Australian Government
Department of the Environment and Energy

NVIS Fact sheet
MVG 23 – Mangroves

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 23 – Mangroves:

- generally consist of trees or shrubs with dense leaf canopies and generally exceeding two m in height
- typically occur above mean sea level in the intertidal zone of marine coastal environments and estuarine margins that are subject to regular inundation by seawater in low-wave energy environments
- has species richness of mangrove vegetation declines with increasing latitude
- are dynamic, responding to changes in sediment distribution arising naturally or from disturbances such as dredging, landfill, reclamation construction of breakwaters or increases in erosion of river catchments
- occupy approximately 11 000 km of the Australian coastline which is the third largest area of mangroves in the world
- Australia has 6.4 per cent of the world's mangrove area, but 58 per cent of the world's mangrove species
- growth forms have evolved numerous times and are represented in many different plant families that also include non-mangrove species
- are major contributors to primary productivity in coastal marine systems and consequently are important spawning grounds for fish and habitat for crustaceans, molluscs and other marine invertebrates.

Mangroves (*Avicennia marina subsp. marina*), St Kilda Beach, near Adelaide SA (Photo: M. Fagg)

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Facts and figures

Major Vegetation Group	MVG 23 - Mangroves
Major Vegetation Subgroups	40. Mangroves
Typical NVIS structural formations	Closed forest (mid, low) Open forest (mid, low) Woodland (mid, low) Open Woodland (mid, low) Shrubland (tall, mid, low) Open Shrubland (tall, mid, low)
Number of IBRA regions	29
Most extensive in IBRA region (Est. pre-1750 and Present)	Cape York Peninsula (Qld)
Estimated pre-1750 extent (km^2)	10 750
Present extent (km^2)	10 491
Area protected (km^2)	2 494

Mangroves, Jervis Bay Territory (Photo: M. Williams and DEH)

Structure and physiognomy

- Mangroves typically consist of a tree stratum growing in bare sediments and may have a sparse to dense structure. The height of the canopy is two – eight m but may reach 20 m in northern parts of Australia and may be less than one m tall in temperate riverine estuaries.
- The mangrove communities decrease in stature with increasing distance from the equator.
- Multi-species communities are common at tropical and subtropical latitudes, with the distribution of the different tree species in locations determined by environmental factors such as water salinity and inundation levels. Monospecific stands occur at temperate latitudes.
- In general, plants on the edges of stands (both water and landward) have more lower limbs and foliage, and their stems are typically sprawling and sinuous, rather than erect and straight.
- Trees typically form closed canopies.
- Mangrove understoreys may include shrub mangroves and in some locations a sparse ground cover may occur where mangroves grade into saltmarsh.
- Mangroves have specialised adaptations to survive in frequently inundated anaerobic mudflats including stilt roots and pneumatophores (aerial roots which resemble fingers or limbs growing upwards from sediments) to increase the diffusion of oxygen into roots.
- Other mangrove adaptations include the ability to exclude, accumulate or excrete salt from leaves, the buoyancy of propagules enabling them to disperse long distance in currents, and vivipary, the ability of seeds to germinate before dispersal while still on the tree.

Indicative flora

- Mangrove communities are relatively species poor in vascular plants compared to other vegetation types but the diversity of mangrove plant families is high in the tropics.
- The Australian mangrove tree and shrub flora includes 41 species from 22 genera and 19 families, the most prominent families being Rhizophoraceae (13 species) and Sonneratiaceae (five species). All mangroves are flowering plants, including one palm (*Nypa fruticans*).
- The most floristically diverse mangrove communities are in the tropics, with widespread species including *Acrostichum speciosum, Aegialitis annulata, Aegiceras corniculatum, Avicennia marina* var. *eucalyptifolia, Excoecaria agallocha,* and several species of the genera *Bruguiera, Ceriops, Lumnitzera, Rhizophora, Sonneratia* and *Xylocarpus*. *Acrostichum speciosum* (Mangrove fern) is one of the few vascular plants found commonly in the understoreys of tropical mangrove vegetation.
- Temperate mangrove vegetation is floristically simpler, with only *Avicennia marina* var. *marina* and *Avicennia marina* var. *australasica* extending to the south coast from the west and east respectively, while *Aegiceras corniculatum* extends to the far south coast of New South Wales. The understorey is devoid of vascular plants except near the upper tidal limit where saltmarsh species such as *Sarcocornia quinqueflora* and *Suaeda australis* may co-occur with mangroves.

