Australian Government
Department of the Environment and Energy

NVIS Fact sheet
MVG 32 – Mallee open woodlands and sparse mallee shrublands

Australia's native vegetation is a rich and fundamental element of our natural heritage. It binds and nourishes our ancient soils; shelters and sustains wildlife, protects streams, wetlands, estuaries, and coastlines; and absorbs carbon dioxide while emitting oxygen. The NVIS has been developed and maintained by all Australian governments to provide a national picture that captures and explains the broad diversity of our native vegetation.

This is part of a series of fact sheets which the Australian Government developed based on NVIS Version 4.2 data to provide detailed descriptions of the major vegetation groups (MVGs) and other MVG types. The series is comprised of a fact sheet for each of the 25 MVGs to inform their use by planners and policy makers. An additional eight MVGs are available outlining other MVG types.

For more information on these fact sheets, including its limitations and caveats related to its use, please see: 'Introduction to the Major Vegetation Group (MVG) fact sheets'.

Overview

Typically, vegetation areas classified under MVG 32 – Mallee open woodlands and sparse mallee shrublands:

- are semi-arid systems dominated by eucalypt species that produce multiple stems from an underground rootstock known as a lignotuber
- feature some vegetation in non-arid regions but also supports eucalypts with mallee growth forms, but these are not part of MVG 32 or MVG 14
- have eucalypts as the most widespread tree component, however, species of *Callitris*, *Melaleuca, Acacia* and *Hakea* may co-occur as trees at varying densities and may co-dominate mallee communities
- feature a more open tree or sparse shrub layer (notionally < 10 per cent projective foliage cover, < 20 per cent crown cover) distinguishes MVG 32 from MVG14 (Mallee woodlands and shrublands), which has a denser tree layer (notionally > 10 per cent foliage projective cover, > 20 per cent crown cover). However, tree cover often varies spatially at fine scales and temporally with fire regimes
- Have understorey composition strongly influenced by rainfall, soil types and fire regime and can be dominated by hummock grasses (Spinifex), chenopods or other woody shrubs
- Some mallee woodlands are among the most fire prone of all plant communities in semi-arid and arid zones.

Eucalyptus gracilis (yorrell) with *Beyeria opaca* and *Triodia sp*. Calperum, near Renmark, SA (Photo: M. Fagg)

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Facts and Figure

Major Vegetation Group	MVG 32 – Mallee open woodlands and sparse mallee shrublands
Major Vegetation Subgroups	66. Open mallee woodlands and sparse mallee shrublands with a hummock grass understorey 67. Open mallee woodlands and sparse mallee shrublands with a tussock grass understorey 68. Open mallee woodlands and sparse mallee shrublands with an open shrubby understorey 69. Open mallee woodlands and sparse mallee shrublands with a dense shrubby understorey
Typical NVIS structural formations	Open mallee woodland (mid, low) Sparse mallee shrubland (tall, mid)
Number of IBRA regions	27
Most extensive in IBRA region	Est. pre-1750: Murray Darling Depression (NSW, SA and Vic) Present: Murchison (WA)
Estimated pre-1750 extent (km2)	34 265
Present extent (km2)	20 779
Area protected (km2)	4 473

Structure and physiognomy

- Open woodlands and sparse shrublands dominated by low, multi-stemmed, sclerophyllous eucalypts and occasionally small trees from other genera with a sparse to dense understorey.
- Height of eucalypt canopy varies from two - 10 m.
- Tree canopy cover varies with rainfall, topographic position, soil characteristics and particularly fire history, but projective foliage cover is notionally within < 10 per cent and crown cover is notionally < 20 per cent.
- Understorey structure also varies with rainfall, topographic position, soil characteristics and particularly fire history, and may be dominated by sclerophyllous or non-sclerophyllous shrubs, hummock grasses, chenopods or tussock grasses.
- Ground layer is strongly influenced by recent rainfall and fires. In drought the ground layer is sparse, while following heavy rainfall a prominent cover of ephemeral herbs with tussock grasses occurs.
- A soil crust forms on flat areas and local depressions, comprising cryptograms i.e. cyanobacteria, lichens and mosses, but is largely absent from dune crests and slopes.
- The subgroups of this MVG differ in terms of canopy dominants, understorey composition, soil characteristics and topographic position.

