



VEGETATION CLASSES

Victorian Bushfire Management Overlay



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Cover image: Owen Gooding, Grassy Dry Forest EVC, Chum Creek, Victoria

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1. INTRODUCTION

Clause 52.47 of the Victoria Planning Provisions draws on the seven (7) vegetation classifications of AS 3959–2009 *Construction of buildings in bushfire-prone areas*. These classifiable vegetation types are:

- Forest
- Woodland
- Shrubland
- Scrub
- Rainforest
- Mallee/Mulga
- Grassland

These classifications aim to help determine defensible space and construction requirements under the Bushfire Management Overlay (BMO) and AS 3959–2009. This approach uses a generalised description of vegetation based on the AUSLIG (Australian Natural Resources Atlas: No.7 – Native Vegetation) classification system, also referred to as the Specht system (Specht, 1970). This has recently been replaced by the Native Vegetation Inventory System (NVIS), which is similar to the AUSLIG system.

Planning permit applications within the BMO are required to undertake a Bushfire Site Assessment. Part of the assessment requires vegetation to be classified into one of the seven categories defined by AS 3959–2009, or as low-threat/non-hazardous vegetation.

This document has been termed ‘interim’ because the Department of Sustainability and Environment is currently undertaking a review of the vegetation classifications in Victoria. It is anticipated that the revised Ecological Vegetation Classes (EVCs) will be classified into the seven AS 3959–2009 vegetation categories and will be mapped, providing an additional tool for vegetation assessment.

1.1 Purpose

To assist in the correct identification of these seven vegetation classes, this document relies on the use of a BMO/BPA (Bushfire Prone Area) Vegetation Key as the principal method.

The BMO/BPA Vegetation Key is complemented by supporting methods, which are provided in Sections 3 and 4. These methods should be used to confirm the vegetation class where the assessor lacks experience, or where vegetation is at the margins of a clear description.

These supporting methods cover the following information:

- adapted descriptions and pictorial illustrations of vegetation used in AS 3959–2009 for Victorian conditions
- some typical photographic montages that assist in identification of vegetation classifications
- descriptions of common geographic and floristic characteristics of vegetation, which assist in describing the seven classes of vegetation used in the BMO and AS 3959–2009.

The BMO/BPA Vegetation Key and the supporting methods will also assist in the identification of low-threat/non-hazardous vegetation types, which are not classifiable under the BMO and AS 3959–2009.

1.2 Quick Guide

The support tools provided in this document are divided into three categories. They should be used in conjunction to determine the most applicable vegetation class.

- Section 2 – BMO/BPA Vegetation Key
The primary tool to verify the BMO and AS 3959–2009 class.
- Section 3 – Descriptions of Vegetation Using AS 3959–2009
A method to support the application of the Key utilising descriptions and diagrams from AS 3959–2009.
- Section 4 – BMO Vegetation Classes and Descriptors
A brief description and photographic examples of each of the vegetation classes from AS 3959–2009.
- Section 5 – Troubleshooting
The limitations of the assessment methods and tips to overcome these.

2. VEGETATION IDENTIFICATION: AS 3959 AND BMO/BPA

2.1 Introduction

A key is used to assist in the classification of life forms by providing a basis for differentiating between those life forms, using typical characteristics.

This BMO/BPA Vegetation Key is designed to assist in differentiating between vegetation classes in order to aggregate vegetation communities based on typical fire-behaviour characteristics. These descriptors do not provide a detailed assessment of fuels, and in some circumstances underestimate or overestimate fuel properties.

The BMO/BPA Vegetation Key is used to help answer the question: What vegetation type can I describe for the purposes of using the Bushfire Management Overlay and/or AS 3959–2009?

By its very nature, this will give rise to a set of "deemed-to-satisfy" descriptors that can then be used for the assessment of a site. The vegetation key is one tool of vegetation classification within the BMO/BPA, however due to the nature of the vegetation in its natural and modified environment, variations and anomalies may occur that will not be captured in the key.

The BMO/BPA Vegetation Key comprises a series of questions, each with two alternate answers (e.g. either A or A*). To use the BMO/BPA Vegetation Key, read both answers, choose the most accurate one and go to the next question. Repeat until you reach a description name in ***bold italics***. For interpretation of technical terms in the BMO/BPA Vegetation Key, refer to the Glossary at the back of this document.

This BMO/BPA Vegetation Key has been adapted and changed for Victorian purposes from the book *Ocean Shores to Desert Dunes* by Dr David Keith, 2002 (with permission of the author).