Rhizophora stylosa (red mangrove), Cape Tribulation, Qld (Photo: D. Keith)

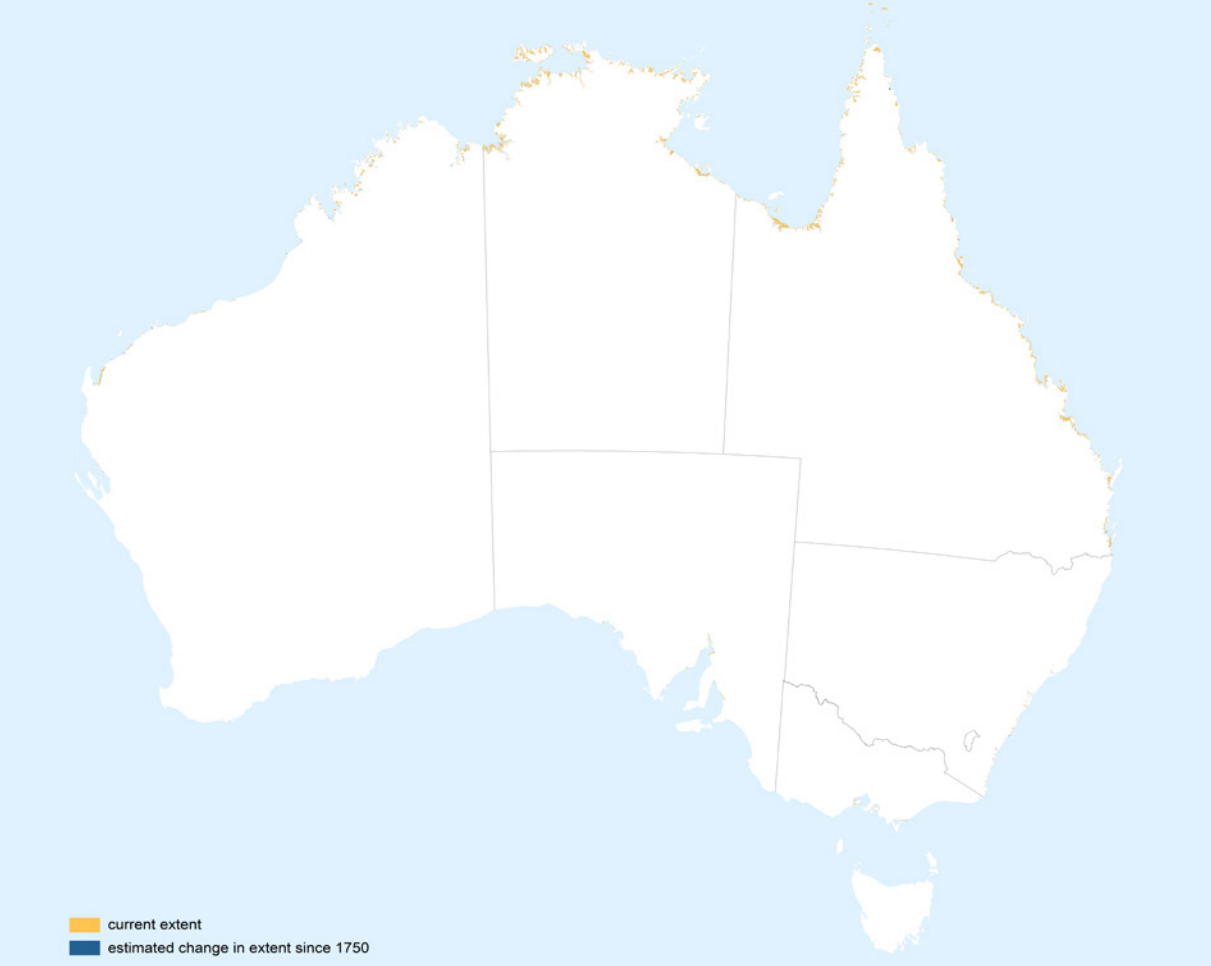
Environment

- Mangroves grow within low-energy intertidal zones, generally in muddy sediments and also found in sandy and rocky habitats.
- Mangroves are subject to periodic inundation by seawater with varying influx of freshwater from terrestrial sources.
- Local zonation of species is related to the extent and severity of soil waterlogging and salinity, which, in turn, are influenced by the frequency of inundation by sea water and freshwater influx through seepage and river discharge. Species such as *Aegiceras corniculatum* and *Barringtonia racemosa* are commonly found in more brackish habitats.
- Establishment of mangroves requires a suitable sediment surface between mid and high tide levels and shelter from wave action. Locally dynamic distributions of mangroves reflect the movement of sediment related to changes in river discharge and coastal currents.

Geography

- Mangroves are widespread around the Australian continent, but locally restricted to low-energy coastal environments. The range of mangrove community and species found in Australia is equaled only by those in Indonesia.
- As noted above, there is a strong latitudinal gradient in mangrove composition and diversity, with the number of species declining from 39 in northern Queensland to one in Victoria. Mangroves do not occur in Tasmania.
- Mangroves in the Northern Territory are likely to cover the largest area, covering 42 per cent of the Northern Territory coastline and representing up to 42 per cent of Australia's mangrove communities. Mangrove mapping within the NVIS requires finer scale mapping in many states.

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



Change

- According to NVIS (see notes regarding mapping limitations), approximately two per cent (2 494 km^2) of the estimated pre-1750 extent cleared accounting for less than 0.01 per cent of total clearing in Australia.
- Other estimates indicate up to 17 per cent of Australia's mangroves have been destroyed since European settlement, with more recent die off due to climate change occurring, such as that in the Northern Territory 2016, killing up to 7 000 hectares in a month.
- Much of this area has been lost through infilling and clearing for urbanisation, port development and industrial areas around coastal and estuarine areas.
- Further losses occurred in response to changes in sediment distribution associated with reduced input from dammed rivers, increased freshwater influx from urbanised surfaces and interruption of currents by coastal infrastructure.
