Australian Government
Department of the Environment and Energy

NVIS Fact sheet
MVG 8 – Casuarina forests and woodlands

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 National Vegetation Information System (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 8 – Casuarina forests and woodlands:

- feature Casuarinas (she-oaks) that are a distinctive part of the Australian landscape. The name Casuarina is derived from the Malay *Kasuari* and alludes to the similarity between the drooping foliage of some species in the genus and that of the feathers of the cassowary
- feature casuarinas that have a unique leaf structure, in which individual leaves are reduced to small teeth, the bases of which are fused and surround the stem. This gives the leaf-bearing branchlets the appearance of needles and the plant canopies a fine structure allowing permeability of more light than broad-leaf tree canopies
- while several contrasting vegetation types are dominated by Casuarinas, most species of *Allocasuarina* are subordinate or subdominant members of mixed plant communities
- include vegetation dominated by *Casuarina* or *Allocasuarina* in contrasting environments such as arid sandplains, coastal floodplains and riparian corridors in humid landscapes.

(Banner Photo) *Casuarina* forest (floodplain), Western Sydney, NSW (Photo: B. Pellow)

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Facts and figures

Major Vegetation Group	MVG 8 - Casuarina forests and woodlands
Major Vegetation Subgroups	26. Casuarina and Allocasuarina forests and woodlands
Typical NVIS structural formations	Closed forest (low, mid) Open forest (low, mid) Woodland (low, mid, tall)
Number of IBRA regions	52
Most extensive in IBRA region **(Est. pre-1750 and present)**	Present: Great Victoria Desert (WA, SA) Est. pre-1750: Murray Darling Depression (NSW, SA, Vic)
Estimated pre-1750 extent (km²)	31 278
Present extent (km²)	16 579
Area protected (km²)	4 358

Structure and physiognomy

- Dominated by Casuarina species, often in monospecific stands or otherwise with infrequent co-dominants. Dominant tree Casuarina species reproduce vegetatively by suckers to varying degrees.
- In riparian and estuarine environments, tree canopies may reach 20 - 30 m tall with 30 – 40 per cent canopy cover, sometimes producing a deep layer of Casuarina 'needles' which can limit the growth of shrubs and ground layer species. Some stands, however, have a conspicuous ground layer of moisture-tolerant forbs and sedges or rushes.
- In semi-arid regions ephemeral plant species are an important component of this group. The canopy tends to be sparser in the semi-arid areas than in moist environments, permitting the development of an open shrub layer and ground layer of perennial and ephemeral forbs and grasses.
- Trees are typically around 12 m tall with crown cover >20 per cent, foliage projective cover >10 per cent, and the understorey includes an open layer chenopod or other shrubs.

Casuarina forest along Kilaben Creek, near Kilaben Bay, Lake Macquarie NSW (Photo: J. Baker)

Indicative flora

- Although MVG 8 is dominated by species of Casuarina or Allocasuarina, species composition varies between geographic locations.
- Typical species in inland areas include belah (*Casuarina cristata*), drooping she-oak (*Allocasuarina verticillata*), desert oak (*A. decaisneana*) and river she-oak (*C. cunninghamiana*). Coast she-oak (*C. equisetifolia*) can also occur in association with coastal banksias along the **s**outh-east and eastern seaboards in less exposed sites.
- Large areas of *A. decaisneana* (desert oak) open woodlands occur in arid Northern Territory, Western Australia and South Australia.
- In floodplain/estuarine environments *Casuarina glauca,* are found either in pure or mixed stands, with *Melaleuca styphelioides, M. quinquenervia* or *M. ericifolia*. The ground layer includes a varying mixture of forb genera such as *Alternanthera, Commelina, Persicaria, Solanum* and *Viola*, and graminoids including species of *Baumea, Carex, Cynodon, Gahnia, Juncus, Lomandra, Microlaena* and *Phragmites*.
- *Casuarina cunninghamiana* (river oak) typically dominates riparian zones. Various eucalypts and other genera may co-occur in low densities. Common understoreys include riparian graminoids *Lomandra longifolia* and *Carex appressa*, with forbs such as species of *Alternanthera, Aneilema, Hydrocotyle* and *Persicaria*.
- In semi-arid areas, *Casuarina pauper* in pure or mixed stands, often with a subcanopy of *Alectryon oleifolius,* are associated with calcareous sandplains. Understoreys are often dominated by chenopod shrubs and forbs including species of *Maireana, Chenopodium Enchylaena, Rhagodia* and *Sclerolaena*. The ground layer includes ephemeral species of *Asteraceae* and *Zygophyllum* with tussocks of *Austrostipa, Chloris, Enneapogon* and *Sporobolus*.

Environment

- Pure stands of Casuarina (the she-oaks) are often restricted in area to specific sites. Coast she-oak (*C. equisetifolia*) is typically restricted to the coastal foredunes of eastern Australia; grey she-oak (*C. glauca*), Western Australian swamp she-oak (*C. obesa*) and river oak (*C. cunninghamiana*) to fringes of flow lines in swamps, and *A. huegeliana* on granitic soils and near outcrops in Western Australia.
- May occur as mosaics with other MVGs, such as with other floodplain forests in their upper reaches (MVGs 3 and 9) or coastal saltmarshes (MVG 22) at their tidal extremity, and in semi-arid climates (220 to 350 mm mean annual rainfall) with mallee woodlands (MVG 14 and 32) and bluebush shrublands (MVG 22).
- Found in association with acacia and eucalypts in other inland areas.
- In South Australia and Tasmania *Allocasuarina verticillata* forms monospecific stands on a range of topographies from hill slopes and crests to coastal dunes and plains. Coastal dune assemblages of *A. verticillata* belong to MVG 15.