2.2 The BMO/BPA Vegetation Key

A	Vegetation dominated by trees (single-stem plants that are generally more than 5 metres tall when mature) and mallee forms.	
B	Forests or woodlands dominated by eucalypts other than multi-stemmed mallee eucalypts.	
C	Tall forests (typically >30 metres) dominated by tall straight-trunked eucalypts, often with understorey trees (typically Acacia), ferns ¹ or herbs in the understorey. Largely confined to moderately fertile soils in sheltered locations where average annual rainfall exceeds 900 millimetres. Excludes riverine forests of the inland or coastal plains that lack the understorey characteristics described.	<i>Forests (Wet)</i>
C*	Forests or woodlands dominated by short to moderately tall trees (rarely >30 metres), usually branching at less than half of their height. The understorey generally lacks ferns ¹ and shrubs with broad soft leaves, but may include abundant grasses, hard-leaved shrubs or ephemeral herbs. Widespread across Victoria.	
D	Forests and woodlands with an abundance of plant groups in the understorey that are able to tolerate periodic inundation or waterlogging, particularly sedges, rushes and reeds. Confined to damp low-lying parts of the coast or adjacent to rivers, lakes or swamps in the inland.	<i>Forests (Riparian)</i>
D*	Forests or woodlands generally lacking plants that tolerate inundation or waterlogging. Rarely in damp, low-lying sites adjacent to rivers, lakes or swamps.	
E	Forests or (rarely) woodlands with an abundance of hard-leaved (sclerophyllous) shrubs in the understorey. Only rarely dominated by 'box' eucalypts. Ground cover often sparse and typically dominated by sclerophyllous sedges, but may sometimes include reasonably continuous swards of grasses and/or Bracken Fern. Occurs on coastal plains and the inland slopes where average rainfall exceeds 500 millimetres, can be on moderately fertile soils, but generally infertile soils.	<i>Forest(Damp/Dry)</i>
E*	Woodlands or (rarely) forests that lack an abundance of hard-leaved (sclerophyllous) shrubs in the understorey. 'Box' eucalypts usually present and often dominate, generally 15–30 metres tall, inland. Callitris (native pine) and Casuarina (she-oak) may dominate or be co-dominant with eucalypts. In sub-alpine areas trees may be lower at 5–15 metres high, dominated by 'Snow Gum'. Perennial grasses interspersed with perennial herbs are prominent in the understorey and may be continuous, with shrubs being clumped or sparse, except in some semi-arid areas, where drought-tolerant shrub species (chenopods) may dominate in more open woodlands, typically 5–20 metres high. In box ironbark, shrubs will be more prominent and may vary widely subject to seasonal and climatic conditions. Widespread across Victoria, including sub-alpine areas and north of the Divide, over a wide range of rainfall and soil types.	<i>Woodland</i>

¹ The term 'fern' excludes Bracken Fern, as it does not necessarily occur in places typically associated with other ferns moisture loving plants.

B*	Forests or woodlands not dominated by eucalypts, although they may be present as scattered individuals or may dominate as a multi-stem habit of mallee eucalypts. Includes plantations of pine.	
F	Forests dominated by trees with dense canopies touching those of adjacent trees (i.e. a closed canopy), and with horizontally held leaves. Trees and shrubs typically with soft leaves. Primarily occurring in sheltered gullies where average annual rainfall exceeds 1000 millimetres. Does not include canopies dominated by wattles or she-oak.	
G	Trees tolerant of (and subject to) tidal inundation, understorey sparse to non-existent. Restricted to tidal estuaries along the coast. May be found in conjunction with saltmarsh.	<i>Mangrove</i> ²
G*	Trees not tolerant of (or subject to) tidal inundation, understorey usually open to dense, rarely sparse, never non-existent. Found on the coast and escarpments but never in tidal estuaries. Trees belonging to various plant families, their leaves broad and usually soft. Vines often occurring in the tree canopies or understorey. Understorey typically includes ferns and herbs. Found in deep, sheltered gullies.	<i>Rainforest</i>
F*	Woodlands and open forests largely dominated by trees with open canopies to dense canopies under scattered trees such as eucalypts. Trees may include Casuarina and/or Acacia as well as pine plantations. In semi-arid inland, multi-stemmed mallee eucalypts are found. Some areas may form thick dense vegetation for periods after fire.	
H	Vegetation dominated by Casuarina and Acacia forming thick stands, sometimes under scattered trees, which may include eucalypts. Plantations of pine.	<i>Forest</i>
H*	Dominant trees are multi-stemmed (mallee) eucalypts, although taller single-stemmed trees may occur 5–10 metres tall with canopies of adjacent trees barely touching. Understorey includes an open ground cover of perennial and ephemeral grasses and herbs, and a variable cover of drought-tolerant shrubs. Extensive areas of the semi-arid and arid inland.	<i>Mallee</i>
A*	Trees absent, or present only as scattered emergent individuals.	
I	Vegetation dominated by stunted and slow-growing shrubs or herbfields that tolerate prolonged seasonal burial in snow. Restricted to the alpine zone above 1600–1800 metres elevation.	<i>Tussock Moorland</i>
I*	Vegetation dominated by plants that cannot tolerate prolonged seasonal burial in snow. Distributed in non-alpine landscapes (below 1600 metres elevation).	
J	Vegetation with an abundance of plants that can tolerate periodic inundation or waterlogging, dominated by emergent sedges or shrubs, and water bodies dominated by submerged or floating aquatic herbs, rushes, reeds, grasses or succulent herbs. Soils are deep and often black or dark grey with partly decomposed organic matter.	
K	Dominated by shrubs (generally less than 2 metres in height) and sedges together with grasses or non-succulent herbs that tolerate permanent or periodic inundation or waterlogging with fresh water. Restricted to freshwater swamps with humic or gleyed soils on the coast, slopes and plains.	<i>Shrubland</i>

