

**Approved Conservation Advice for**  
**Western Sydney Dry Rainforest and Moist Woodland on Shale**

(s266B of the *Environment Protection and Biodiversity Conservation Act 1999*)

This Conservation Advice has been developed based on the best available information at the time this Conservation Advice was approved; this includes existing plans, records or management prescriptions for this ecological community.

**Description**

The **Western Sydney Dry Rainforest and Moist Woodland on Shale** ecological community covers two vegetation units, Western Sydney Dry Rainforest and Moist Shale Woodland, described by Tozer (2003) and Tozer et al. (2010) and listed as endangered under the New South Wales *Threatened Species Conservation Act 1995* (NSW Scientific Committee, 2000a; 2000b).

The ecological community varies from a low closed rainforest, typically in lower slopes and gullies, to a more open moist woodland form on upper slopes and disturbed sites. Emergent trees can be up to around 25 m high and a lower tree layer is often present. Dominant species of the canopy and the sub-canopy vary across the latitudinal range of the ecological community, and also according to the available moisture and shelter. Each dry rainforest stand is unique in its assemblage of species, although there are a group of common species throughout with local floristics depending on local conditions. In sheltered gullies and on lower slopes the canopy layer of the ecological community is typically dominated by *Melaleuca styphelioides* (prickly-leaved paperbark). Other diagnostic tree species include *Acacia implexa* (hickory wattle), *Alectryon subcinereus* (native quince), *Brachychiton populneus* (kurrajong), *Corymbia maculata* (spotted gum), *Melicope micrococca* (white euodia) and *Streblus brunonianus* (whalebone tree). *Eucalyptus* spp. occur as emergents in the rainforest form, and grade into a canopy in moist woodlands, the dominant species generally being *E. tereticornis* (forest red gum), *E. moluccana* (coastal grey box) and/or *E. crebra* (narrow-leaved ironbark).

Mesic species commonly occur in the shrub layer of the ecological community and some shrub species are prickly. Characteristic shrub species include *Breynia oblongifolia* (coffee bush), *Clerodendrum tomentosum* (hairy clerodendrum) and *Notelaea longifolia* f. *longifolia* (large mock-olive), which are common in both the dry rainforest and moist woodland forms of the ecological community. At sites where the dry rainforest form is present additional shrub species are common, including *Abutilon oxycarpum* var. *oxycarpum* (lantern bush), *Deeringia amaranthoides* (shrubby deeringia), *Melicytus dentatum* (tree violet), *Myrsine variabilis* (muttonwood), *Pittosporum multiflorum* (orange thorn), *P. revolutum* (yellow pittosporum) and *Solanum stelligerum* (Devil's needles). Other shrub species present in the moist woodland form of the ecological community include *Bursaria spinosa* (blackthorn) and *Olearia viscidula* (wallaby weed).

Vines and other climber species are typically common throughout the ecological community. Species frequently recorded in patches of the ecological community include: *Aphanopetalum resinosum* (gum vine), *Cayratia clematidea* (native grape), *Celastrus australis* (staff climber), *Cissus antarctica* (kangaroo vine), *Clematis glycinoides* var. *glycinoides* (headache vine), *Eustrephus latifolius* (wombat berry), *Geitonoplesium cymosum* (scrambling lily), *Glycine clandestina* (twining glycine), *Pandorea pandorana* (Wonga Wonga vine), *Ripogonum album* (white supplejack), *Rubus parvifolius* (native raspberry), *Sarcopetalum harveyanum* (pearl vine) and *Stephania japonica* var. *discolor* (snake vine).

