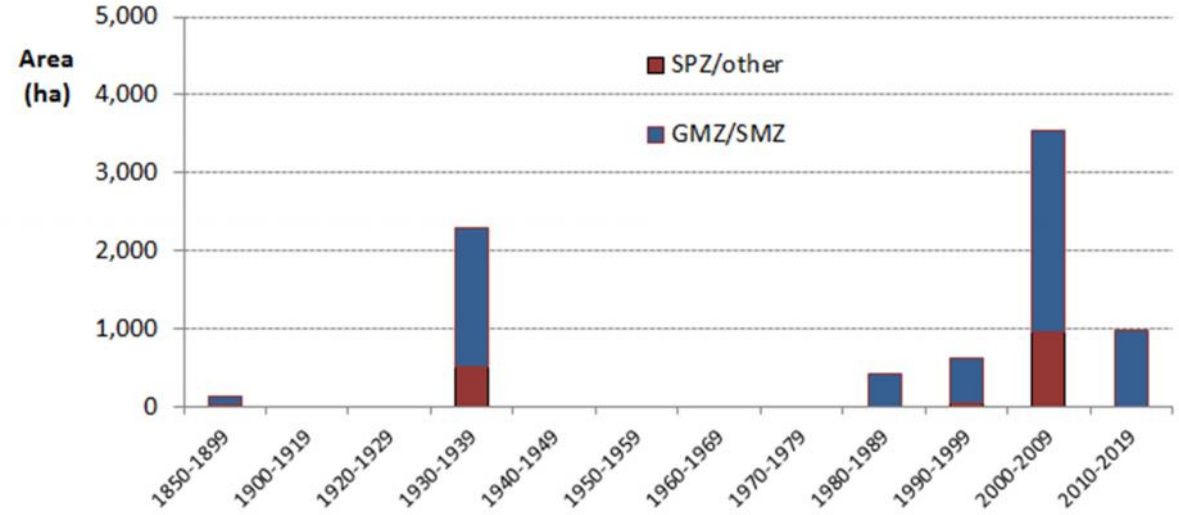
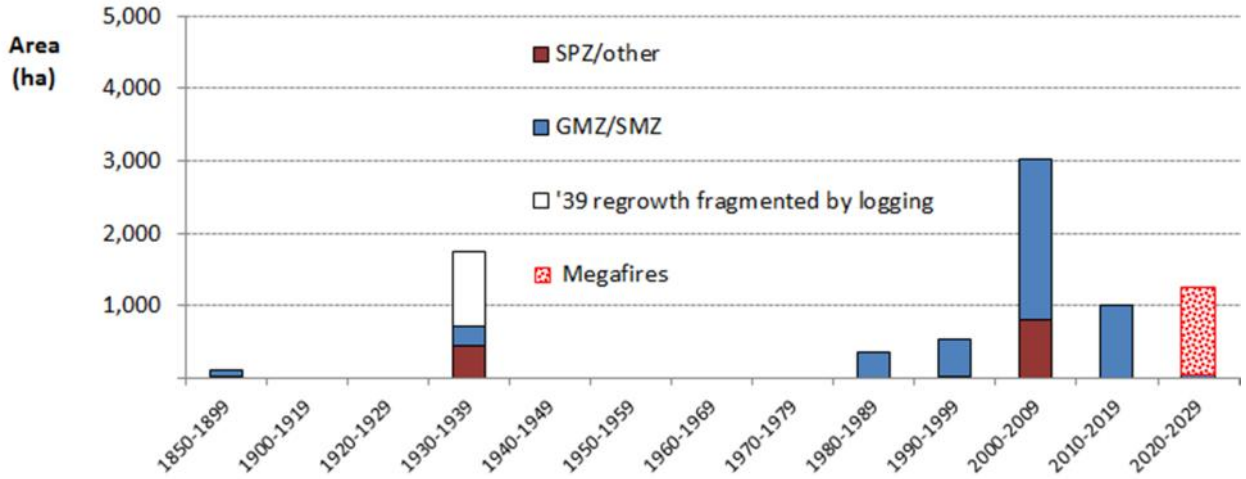


Chart 6: Ash stands in Blocks 285 and 286 in Rubicon State Forest by decade of origin, projected to 2030 and adjusted for fire



The bleak picture in Chart 6, which takes account of the likelihood of future major fires, is not confined to blocks 285 and 286 but due to the extent of logging since 2009 a similar picture exists west of Snobs Creek generally (ie. in the Royston River Valley and on the Royston Range) covering block 287 and half of block 288.

Action Sought

Given the above analysis, which RFPG has presented to VicForests in general terms on various occasions since 2016, we would have expected the 2019 TRP to have had far fewer new coupes. The refusal by VicForests to provide RFPG with reasons for adopting the 2019 TRP leads us to suspect that its development failed to entail proper expert advice or consideration of relevant research, such as that relating to the listing by IUCN of mountain ash as a threatened ecosystem[5], or the work by Mori et al (2013)[6] on ecological resilience, or the work by Anderson (2011)[7] on the need to protect all fauna and fauna within an ecosystem to effectively protect its biodiversity. If so, then Code Clause 2.2.2.3 has been breached and the TRP would therefore fail to comply with the Allocation Order. This is a matter which OCR must urgently investigate.

In the meantime, the only responsible action that OCR can take if Code Clauses 2.2.2.2, 2.2.2.8 and 2.2.2.9 are to be enforced is to require VicForests to cease all further logging of the RSF – or at the very least all coupes in Blocks 285, 286, 287, 288 and 289 – until a rigorous analysis of the ecological values of the area, including a comprehensive biodiversity assessment has been undertaken, and a new Forest Management Plan for the Central Highlands has been put into place.

[5] Burns et al. Ecosystem assessment of mountain ash forest in the Central Highlands (2015). Austral Ecol, **40**:386-399

[6] Mori, A. S.., Furukawa, T and Sasaki, T. (2013) Biological Reviews, **88**:349-364.

[7] Anderson, M.G. (2008) Conserving Forest Ecosystems: Guidelines for Size, Condition and Landscape Requirements pp. 119-136, In Askins, R.A., Dreyer, G.D., Visgilio, G.R., Whitelaw, D.M. (Eds) Saving Biological Diversity. Springer. Chapter 10.