² Vegetation classified as *Mangrove* is deemed to be non-hazardous vegetation for the purposes of the BMO and AS 3959–2009.

K*	Dominated by herbs (including succulents), grasses, floating aquatic herbs or rarely shrubs that tolerate periodic inundation or waterlogging in lakes, lagoons or saline water. Restricted to freshwater lakes, lagoons and tidal estuaries on the coast, and salt lakes on the western plains.	<i>Lakes, Lagoons and Saltmarsh²</i>
J*	Vegetation with few, if any, plants that tolerate periodic inundation or waterlogging, usually dominated by shrubs or grasses, sometimes including an abundance of sedges, but never submerged or floating aquatic herbs. Soils may be grey-brown, yellow or red, usually dry or damp, though may be flooded on rare occasions.	
L	Vegetation dominated by perennial tussock grasses with herbs. Shrubs very rarely present. Generally found in clay soils on flat to undulating terrain on the coast, slopes and plains.	<i>Grasslands</i>
L*	Vegetation dominated by shrubs. Perennial tussock grasses are absent or occasional, though never dominant. May be dominated by hard-leaved but not drought-tolerant shrubs, usually also with perennial sedges, herbs and grasses, though generally lacking ephemeral plants closer to the coast. In the inland, dominated by drought-tolerant shrubs, including saltbush, with some perennial grasses and herbs as well as abundant ephemeral grasses and herbs after rain. Generally found on sandy or loamy soils.	
M	Vegetation generally greater than 2 metres in height at maturity, although may be lower shortly after fire.	<i>Scrub</i>
M*	Vegetation less than 2 metres in height at maturity.	<i>Shrubland</i>

3. DESCRIPTION OF VEGETATION USING AS 3959–2009

3.1 Introduction

The Bushfire Management Overlay (BMO) relies on a generalised description as provided by AUSLIG (Australian Natural Resources Atlas: No. 7 – Native Vegetation).

This system is often referred to as the Specht system, named after the author (R. Specht) of the vegetation classification used in Australia from the 1960s.

The system utilises three vegetation characteristics:

- i) The life form of the dominant stratum of vegetation (e.g. tree, shrub or grass forms)
- ii) The relative height of the vegetation form (e.g. low, medium, tall)
- iii) Canopy cover or separation between canopy specimens of the dominant vegetation.

This system is also used in AS 3959–2009.

3.2 Limitations

The AUSLIG descriptors of vegetation classes are useful to an extent, but also have their limitations. These limitations are associated with the inability to provide a suitable description at a local, regional or state level. This is because AUSLIG is aimed at a national characterisation of vegetation. In addition, vegetation classes are based on conventions that have changed over time. In some cases, local terminology persists despite attempts to adopt a national system of describing vegetation. It can even be difficult to get plant ecologists and botanists to observe these conventions or consistently observe the interpretation of such systems.

An example of this is the use of the term 'closed forest', which can be used to describe a range of vegetation communities. Closed forests are typically rainforests and the term 'rainforest' is used in preference to 'closed forest'. The term 'closed forest', however, is used in the diagrams associated with AS 3959–2009 to refer to rainforest.

Other examples include the terms 'forest' or 'woodland', which may refer to the most dominant layer of trees. Normally, forests and woodlands are dominated by eucalypt species that form a canopy, which is clearly separated from understorey layers. However, this is not always the case. In some coastal locations, the differences in height between the uppermost layer of short trees and the next layer(s) down of shrubs are only marginal. Where these layers blend into each other, they form a continuous layer of fuel from the ground to the canopy. In terms of fire behaviour, these types should be regarded as tall heaths or scrub. In other cases the differences in canopy cover from less than to greater than 30% is at best an indicator, rather than a precise delineation of vegetation class. In these circumstances, the numbers of strata of vegetation and their relative densities may be more important than the canopy cover of the dominant trees. Likewise, areas long unburnt may have their mid-layer of shrubs suppressed, and so heavy canopy with thick fuel beds may also be an indication of forest.

Please note, Ecological Vegetation Class (EVC) naming principles do not apply directly to the classification of vegetation in AS 3959–2009 and the BMO. For example, in the instance that an EVC is termed 'Woodland', it is not automatically cross-referenced with 'Woodland' for the purposes of the BMO or AS 3959–2009.