The ground stratum of the dry rainforest form typically is comprised of a mixture of fern and forb species with grasses being absent to uncommon and mosses also rare. In the moist woodland form, some rainforest-affiliated species also remain and grasses can be more abundant, comprising shade and moisture-tolerant species such as *Echinopogon ovatus* (forest hedgehog grass), *Microlaena stipoides* (weeping grass) and *Oplismenus imbecillis* (creeping beardgrass). Fern and forb species recorded as occurring in the ground layer of the ecological community include: *Adiantum aethiopicum* (common maidenhair), *Asplenium flabellifolium* (necklace fern), *Cheilanthes distans* (bristly cloak fern), *Desmodium brachypodum* (large tick-trefoil), *Desmodium varians* (slender tick-trefoil), *Dichondra* spp. (kidney weed), *Doodia aspera* (rasp fern), *Einadia hastata* (berry saltbush), *Einadia nutans* subsp. *nutans* (climbing saltbush), *Galium leiocarpum* (bedstraw), *Geranium homeanum* (cranesbill), *Glycine clandestina* (twining glycine), *Nyssanthes diffusa* (barbwire weed), *Oxalis perennans* (wood sorrel), *Pellaea falcata* (sickle fern), *Plectranthus parviflorus* (cockspur flower), *Pyrrosia rupestris* (rock felt fern), *Sigesbeckia orientalis* subsp. *orientalis* (Indian weed), *Rumex brownii* (swamp dock), *Solanum* spp. (e.g. *S. prinophyllum* (forest nightshade) and *S. pungetium* (jagged nightshade)), *Stellaria flaccida* (forest starwort), *Urtica incisa* (stinging nettle) and *Wahlenbergia gracilis* (sprawling bluebell).

The ecological community supports a wide range of animal species, including small mammals (particularly micro-bats), insectivorous, frugivorous and seed-foraging ground-dwelling birds, birds of prey, skinks, snakes, frogs and a large range of invertebrates. The vegetation structure and species composition of the ecological community provides shelter, food and nesting material for these animals, which in turn play important roles in the ongoing function of the ecosystem.

A small number of plants and animals likely to be present in the ecological community are listed as threatened at the national and/or state level.

A more comprehensive description of the ecological community is contained in the Listing Advice which is available on the Internet at:

[www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl](http://www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl)

## **Conservation Status**

The **Western Sydney Dry Rainforest and Moist Woodland on Shale** is listed as **critically endangered**. This ecological community is eligible for listing as critically endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as, the Minister has considered the Threatened Species Scientific Committee's advice (Threatened Species Scientific Committee, 2012) and amended the list under section 184 to include the Lowland Rainforest of Subtropical Australia ecological community. The Committee determined that this ecological community met criteria 1, 2, and 4 of the eligibility criteria for listing as threatened under the EPBC Act because its decline in geographic distribution is substantial; its very restricted geographic distribution makes it likely that the action of a threatening process could cause it to be lost in the immediate future and because the reduction in integrity across most its range is very severe, as indicated by degradation, weed invasion and loss of species from the ecological community.

## **Distribution and Habitat**

The ecological community has a highly restricted distribution in the Sydney Basin bioregion in New South Wales. It is confined to sheltered slopes and gullies on steeply sloping, rugged topography mostly in the Cumberland Plain sub-region (Tozer, 2003; Tozer et al., 2010). The ecological community occurs in the Hawkesbury/Nepean and Sydney Metro Catchment Management Authorities (CMAs) / Natural Resource Management (NRM) Regions, as structured in May 2012. The majority of remnants of the ecological community are found in

the Wollondilly local government area (LGA) but remnants are also known to occur in the Camden, Campbelltown, Holroyd, Fairfield, Liverpool, Penrith, Hawkesbury and The Hills LGAs and may occur elsewhere in the Sydney Basin Bioregion (James, 1997; NSW Scientific Committee, 2000a,b).

The ecological community is generally limited to elevations below 300 metres above sea level (asl) in gullies, sheltered slopes and rugged terrain. The soils on which the ecological community occurs are almost exclusively clay soils derived from Wiannamatta Group shales (National Parks and Wildlife Service, 2002b; Tozer, 2003; Tozer et al., 2010). The moist woodland form of the ecological community generally occur on upper slopes, while the dry rainforest component occupies lower slopes and gullies where conditions are more favourable for rainforest species.