Indicative flora

- Eucalypts of the semi-arid mallee woodlands belong almost entirely to sections *Bisectaria* and *Dumaria* within the subgenus *Symphyomyrtus*, although a few species belong to section *Adnataria*, also within *Symphyomyrtus*. See further discussion in Notes below. Widespread mallee tree species include *Eucalyptus dumosa* (white mallee), *E. socialis* (red mallee), *E. gracilis* (yorrell), *E. oleosa* (red mallee), and *E. calycogona* (gooseberry mallee). In the west, mallee is characterised by several eucalypts some of which are endemic to Western Australia, including *E. eremophila*, *E. moderata, E. oleosa, E. incrassata, E. foecunda, E. redunca* and *E. uncinata*.
- Support a diverse range of understorey species, with composition strongly influenced by rainfall, soil types and fire regime. In sub-humid areas mallee formations are dominated by grasses and shrubs, and in the semi-arid areas the understorey below mallee species such as *E. oleosa*, *E. socialis* and *E. youngiana* is dominated by hummock grasses such as *Triodia* and *Plectrachne*.

- Typical Mallee understoreys include the following:
  - Shrubby understoreys dominated by Chenopods may include species of *Maireana, Sclerolaena, Enchylaena, Chenopodium* and *Zygophyllum.*
  - Other shrubby understoreys include a range of mostly non-sclerophyll shrubs from genera such as *Senna, Acacia, Dodonaea, Myoporum, Eremophila, Enchylaena, Sclerolaena, Melaleuca, Grevillea, Hakea* and *Westringia*.
  - Some sclerophyllous shrub species may also form shrubby understoreys with *Callitris verrucosa* often prominent in either the tree or shrub layer. Typical shrub genera include *Acacia, Aotus, Baeckea, Leptospermum, Melaleuca, Beyeria, Brachyloma, Hibbertia, Cryptandra, Spyridium* and *Phebalium*. *Triodia* may occur sparsely among the shrubs.
  - *Triodia* (hummock) understoreys are characteristically dominated by *Triodia scariosa* and *Triodia irritans*, interspersed with small trees or shrubs of genera such as *Acacia, Callitris, Eremophila* and *Beyeria*.
  - Less common are dominant Tussock understoreys from the genera *Austrostipa, Austrodanthonia, Themeda, Poa* and *Astrebla.* Tussocks may also be interspersed among other dominant understorey growth forms.
- Ephemeral herbs from a wide range of plant families are abundant after rain including the *Poaceae* (mainly *Austrostipa*), *Asteraceae, Goodeniaceae, Solanaceae, Apiaceae, Brassicaceae* and *Zygophylla*ceae.