The BMO/BPA Vegetation Key (Section 2 of this document) is most helpful in determining the best fit for the classification system used in the BMO and AS 3959–2009 because it addresses both the structure and floristics of vegetation communities commonly found in Victoria.

3.3 Descriptors and Diagrams

Figure 1 shows how vegetation descriptions have been grouped into classes for the purpose of applying AS 3959–2009. It provides guidance based on vegetation canopy height and cover.

Table 1 provides a description of the vegetation classes and AUSLIG vegetation types generally referred to in accordance with AS 3959–2009 and adapted for Victoria. It provides specifications for canopy height and cover and additional information describing the typical geographic conditions and canopy or understorey species that are common to the type.

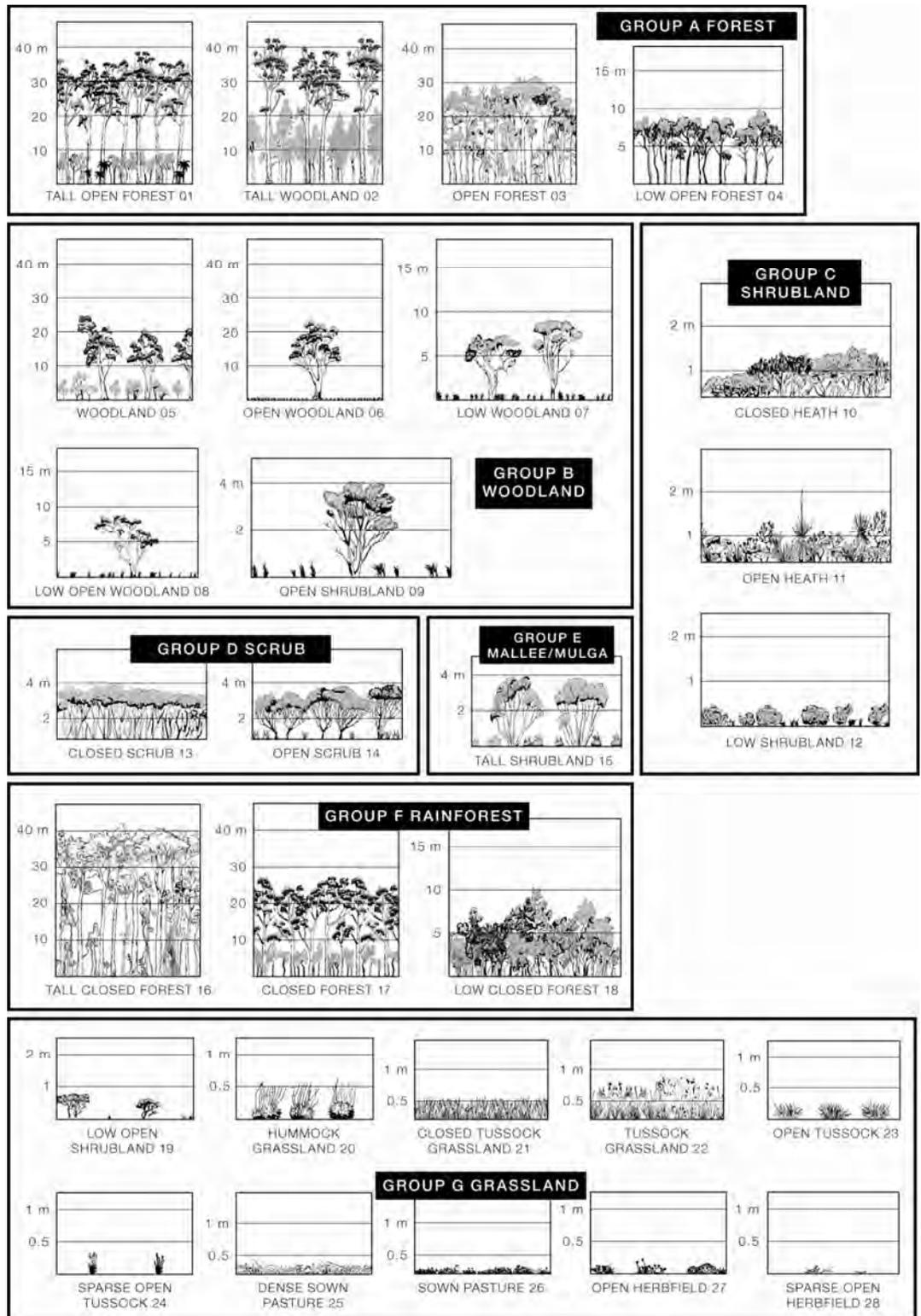


Figure 1 – Summary of Classification of Vegetation (Figure 2.3 in AS 3959–2009)