Casuarina cristata subsp. *pauper* woodland, Carrawinya National Park, QLD (Photo: M. Fagg)

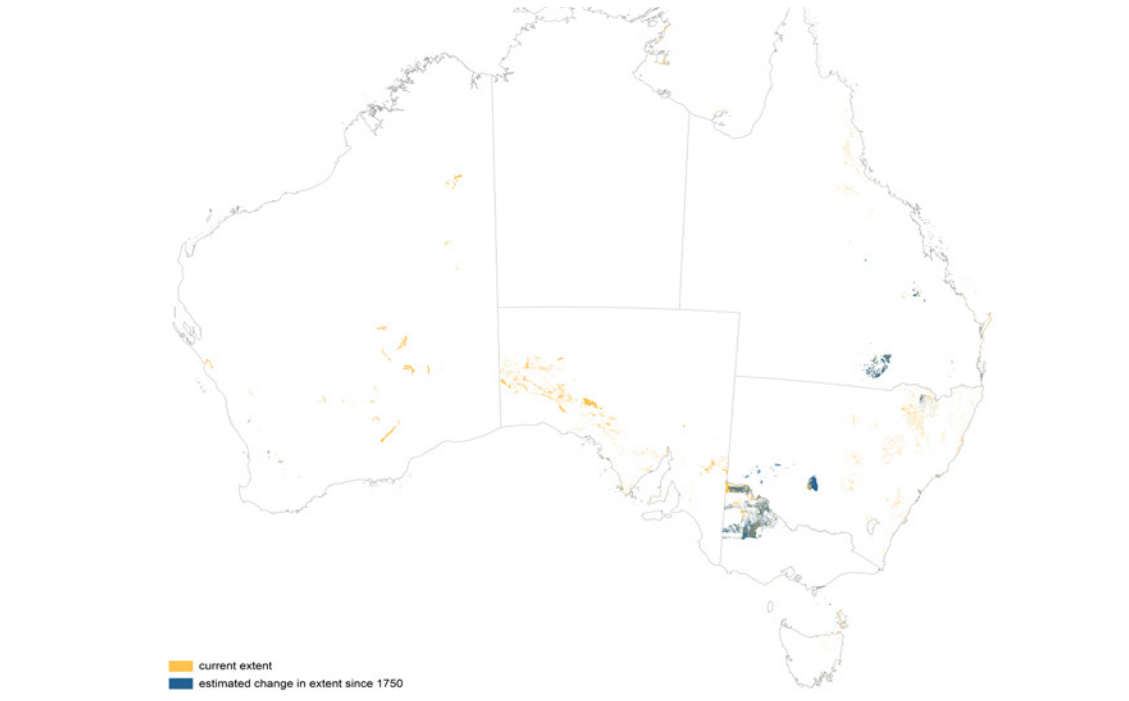
Geography

- Occur on littoral and riverbank sites along the south-eastern, eastern and northern coast of Australia, semi-arid south-eastern Australia and rocky sites throughout the continent.
- In floodplain/estuarine zones such as periodically inundated subsaline flats associated with lower floodplains and estuarine fringes.
- Narrow riparian zones restricted to alluvial soils of largely permanent streams draining the Great Dividing Range (up to 800 m).
- On calcareous sandplains of semi-arid climates (lower Murray Darling Basin to the Nullarbor Plain in the west) on soils of solonized sandy loams with calcrete nodules in the subsoil.
- The largest distribution is in South Australia (6 507km^2).

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

Change

- Approximately 10 per cent (>14 500 km^2) of the estimated pre-1750 extent cleared accounting for 1.7 per cent of total clearing in Australia.
- Clearing for intensive agriculture.
- Changes to floodplain drainage have further modified the distribution of floodplain vegetation. Soil oxidation related to ditching has resulted in dense regrowth of *Casuarina glauca* in locations where it may not have previously occurred, but rarely with the range of other species characteristic of the native forests.
- Invasions by weeds associated with fertiliser use in catchments.
- Casuarina woodlands have been cleared for cropping and pasture improvement in the higher rainfall parts of their range, and more recently mining activities.
- Grazing by sheep, cattle, feral goats and rabbits, limits recruitment of *Casuarina* and other woody species.
- Dieback related to salinisation affects coastal and inland woodlands where tidal flows have been altered or water tables are rising as a result of clearing and fragmentation of vegetation.
- Threats to these restricted-site communities include grazing by feral animals, pollution, sedimentation, rising water tables and dryland salinity in temperate Australia, and coastal development affecting wetland and supratidal forests of *Casuarina glauca.*



Key values

- Biodiversity including wetland biota and species of parrot that feed on Casuarina fruits.
- Hydrological functions of streams and floodplains.
- Health of coastal estuaries and wetlands.
- Fire management in semi-arid landscapes, as Casuarina woodlands are much less flammable than co-occurring mallee woodlands.
- Soil conservation in the semi-arid landscapes.

List of key management issues

- Clearing and edge effects.
- Floodplain infrastructure.
- Water pollution and sedimentation from urban and agricultural practices.
- Construction of dams and weirs.
- Grazing by livestock and feral animals.
- Weed control.
- Changes to coastal ecology and tide regimes.
- Changes to fire regimes.
- Climate change and its impact on coastal wetlands and stream flows.
- Catchment salinization related to vegetation clearing.

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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

- Stunted forms of *Casuarina* and *Allocasuarina* may be associated with other species of similar growth form in Heathlands (MVG 18).