Environment

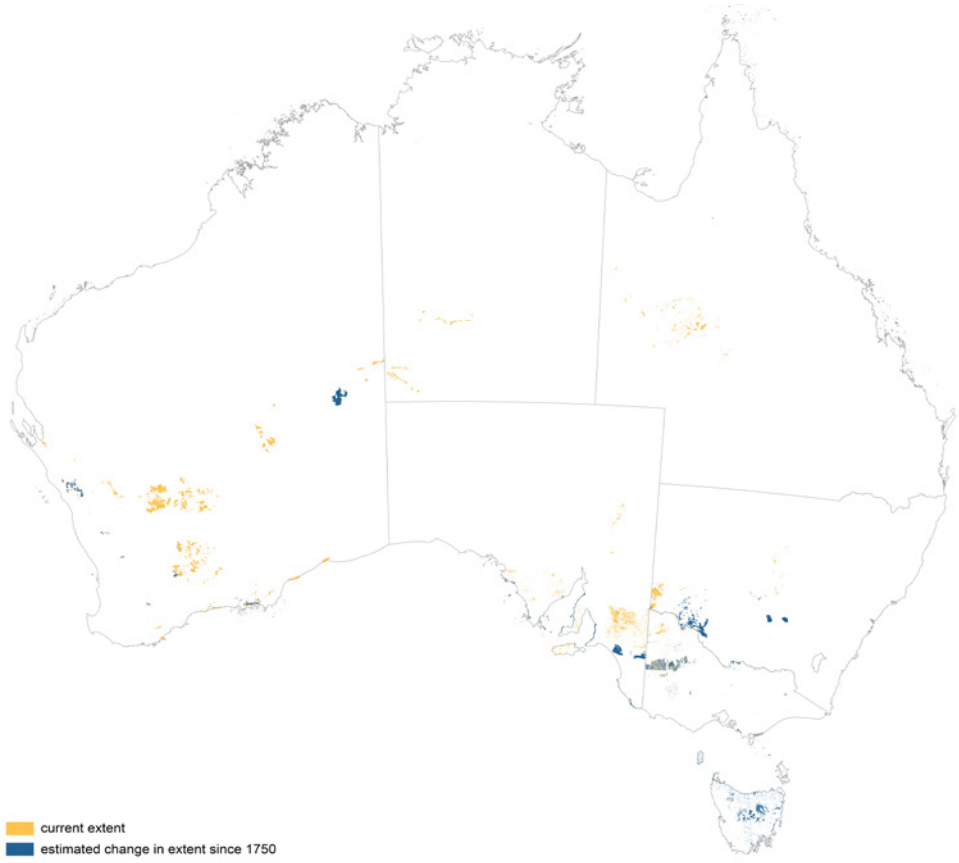
- Typically semi-arid Mediterranean with cool winters and hot dry summers, and annual rainfall of between 200 – 500 mm per annum occurring predominately in winter.
- Occurs on calcareous sandplains, predominantly with lateritic soils in Western Australia and on aeolian landscapes in eastern Australia.
- Different geomorphic processes have shaped these mallee regions with much of the central and south-eastern mallee characterised by sand dune and swale systems.
- In many areas the variation in the thickness of surface sand above clay or calcareous hard pan affects the structural and floristic composition of mallee.
- Soils associated with mallee of arid Australia include solonized brown soils, siliceous sands, calcareous sands, solodized solonetz, soloths, earthy sands and calcareous red earths.

Mallee open woodland with a hummock understorey, western NSW (Photo: B. Pellow)

Geography

- Located in the semi-arid areas of southern Australia in south-west New South Wales, north-west Victoria, southern South Australia and Western Australia.
- Outliers in the Northern Territory, Queensland and northern Western Australia refer mostly to the growth form of pockets of individual trees in places such as mountain tops, rather than the typical extensive mallee plains of southern Australia.
- Largest area occurs in Western Australia (13 618 km^2).
- In the east, mallee is largely restricted to the sandplains and sand dunes of the western part of the Murray Basin with small areas occurring on landforms of aeolian origin further north.
- In the west, mallee occurs on three main land forms, the Yilgarn Plateau, the Stirling coastal zone and the Nullarbor Plain.
- Centrally, in South Australia mallee occurs on extensive dunefields of the Eyre Peninsula, the lower Murray and in the Gulf Ranges provinces.
- Mallee in the temperate zones in southern Western Australia, South Australia, central-west Victoria and central New South Wales are likely to produce dense shrubby understoreys, becoming more open with increasing latitude and transitioning into hummock grasses in the semi-arid and arid zones in central Western Australia and South Australia, northern Victoria, and south-western New South Wales. Pockets in the Northern Territory and Queensland are generally dominated by hummock grasses.
- Make up the most arid of the eucalypt-dominated communities of temperate Australia.

