Australian Government
Department of the Environment and Energy

NVIS Fact sheet
MVG 18 – Heathlands

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 18 – Heathlands:

- comprise nutrient-poor ecosystems characterised by a diverse and endemic flora and fauna
- occur on regularly fire-prone, rocky landscapes and sand plains
- are dominated by shrubs with mostly nanophyll (0.25 – 2.5 cm^2) or microphyll (2.5 – 20.5 cm^2) sclerophyllous leaves, typically with co-occurring undershrubs, sedges, forbs and few grasses. Trees are usually absent, but scattered emergents or an upper stratum of mallee eucalypts may be present
- occupy a relatively small portion of the Australian continent dispersed through all states and territories of Australia in tropical and cool temperate latitudes but not in arid environments
- have very large numbers of heathland plant species that belong to relatively few plant families including Proteaceae, Myrtaceae, Fabaceae, Ericaceae, Restionaceae and Cyperaceae
- are acknowledged as being amongst the most species-rich vascular plant communities in the world.

Coastal heath on clifftops, North Head, Sydney Harbour, NSW (Photo M. Fagg)

SSD18R.0117

Facts and figures

Major Vegetation Group	MVG 18 - Heathlands
Major Vegetation Subgroups (number of NVIS descriptions)	28. Low closed forest or tall closed shrublands (including Acacia, Melaleuca and Banksia) 30. Heath 32. Other shrublands 80. Other sparse shrublands and sparse heathlands
Typical NVIS structural formations	Closed heathland (tall, mid, low) Heathland (tall, mid, low) Open heathland (tall, mid, low) Sparse heathland (tall, mid, low)
Number of IBRA regions	38
Most extensive in IBRA region (Est. pre-1750 and Present)	Coolgardie (WA)
Estimated pre-1750 extent (km^2)	15 993
Present extent (km^2)	14 429
Area protected (km^2)	8 356

Heathland, Stirling Ranges, WA (Photo D. Keith)

Structure and physiognomy

- Heathlands may have one to three strata: upper stratum shrubs up to six m tall; a layer of smaller shrubs, generally 0.5 – 2.0 m tall, and a ground layer of forbs, orchids, prostrate shrubs and occasional graminoids.
- The upper shrub stratum, if present, comprises a dense layer of tall shrubs up to 90 per cent cover. These shrubs are typically killed by fire and regenerate by seed.
- Trees may be present as sparse scattered emergents, rarely exceeding 10 m tall, or as an open layer of mallee growth forms up to five m tall and up to 20 per cent canopy cover.
- Most of the plant diversity is present in the lower strata, with the upper shrub or mallee stratum generally comprising one to four species, but the diversity and cover of the lower shrub stratum is inversely related to the cover of the upper layer.
- In extreme alpine environments, a single structural layer is present, less than 0.3 m tall, with prostrate shrubs, forbs and tussock grasses, and may include cushion plants.
- Shrubs often have small sclerophyllous foliage (mostly nanophyll, 0.25 – 2.5 cm^2), features typically associated with low levels of soil nutrients.