The available data indicates a highly fragmented distribution and small patch size with 99% of remnants being under 10 ha in size, and about 60% of remnants under one ha. The extent of the ecological community is approximately 950 ha.

### **Threats**

The main identified threat is ongoing clearing, particularly for urban and industrial development in western Sydney, and the consequent increased fragmentation of the ecological community, as indicated by the smaller size of remnant patches. Other current threats to the ecological community include weed invasion, inappropriate grazing, increased fire frequency and impacts associated with close proximity to development such as dumping of rubbish into remnants, recreational vehicle use, and trampling of sites. A number of serious, high impact weeds invade the ecological community, notably African olive and lantana. Logging has been a past threat. Climate change is projected to be a future threat with predicted temperature rises, increased fire frequency, reduced rainfall and generally drier conditions, potentially influencing the future distribution and extent of the ecological community.

More detail about these threats is contained in the Listing Advice which is available on the Internet at:

<http://www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl>

The following EPBC Act listed Key Threatening Processes are most relevant to the **Western Sydney Dry Rainforest and Moist Woodland on Shale** ecological community:

- Land clearance and;
- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants.

### **Research Priorities**

Research priorities that would inform future regional and local priority actions include:

- Undertake surveys to locate and map occurrences of the ecological community, as well as threatened species that occur in the ecological community.
- Map and survey remnants that meet the condition thresholds for the ecological community.
- Design and implement a monitoring program or, if appropriate, support and enhance existing programs for the ecological community and associated threatened species.
- Continue to build upon existing research efforts into the impacts of various management regimes, the restoration of ground layer species and the regeneration of trees and shrubs in the ecological community.

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- Develop effective management methods for the most damaging weed species that infest the ecological community
- Assess the vulnerability of the ecological community to climate change.

### **Priority Actions**

The following priority recovery and threat abatement actions can be done to support the recovery of **Western Sydney Dry Rainforest and Moist Woodland on Shale**.

#### **Habitat Loss, Disturbance and Modification**

- Protect and conserve remaining areas of the ecological community. Further clearance and fragmentation of this critically endangered ecological community should be avoided wherever possible.
- Where further clearance is unavoidable, any offsets should take into consideration the location of the ecological community and which component is being lost (i.e. dry rainforest or moist woodland).
- Maintain and reconnect wildlife corridors or linkages and ensure that areas of particularly high quality, connectivity or importance in a landscape context, are protected.
- Investigate formal conservation arrangements, management agreements and covenants on private land and, for crown and private land, investigate inclusion in reserve tenure. This is particularly important for areas that link patches and create wildlife corridors.
- Monitor the progress of recovery, through improved mapping, estimates of extent and condition assessments of the ecological community, and effective adaptive management actions.
- Implement appropriate management regimes to maintain the biodiversity, including the threatened species, of the ecological community.
- Liaise with local councils and state authorities to ensure new developments, road widening, maintenance activities, or other activities involving substrate or vegetation disturbance in areas where the ecological community occurs, do not adversely impact the ecological community.
- Liaise with planning authorities to ensure that planning takes the protection of the ecological community into account, with due regard to principles for long-term conservation.
- Include buffer zones between the ecological community and development zones and areas undergoing pasture development or cultivation.
- Where feasible, fence significant remnants in or adjacent to residential areas and limit access for vehicles and pets.
- Raise awareness of the ecological community within State Government authorities (including Natural Resources Management/ Catchment Management Authorities) and the local community (e.g. through active Conservation Management Networks, Landcare groups and other groups), as well as local councils.
- Develop education programs, information products and signage to help the public recognise the presence and importance of the ecological community, and their responsibilities under state and local regulations and the EPBC Act.
- Encourage local patch management through local conservation groups (e.g. Bushcare/Landcare).