- Agricultural chemicals in runoff appear to affect mangrove health. In five adjacent estuaries in the Mackay region of central Queensland, more than 30 km^2 of mangroves have been affected by the severe dieback of *Avicennia marina*. Correlative evidence implicated herbicides used in sugar cane production as the most likely cause of this dieback.
- In other regions, notably the south-east coast beyond urbanised areas, mangrove vegetation have expanded, partly due to increased sedimentation from river catchment erosion which creates new substrates for colonisation, and partly due to ingression of mangroves into saltmarsh and freshwater wetland habitats. The latter may be an early response to sea level rise and has been observed in other countries such as Mexico.
- Impacts on mangrove vegetation in Australia are generally less than in other countries.
- In recent decades the conservation values and economic benefits of mangroves to fisheries have been recognised through planning strategies and habitat protection controls in most States and Territories.

Key values

- Essential breeding habitat for estuarine and marine species.
- Coastal and estuarine ecology and fisheries habitat.
- Mangroves support a wide range of birds and mammals, including some rare and endangered species.
- Stabilisation of sediments and estuarine fringes.
- Protection from water current and tidal erosion.
- Maintenance of coastal water quality by filtering and trapping sediments and other materials from coastal runoff.
- Ecotourism including boardwalks and guided fishing tours.
- Educational and teaching resources for ecosystem and food web ecology.

List of key management issues

- Protection of mangrove from in-filling, pollution, aquaculture, urbanisation, industrialisation and shipping infrastructure.
- Sedimentation associated with clearing and overgrazing of river catchments.
- Hydrological changes, including changes to currents, tidal regimes, waterlogging and salinity.
- Warming waters, erratic rainfall, rising sea levels and increased storm surges associated with climate change.
- Increases in wave energy as a result of maritime infrastructure and increased shipping/recreational boating activity.
- 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

- Mangrove mapping in NVIS is incomplete for many states/territories and thus not a complete reflection of the actual distribution of Mangroves across Australia. It is likely that many areas of die off or degradation are unmapped and that the restricted nature of the mangrove communities requires finer scale mapping. Area and change statistics for this community are likely to be understated.