**Table 1 – Classification of Victorian Vegetation under AS 3959–2009
(adapted from AS 3959–2009).**

Vegetation Classification	AUSLIG Description	Grouping in AS 3959–2009	Descriptions from AS 3959–2009.
Forest	Tall open forest Tall woodland	A	Trees over 30 metres high; 30–70% foliage cover; (may include understorey ranging from rainforest and tree ferns to low trees and tall shrubs). Found in areas of high reliable rainfall. Typically dominated by eucalypts.
	Open forest Low open forest		Trees 10–30 metres high; 30–70% foliage cover; (may include understorey of sclerophyllous low trees and tall scrubs or grass). Typically dominated by eucalypts.
	Pine plantations		Trees 10–30 metres in height at maturity, generally comprising Pinus species or other softwood species, planted as a single species for the production of timber.
Woodland	Woodlands Open woodlands	B	Trees 10–30 metres high; 10–30% foliage cover dominated by eucalypts; understorey of low trees to tall shrubs typically dominated by Acacia, Callitris or Casuarina.
	Low woodland Low open woodland Open shrubland		Low trees and shrubs 2–10 metres high; foliage cover less than 10%. Dominated by eucalypts and Acacias. Often have a grassy understorey or low shrubs. Acacias and Casuarina woodlands grade to Atriplex shrublands in the arid and semi-arid zones.
Shrubland	Closed heaths Open heaths	C	Found in wet areas that are affected by poor soil fertility or shallow soils. Shrubs 1–2 metres high, often comprising Banksia, Acacia, Hakea and Grevillea. Wet heaths occur in sands adjoining dunes of the littoral (shore) zone. Montane heaths occur on shallow or water-logged soils.
	Low shrubland		Shrubs <2 metres high; greater than 30% foliage cover. Understoreys can contain grasses. Acacia and Casuarina often dominant in the arid and semi-arid zones.
Scrub	Closed scrub	D	Found in areas wet enough to support eucalypt trees, which are affected by poor soil fertility or shallow soils. >30% foliage cover. Dry heaths occur in rocky areas. Shrubs >2 metres high. Often coastal heaths and wetlands.
	Open scrub		Trees greater than 2 metres high, 10–30% foliage cover. Dominated by eucalypts or co-dominant Melaleuca and Myoporum with a mixed understorey.
Mallee/Mulga	Tall shrubland	E	Vegetation dominated by shrubs (especially eucalypts) with a multi-stemmed habit; usually greater than 2 metres in height; <30% foliage cover. Understorey of widespread to dense low shrubs or sparse grasses. Note: Mulga is not found in Victoria.
Rainforest	Tall closed forest Closed forest Low closed forest	F	Trees 10–40 metres in height; >90% foliage cover; understorey may contain a large number of species with a variety of heights.
Grassland		G	All forms, including situations with shrubs and trees if the overstorey foliage cover is less than 10%.

4.0 BMO VEGETATION CLASSES AND DESCRIPTORS

4.1 Forest

Forests occur throughout Victoria and encompass great floristic diversity. Forests are generally characterised by tall, straight trees, but there is a great degree of variability in forests. Forests are described by the BMO as having multiple layers of vegetation, including a pronounced shrubby middle layer in addition to a taller canopy and an underlying layer of grasses, herbs or sedges. Although normally defined by the highest layer of trees having a canopy cover of greater than 30%, this can in practice be difficult to discern, particularly in more open situations. In addition, taller woodlands may have a secondary tree layer just below the dominant tree canopy and are therefore also treated as forests. Shrubby variants can be low-growing in the dry forests, or tall and dense in the wet forests. Grassy variants often have a high diversity and cover of herbs. Grasses are dominated by Wallaby grass and Spear grass species.

Of particular interest are heathy woodlands, which may not be tall, but have significant fuel loads in the mid layers. Heathy woodland canopies can grow close together, so are treated as forests.

Plantations of pine and blue gum have also been included as forests. Fire behaviour in plantations can be highly variable depending on management regimes. Pine plantations can have very high fuel loads without shrubby layers, due to the tree structure having branches near ground level, providing almost continuous fuel from the ground to the top of the canopy.



Dry shrubby forest



Heathy woodland



Wet forest

4.2 Woodland

Woodlands occur throughout Victoria, in isolated patches in the Mallee and on the plains of the north-central and south-west, the slopes of the central, and the lower slopes of the north-east, south-west and Gippsland areas.

Woodlands are dominated by trees and are characterised by a canopy cover of less than 30%. They are normally dominated by eucalypt species, although these may co-dominate with Cypress Pine in inland areas. In general, woodlands are lower than forests in height and are associated with extremes of drought and/or cold. Woodlands also lack the dominant shrubby middle layers

normally associated with forests and have a more grassy ground layer, typically without ferns. In some cases, shrubs may become more abundant after sustained rainfall events in drier parts of the state (e.g. box-ironbark forests). They rarely have the deep surface litter that is an indicator of a forest.