Indicative flora

- *Proteaceae, Myrtaceae, Fabaceae, Ericaceae, Restionaceae* and *Cyperaceae* are the most species-rich and widespread plant families in heathland. Numerous other families contribute to the diversity including *Anthericaceae, Apiaceae, Dilleniaceae, Goodeniaceae, Lomandraceae, Orchidaceae, Rhamnaceae, Rutaceae* and *Stylidiaceae*.
- Heathlands are characterised by high species turnover, hence few species are in common between different regions of the continent, even though many genera are shared. Composition and structure is heavily influenced by soil substrates and landform.
- In the east, the most widespread and abundant species belong to the following genera: *Allocasuarina, Banksia, Hakea, Leptospermum, Phyllota, Hibbertia, Hypolaena, Caustis, Lepidosperma, Schoenus, Acacia, Dillwynia, Pultenaea, Epacris, Leucopogon, Xanthorrhoea* and *Lomandra*. *Melaleuca* species are prominent on coastal sands, variant 'mallee ash' species (*Eucalyptus*) are typical of Sydney basin sandstones, and dominant species of *Allocasuarina, Kunzea* or *Leptospermum,* are found on rocky substrates on the ranges at 700 – 1500 m elevation.
- Alpine heathlands contain a range of endemics including shrub species of *Grevillea, Orites, Kunzea, Epacris, Leucopogon, Richea, Nematolepis, Prostanthera, Bossiaea, Oxylobium, Baeckea, Podocarpus, Olearia* and *Ozothamnus*, with forbs and graminoids, *Astelia, Carex, Oreobolus, Schoenus* and *Poa*. Tasmanian alpine heaths include the genera *Athrotaxis, Microcachrys* and *Bellendena* while cushion plants of genera *Abrotanella, Colobanthus, Donatia, Phyllachne* and *Schizacme* dominate the Tasmanian bolster heaths.
- Typical species of the south-west belong to the genera *Banksia, Conospermum, Hakea, Petrophile, Calothamnus, Eremaea, Melaleuca, Verticordia, Acacia, Daviesia, Gompholobium, Astroloma, Leucopogon, Lysinema, Boronia, Stylidium, Thysanotus, Anigozanthos, Xanthorrhoea, Mesomelaena, Schoenus, Desmocladus* and *Lyginia*. A major distinction exists between heathlands of coastal sandplains north of Perth and those of the south coast. Mallee eucalypts are a feature of south coast sands (e.g. *Eucalyptus pleurocarpa*) and granite outcrops (e.g. *Eucalyptus caesia*). Unique assemblages are found at 900 -1000 m elevation on the Stirling Range.
- Heathlands in the north are restricted to rocky landscapes within a relatively small range. Common genera include *Acacia, Asteromyrtus, Calytrix, Thryptomene, Grevillea, Hibbertia, Jacksonia, Boronia, Pityrodia, Fimbristylis, Triodia, Micraria* and *Eriachne*. Scattered emergents of *Corymbia* species and *Callitris intratropica* occur where soils are deeper.

Environment

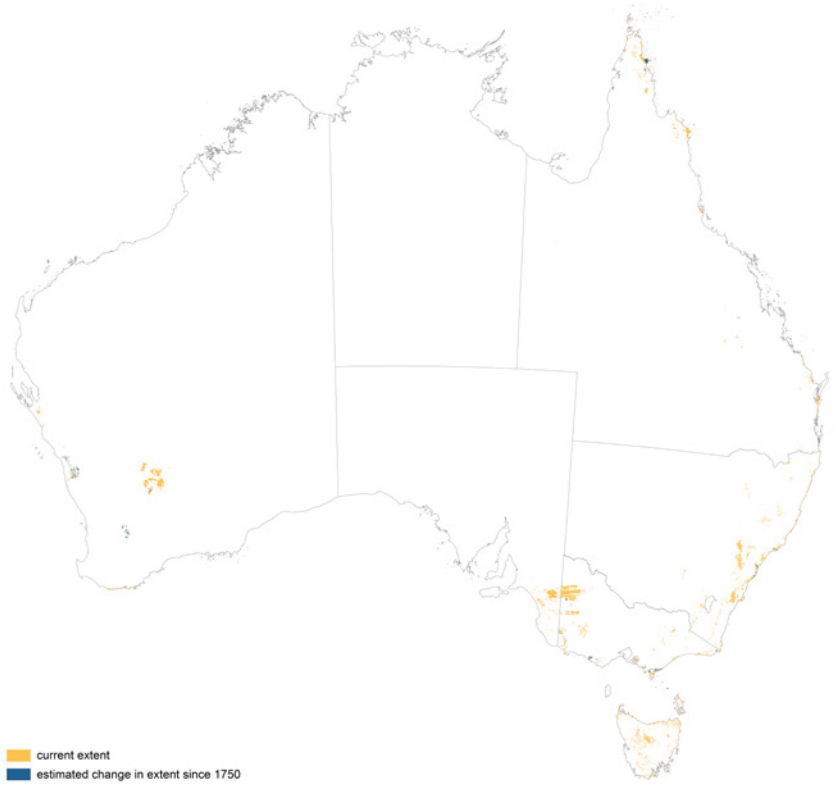
- Occur in low nutrient acid soils usually derived from quartz-rich substrates but also found on calcium-rich soils in Western Australia.
- Found on a variety of substrates including calcareous and siliceous sandplains, lateritic uplands, sandstone granites and acid volcanics.
- Soil depth varies from several metres on sandplains to less than a few centimetres on rocky sandstone or granite outcrops.
- Soils are typically phosphorus and nitrogen deficient and have high levels of immobilized iron and aluminium.
- Often occur on landscape components with high levels of exposure to wind and solar radiation or where levels of soil moisture are periodically high.
- Occur where mean annual rainfall typically exceeds 400 mm in southern Australia, but may exceed 2000 mm on parts of the east coast ranges and Tasmania.