The below image outlines the location of this MVG group in Australia.



Change

- Approximately 39 per cent (13 000 km^2) of the estimated pre-1750 extent cleared accounting for 1.3 per cent of total clearing in Australia including large areas of southern Western Australia and South Australia, and northern Victoria.
- Clearing for crops is ongoing, albeit at reduced rates. Legacies of fragmentation continue to degrade ecological functions.
- Removed from many cereal cropping and sheep grazing lands in the southern and eastern parts of Australia over the last 100 years, most recently for irrigated vineyards and orchards.
- Clearing of the mallee in South Australia commenced in approximately 1900 following the widespread introduction of the stump-jump plough.
- Most of the South Australian Murraylands, Yorke and Eyre Peninsula areas were cleared before World War II. Tops of sandhills were cleared later in the 1960s as part of the rabbit control program.
- Parts of the Kangaroo Island mallee community were cleared following World War II with the soldier settlement scheme.
- Overgrazing associated with pastoral activities and feral herbivores (notably rabbits and goats) have modified mallee in the inland and more arid areas of Australia beyond the rainfall limits of cropping and within the cropping region.
- Fire regimes involving short intervals between successive fires and fire events followed by droughts and/or overgrazing are greatly reducing plant diversity and the capacity of mallee to support its avian and mammal fauna.
- Threats include fragmentation of remaining areas, inappropriate fire regimes (e.g. fires too regular and/or too intense) and grazing impact on understorey.
- Associated issues in understanding and managing mallee areas for multiple values are yet to be fully explored.

Mallee open woodland with a mixed chenopod and tussock grass understorey, western NSW (Photo: B. Pellow)

Key values

- Many species of plants, birds, reptiles and invertebrates not found in any other ecosystems.
- Uniquely Australian form of semi-arid woodland.
- Remnant populations of many rare and endangered vertebrate and invertebrate species (e.g. the Black-eared Miner and the Mallee Fowl).
- Significance to Indigenous communities.
- Conservation and tourism.

List of key management issues

- Control of vegetation clearing for mining, cropping and other transient uses.
- Weed control in remnant vegetation within agricultural landscapes.
- Management of total grazing pressure (including domestic, native and feral animals).
- Rising water tables in cropping areas affected by dryland salinity.
- Destruction of soil crusts by non-native hard hooved animals.
- Wind erosion of soils exposed by overgrazing or cropping.
- Fire frequency and interactions between fires and droughts.
- Livestock grazing and feral animal activity in recently burnt areas.
- Declining rainfall, especially in western and southern Australia.
- Many forms of mallee vegetation remain primarily in private ownership or under leasehold.
- Increased stewardship and multi-value management in response to pastoralist and mining access to natural resources.
- Long-term monitoring to inform future management strategies.

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Data sources

Interim Biogeographic Regionalisation for Australia (IBRA), Version 7.

National Vegetation Information System, Version 4.2.

Collaborative Australian Protected Areas Database – CAPAD 2014 – Terrestrial.

Notes

- Many authors take a broad interpretation of 'mallee woodland' to include any vegetation dominated by multi-stemmed eucalypts. That concept encompasses additional vegetation types including woodlands on rocky hills and other stony substrates in semi-arid landscapes at temperate and subtropical latitudes that incorporate mallee growth forms from sections *Exsertaria* or *Adnataria*. It may also include mallee heaths in temperate humid or semi-humid climates on rocky or sandy substrates with multi-stemmed eucalypts from subgenus *Monocalyptus* or *Eudesmia*. All of these vegetation types are excluded from MVGs 14 and 32, and instead referred to as woodland and heathland groups. The 'true' mallee woodlands and shrublands included within MVGs 14 and 32 encompass those in semi-arid, winter-rain, temperate climates on sandy duplex substrates, dominated by eucalypts in sections *Bisectaria* and *Dumaria*.
- This fact sheet should be read in conjunction with MVG 14: Mallee woodlands and shrublands.