Canopy species are eucalypts of the Box, Ironbark or Stringybark species, Hill or River Red Gum, and can be non-eucalypt such as Cypress Pine or Buloke. Sub-alpine woodlands are dominated by Snowgum. Shrubby variants are generally woody, sclerophyllous forms (numerous Peas and Acacia), or chenopods (salt-tolerant succulents) in the north-west. Grassy variants include diverse native grasses such as Wallaby grass, Kangaroo grass, Spear grass and herbs.

Woodlands are likely to be found on plains and lower slopes in most geology and soil types, with the exception of sub-alpine woodlands.



Box Ironbark



Grassy woodland

4.3 Shrubland and Scrub

Due to their widespread occurrence and variances, it is important to differentiate between shrubland and scrub.

As suggested by their names, shrubland and scrub are dominated by shrubs and smaller trees (such as Melaleuca or Banksia) that are typically non-eucalypt in nature. The key difference between shrubland and scrub is the height of vegetation at maturity. For the purposes of the Bushfire Management Overlay and AS 3959–2009, a height of 2 metres is used to differentiate between the two vegetation types. Scrub is defined as being greater than 2 metres high at maturity. In some cases the vegetation may be described as woodland, however, the continuous nature of the vertical fuel and the height of the dominant vegetation makes this scrub, rather than woodland. Plantations of tea-tree would also be described as scrub.



Swamp scrub



Sub-alpine shrubland

4.4 Rainforest

Rainforests are characterised nationally by a closed canopy dominated by often tall, non-eucalypt trees with little fuel at lower levels. They have cooler and damper microclimates within the communities and feature soft ferns, vines and other climbers. Any fuel on the ground is rapidly decayed. Often, wet forests may be confused with rainforests due to the presence of ferns or palms. However, wet forests are dominated by taller eucalypts. Rainforests and wet forests may also be found close together or may form a mosaic of different vegetation forms, with rainforests found in more sheltered gullies or creek lines.



Rainforest

4.5 Mallee

Mallee is a low, multi-stemmed tree, usually of the genera *Eucalyptus*, found in western parts of Victoria. In some vegetation, the eucalypt overstorey is combined with, or replaced by, Cypress Pine and Buloke. Mallee is easily distinguishable by the presence of a lignotuber below the ground under the multi-stemmed base. Understorey shrubs are sparse or non-existent. The understorey is often characterised by tussocky grasses such as Wallaby and Spear grass, or Spinifex (Porcupine grass).

Mallee is restricted to the north-western and western areas of Victoria, west and north of Bendigo to the Murray River and to South Australia, including the Wimmera. It has also been reported in isolated stands near Bacchus Marsh.

It is found in infertile sandy or sandy clay loam soils, often with a lunette (dune) influence where the clays have accumulated in the depressions or are of Aeolian origin (transported by wind).

In some situations, trees that have been cut down may coppice and form what appears to be a mallee form. Such situations are often associated with low woodland communities and should not be confused with true mallee, which are geographically restricted.



Mallee

4.6 Grassland

Grasslands are widespread and cover not only native grasslands, but also areas of cropping, pasture and some cultivation. Although trees or shrubs may be present, they are widely spaced, occur only occasionally and form less than 10% canopy cover. Although strictly a shrubland, chenopod shrubland (e.g. Saltbush) is characterised by grass growth after a high-rainfall event. This growth influences fire behaviour in the drier parts of the state and as such, these areas are described as grassland for the purposes of the BMO and AS 3959–2009 in Victoria.

The predominant native grasslands in Victoria are located on the volcanic plains in the south-west, the north-central plains, the Wimmera plains, and the Gippsland Plains in the south-east. Clay soils support a diverse range of native grasses, herbs, forbs and small shrubs (<1 metre). The more arid locations exhibit chenopod-dominated shrublands (salt-tolerant, succulent shrubs of various Saltbush species). Montane and alpine grasslands and shrublands are located at higher elevations on fertile, rocky or shallow soils, and dominated by grasses and herbs.

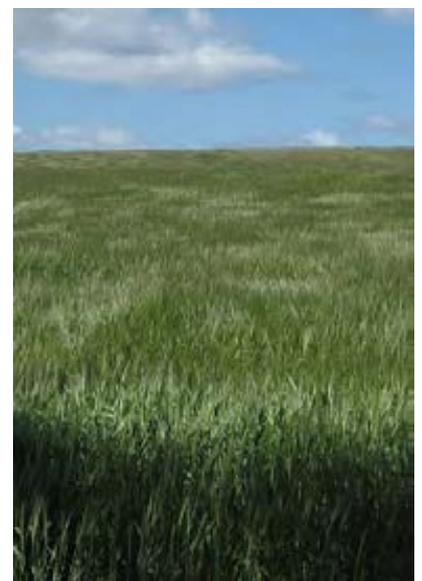
Areas of modified woodland or forest that has been converted to pasture or crop are treated as grassland areas. There may be scattered individual trees or treelines along creeks within an otherwise treeless landscape.