- Rainfall seasonality and temperature varies widely from: warm wet-summer tropical monsoons of the north; wet-winter Mediterranean and semi-arid climates of south-western and southern Australia; warm temperate climates of eastern Australia; cool-temperate climate of Tasmania and eastern highland areas; and to alpine mountains where snow cover persists for several months of the year.
- Span the full range of elevations from sea level to above 2000 m.

Geography

- Heathlands occur around the continental fringe in all states and territories of Australia (due to scale, some distributions may not be present on the map included).
- Heathlands in the east are associated with a broad range of substrates and landforms including coastal sandplains from Queensland to southern New South Wales; sandstone plateaus within the Sydney Basin; locally exposed sites with poor siliceous soils along the Great Dividing range and into Tasmania; granite coasts and plateaus (e.g. Green Cape NSW, Furneaux Islands, Tasmania) and old sandplains in the lower Murray River and Eyre Peninsula districts of South Australia and Victoria.
- Alpine heathlands occur in high mountain plateaus of south-east New South Wales, eastern Victoria and central and southern Tasmania.
- In the south-west, heathlands occur on a range of substrates and landforms including 'kwongan' sandplains north of Perth; sandplains, calcarenite and spongelite around the south coast; granite outcrops scattered through the Darling Range and wheatbelt; and the Stirling Range up to 1000 m elevation. These heathlands account for the most extensive tracts of heathland in Australia.
- Heathlands in the north typically occur on the sandstone escarpments of Cape York, the Arnhem Plateau, Northern Territory and the northern Kimberley region in Western Australia.
- The largest area is found in Western Australia (3 627 km^2).

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



Change

- Approximately 10 per cent (1 500 km^2) of the estimated pre-1750 extent cleared accounting for 0.1 per cent of total clearing in Australia.
- Extent in Western Australia most affected by clearing for coastal development and agriculture with approximately 20 per cent of heath lost in the south-west.
- Near major population centres and along the eastern seaboard heath communities have been modified extensively by clearing for urban development, recreation infrastructure and by heavy mineral sand mining.
- Land clearing for urban development persists as a major threat to these communities.
- Heathlands are a major attraction to the wider community and tourists, as wild landscapes for bushwalking and wildflower viewing in remote areas and in proximity to the residential areas.
- Inappropriate fire regimes threaten heathland diversity by disrupting life cycles of obligate seeding plant species and altering competitive balance between different life history groups.
- Soil-borne water mould, *Phytophthora cinnamomi,* has infected large areas of south-west heathlands and eastern heathlands at southern latitudes, causing root rot disease that eliminates susceptible plant species and transforms heathland composition and structure.
- Climate change threatens heathlands containing locally endemic species, with declining rainfall in the south reducing flower production, seed set and seedling establishment.
- Weed invasion associated with disturbance and eutrophication threatens the diversity of native species in agricultural landscapes, urban fringes and roadsides.

Kalbarri National Park, WA (Photo: M. Fagg)

List of key management issues

- Coastal development.
- Control of root rot disease.
- Improve coverage of the National Reserve System to represent high beta diversity.
- Tourist/visitor management (e.g. access to beaches).
- Clearing and control of clearing for urban development.
- Fire management to address biodiversity conservation and asset protection.
- Weed control (e.g. aggressive weeds such as boneseed, veldt grass, and South African love grass).
- Reduction of greenhouse gas emissions to mitigate impacts of declining rainfall and changing fire regimes.
- Long term monitoring to inform future management strategies.