Native grassland



Native grassland (grass-dominated)



Wheat paddock

4.7 Non-hazard/ Low-threat Vegetation

Low-threat vegetation and non-vegetated areas under the BMO and AS 3959–2009 covers areas that are supported by a permanent water body and have high-moisture and/or high-salt-content plant species.

Low-threat vegetation and non-vegetated areas are excluded from assessment under the BMO and AS 3959–2009 on the basis that they constitute a non-hazardous condition. However, all vegetation can burn under the right conditions.

Low-threat vegetation includes grasslands managed in a minimal fuel condition (<100 millimetres in height), maintained lawns, golf courses (fairways), maintained public reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks. A windbreak is defined as a single row of trees located on a property boundary or fence line or forming a curtilage to a residential dwelling.

The hazardous nature of this classification will need to be assessed on a case-by-case basis, as vegetation in this class can be highly variable in extent, nature, flammability and density.

Non-vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops, are excluded from assessment. Other exclusions may also apply.



Non-hazard / Low-threat vegetation

5. TROUBLESHOOTING

5.1 Introduction

When classifying vegetation using the assessment method outlined in the BMO and AS 3959–2009, there are a number of important limitations that the assessor must account for.

These limitations are associated with the way observations are made, and the limitations of the classification systems themselves.

5.2 Forest and Woodland Foliage Cover

Threshold limitations

The foliage cover thresholds of 30% for woodland and 70% for forest are derived from a convention used for identifying vegetation that is applied in flora and fauna conservation planning. The threshold may not strictly work in the context of bushfire risk mitigation, which must look at vegetation in terms of fire behaviour (rather than floristics or ecological homogeneity).

For example, a vegetation type designated woodland in Victoria may carry a significant elevated fuel that makes fire behaviour similar to forest or another type, such as scrub.

Foliage cover alone cannot be relied upon to determine the vegetation type.

Observational subjectivity

Foliage cover is subjective. Findings will vary between assessors and depending on the method used. The foliage cover itself may also vary due to seasonal constraints such as prolonged drought, poor tree health (which may be due to disease or insect attack), or changes in local hydrology. Foliage cover may appear sparser than it actually is, compared to circumstances where the vegetation is stress-free.

 Measure foliage cover at multiple sites within the area being assessed and compare the results. If there are one or more sites where canopy cover is approaching or greater than 30%, the vegetation should be classed as forest.

Consider the amount of elevated fuel and its continuity with the canopy. Determine if the vegetation is, in terms of fire behaviour, more like a forest than a grassy woodland type with a negligible or sparse shrub layer. Areas with sparse surface fuels and the presence of grass fuels should be assessed as woodland.

Always consider the tree health in the near future will be in the best possible condition, then undertake your canopy cover assessment.

If the foliage cover is in doubt or elevated fuels in the understorey cover is dense, default to forest classification.

Ecological Vegetation Class (EVC)

EVC naming principles do not apply directly to the classification of vegetation in AS 3959-2009 and the Bushfire Management Overlay (BMO). EVCs are a useful tool for cross-referencing, but the EVC nomenclature (forest, woodland, etc.) should not be allowed to influence the BMO or AS 3959–2009 assessment.

 The vegetation descriptions from AS 3959–2009 and BMO take precedence over EVC naming.

5.3 Emergent Trees

Some vegetation types that, according to descriptors, do not have a tree cover, may have a small number of emergent (individual and isolated) trees within them, or (commonly) at the margins with other types.



Quantify the emergent tree cover. If the tree cover will not significantly influence the fire behaviour within the assessment area, then the treeless vegetation type represents the worst fire risk and therefore still applies.

Conversely, if the patch of vegetation with emergent trees is adjacent to or surrounded by forest types, then it must be assessed as forest.

5.4 Vegetation Maturity

The vegetation being assessed may be in a state of maturity that masks its mature steady state fuel load and structure. This condition can be caused by a disturbance.

The canopy can be sparse or absent until the canopy species mature. Understorey cover (elevated fuels) may dominate but this condition is transitional. After severe bushfire the canopy will appear sparse and the degree of canopy species' death may be uncertain. Regenerating canopy and understorey species may be very dense and a uniform height, which makes the distinction between life forms (and hence cover) difficult to assess.

Consider:

- Fire history
- recent bushfire event
- fuel reduction burns
- Current land use or change of land use
- Effect of drought or growth from a good growing season at the end of an extended period of drought.



Assume the current state of maturity will advance. Determine whether the mature state will be based on mature examples of the same vegetation cover nearby or information sourced from local expert knowledge.

Changing land use should only be taken into account where there is a high degree of certainty, such as the transition from rural to residential land use.