Key values

- Biodiversity including many locally restricted species and communities.
- Scientific values for researching species coexistence and biogeography.
- Ecotourism, including bushwalking and landscape features.
- Cultural and heritage values.

Alpine Heathland, summit of Mt Wellington, Tas (Photo: M. Fagg)

References

Australian Surveying and Land Information Group (1990) *Atlas of Australian Resources. Volume 6 Vegetation*, AUSMAP, Department of Administrative Services, Canberra, 64pp. & 2 maps.

Beadle N.C.W. (1966) Soil phosphate and its role in moulding segments of the Australian flora and vegetation with special reference to xeromorphy and sclerophylly. *Journal of Ecology* vol. 47, pp. 991 – 1007.

Beadle N.C.W. (1981) *The Vegetation of Australia.* Cambridge Univ. Press, Cambridge, 690pp.

Beard J.S. and Sprengler B.S. (1984) *Geographical Data from the Vegetation Survey of Western Australia*. Occasional Paper No. 2. Vegmap Publications, Applecross.

Beard J.S., Beetson G.R., Harvey J.M. Hopkins A.J.M. and Shepherd D.P. (2013) *The Vegetation of Western Australia at 1:3,000,000 Scale. Explanatory Memoir.* Second Edition. Science Division, Department of Parks and Wildlife, Western Australia.

Costin A.B., Gray M., Toterdell C. and Wimbush, D. (2000) *Kosciuszko alpine flora*. CSIRO, Melbourne.

George, A.S., Hopkins, A.J.M. and Marchant, M.G. (1979) The heathlands of Western Australia. In: *Ecosystems of the World, vol 9A. Heathlands and Related Shrublands, Descriptive Studies* (ed. Specht R. L.) pp. 211-230. Elsevier Sci. Publ. Co, Amsterdam.

Groves, R.H. (1981) Heathland soils and their fertility status. In: *Ecosystems of the World. Vol. 9B Heathlands and related shrublands: Analytical Studies* (ed. Specht R.L.) pp. 143 – 150. Elsevier, Amsterdam.

Haigh C. (1981) *Heaths in New South Wales.* NSW National Parks and Wildlife Service, Sydney.

Harris S. and Kitchener A. (2005) *From Forest to Fjaeldmark. Descriptions of Tasmania's vegetation.* Department of Primary Industries, Water and Environment, Hobart, 432pp.

Keith D.A., McCaw W.L., Whelan R.J. (2002) Fire regimes in Australian heathlands and their effects on plants and animals. In: *Flammable Australia.* The fire regimes and biodiversity of a continent (eds. Bradstock R.A., Williams J.E. and Gill A.M.) pp. 199 - 237. Cambridge University Press, Cambridge.

Keith D. A. (2004) Ocean Shores to Desert Dunes the Native Vegetation of New South Wales and the ACT. Department of Environment and Conservation (NSW), Hurstville.

Keith D., Lindenmayer D., Lowe A., Russell-Smith J., Barrett S., Enright N., Fox B., Guerin G., Paton D., Tozer M. and Yates C. (2014) Heathlands. In: *Biodiversity and Environmental Change Monitoring, Challenges and Direction* (eds. Lindenmayer D., Burns E., Thurgate N. and Lowe A.) pp. 213 - 282. CSIRO, Victoria.

National Land and Water Resources Audit (2001) *Australian Native Vegetation Assessment 200*1. National Land and Water Resources Audit, Canberra, 332pp.

Russell-Smith, J., Ryan, P.G. and Cheal, D. (2002) Fire regimes and the conservation of sandstone heath in monsoonal northern Australia: frequency, interval, patchiness. *Biological Conservation* vol. 104, pp. 91-106.

Specht R.L. (1979) The sclerophyllous (heath) vegetation of Australia: the eastern and central states. In: *Ecosystems of the World, vol 9A. Heathlands and Related Shrublands, Descriptive studies.* (ed. Specht, R.L.) pp. 125-210. Elsevier, Amsterdam.

Specht R.L. (1994) Heathlands. In: *Australian Vegetation* (ed. R.H. Groves) pp. 321-344. Cambridge Univ. Press, Cambridge.

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.