5.5 Topographic and Boundary Influences

Within a patch of vegetation, vegetation height, cover and structure may vary over short distances.

Vegetation productivity will increase at the edges of a patch because there is an increase in available resources due to a lack of competition. The understorey may be more productive (taller and thicker) at the edges of a patch adjacent to cleared land. The crown of canopy species may spread into the cleared space, resulting in a canopy that appears to be lower. Separation between elevated and canopy fuels will appear reduced.

Increases in resources such as nutrients or moisture may occur at the base of slopes or in small depressions within the overall slope. The presence of rocky outcrops will influence growth rates and species presence.

Variations within a patch cannot be observed at the edge.

Tip



Never assume the vegetation character can be determined at the edge of the patch. Walk through the site in a number of directions to determine the true character of the vegetation.

6. GLOSSARY

Term	Description
	(Source: adapted from DSE, 2007, citing Meagher, David (1991) The Macmillan Dictionary of the Australian environment. Macmillan Company, South Melbourne, Victoria.)
Altitude	General altitudinal range in which the vegetation occurs. These are guides only: Alpine – above 1500 metres elevation Sub-alpine – between 1200–1500 metres elevation Montane – between 900–1200 metres elevation Foothill – between 300–900 metres elevation Lowland – between 0–300 metres elevation
Casuarina	This has been further dissected to Allocasuarina. Casuarina used in this document encompasses both.
Chenopod	A member of the (former) plant family Chenopodiaceae. Characteristically, these are adapted to tolerate saline environments and are able to survive with very little moisture by having special adaptations for preserving water such as succulent leaves, thick bark or waxy stems.
Ephemeral	This term is used where some significant environmental or vegetation feature is transient in time, i.e. of short and unpredictable duration, such as water in some wetlands.
Estuarine	A partially enclosed body of water at the mouth of a river, that is influenced by tides, and where fresh water mixes with salt water.
Floodplain	An alluvial plain in which streams occasionally overflow their banks, causing active erosion and deposition across the plain.
Forest	Vegetation with trees that usually have a long single bole and are closely spaced. This structural type is generally taller than woodland types (>30 metres). The lower strata may be ferny, shrubby or grassy.
Grassland	Treeless vegetation of chenopod shrubs, grasses or herbs. Includes cropping and grazing land.
Mallee	Shrubland (< 8 metres tall) dominated by multi-stemmed, lignotuberous eucalypts.
Marsh	An area of damp, boggy land, either regularly or permanently under water. These are usually found on flat, poorly-drained sites with relatively impervious soils such as clays or peats, or the sites are barely or not above the regional groundwater table.
Mesophyllous	Plants having soft leaves with little fibrous (woody) tissue and higher amounts of water.
Plain	A large, flat or gently undulating area of land, usually with a relief of less than 9 metres. In the typological context, the elevation range could approach 100 metres over wide areas. Plains are usually found at low elevations, and are often formed by the deposition of alluvium. These may be formed by a variety of geomorphological processes: (i) Deposition of alluvium, e.g. Gippsland Plains (ii) Coastline retreat e.g. Sunset Country (iii) a combination of both (i) and (ii) (iv) by the outflow of highly fluid lavas such as some basalts, e.g. Victoria's Western Volcanic Plains.
Rainforest	In Victoria 'rainforest' is the common term for what Specht calls 'closed-forest'. Rainforest is dominated by trees with a closed canopy (i.e. only very small gaps between the canopies of dense foliage – unlike the open foliage and distinct canopy gaps of eucalypt forests). These forests are fire-sensitive – even a single fire may lead to their local extinction or grossly change their composition and structure. Non-vascular epiphytes (e.g. mosses, liverworts) are usually common, ferns are usually common (except in dry types) and vines are usually present and common, except in high-altitude rainforests.

Riparian	Areas intimately associated with a river, creek or lake that require the presence of free water at some time during the year either through floods or average river flows.
Sclerophyllous	Plants having relatively tough leaves that contain large amounts of woody tissue.
Scrub	Scrubs have closed canopies (i.e. densely foliated and closely-spaced). They can be distinguished from rainforests by their lower canopy heights (< 6 metres tall) and presence of sclerophyllous plants. Often found on dunes close to the coast.
Shrubland	Shrublands are generally treeless or nearly so, usually less than 2 metres in height and with open canopies (wide gaps between the dominant shrubs). These often develop in rocky situations or in very dry environments.
Stream	A natural watercourse of any size.
Swamp	A low wet area that is permanently covered by water or is waterlogged and usually covered by shrubs or trees or sedges.
Wetland	A low-lying area sometimes inundated or permanently covered by water.
Woodland	A vegetation community dominated by widely-spaced, spreading trees, often with short boles and a spreading habit. This structural type is often shorter than forest types (<30 metres). The lower vegetation strata is usually grassy and may be shrubby, but is rarely dominated by ferns.

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