### Invasive Species

- Target control of key existing weeds which threaten the ecological community, using appropriate methods. Manage sites to prevent the introduction of new, or further spread of existing, invasive weeds.
- Ensure chemicals, or other mechanisms used to manage weeds, do not have significant adverse, non-target impacts on the ecological community.
- Control introduced pest animals to allow natural regeneration and to manage threats, especially to threatened species, at known sites through coordinated landscape-scale control programs.

### Fire

- Fire is detrimental to the long-term viability of the ecological community. Therefore, ensure that managed fires and, where possible, wildfires from surrounding areas do not enter buffer zones around remnants.
- Discourage the use of fire as a means to control lantana or other weeds in or near to rainforest remnants.
- Negotiate appropriate standing procedures with local fire brigades, in relation to establishing fire control lines in native vegetation areas, to avoid unnecessary destruction of the ecological community.

This list does not necessarily encompass all actions that may be of benefit to **Western Sydney Dry Rainforest and Moist Woodland on shale**, but highlights those that are considered to be of highest priority at the time of preparing the Conservation Advice.

### **Existing Plans/Management Prescriptions that are Relevant to the Ecological Community**

Benson D and Howell J (1990) Taken for granted: the bushland of Sydney and its suburbs. Kangaroo Press and Royal Botanic Gardens Sydney.

Buchanan R (1989) Bush regeneration: recovering Australian landscapes. TAFE NSW.

Department of Environment and Conservation, New South Wales (2005). Recovering bushland on the Cumberland Plain: best practice guidelines for the management and restoration of bushland. Available on the Internet at:

[www.environment.nsw.gov.au/threatenedspecies/CumberlandPlainManagementGuidelines.htm](http://www.environment.nsw.gov.au/threatenedspecies/CumberlandPlainManagementGuidelines.htm)

Howell J, Benson D and Plaza J (2000). Sydney's bushland : more than meets the eye. Royal Botanic Gardens Sydney, NSW.

National Parks and Wildlife Service,, New South Wales (2002a). National biodiversity audit: Biodiversity strategy case study – Cumberland Plain sub-region, Sydney Basin bioregion, New South Wales. NSW NPWS, Hurstville.

National Parks and Wildlife Service,, New South Wales (2004a). Moist Shale Woodland. Endangered Ecological Community Information. Factsheet. NSW NPWS, Hurstville. Available on the Internet at:

[www.environment.nsw.gov.au/resources/nature/EECinfoMoistShaleWoodland.pdf](http://www.environment.nsw.gov.au/resources/nature/EECinfoMoistShaleWoodland.pdf)

National Parks and Wildlife Service, New South Wales (2004a). Western Sydney Dry Rainforest. Endangered Ecological Community Information. Factsheet. NSW NPWS, Hurstville. Available on the Internet at:

[www.environment.nsw.gov.au/resources/nature/EECinfoWesternSydneyDryRainforest.pdf](http://www.environment.nsw.gov.au/resources/nature/EECinfoWesternSydneyDryRainforest.pdf)

### **Other Information Sources:**

Australian Government (2011). Weeds of National Significance.

Available on the internet at:

[www.weeds.gov.au/weeds/lists/wons.html](http://www.weeds.gov.au/weeds/lists/wons.html)

Benson D (1992). The natural vegetation of the Penrith 1:100 000 map sheet. *Cunninghamia* 2: 541-596.

Botanic Gardens Trust (2009) Ecology of Cumberland Plain Woodland.

Available on the Internet at:

[www.rbg Syd.nsw.gov.au/science/Evolutionary\\_Ecology\\_Research/Ecology\\_of\\_Cumberland\\_Plain\\_Woodland](http://www.rbg Syd.nsw.gov.au/science/Evolutionary_Ecology_Research/Ecology_of_Cumberland_Plain_Woodland)

Cuneo P, Jacobson C and Leishman MR (2009). Landscape-scale detection and mapping of invasive African Olive (*Olea europaea* L. subsp. *cuspidata* (Wall ex G. Don Ciferri) in SW Sydney, Australia using remote sensing, Australia. *Applied Vegetation Science*. 12: 145–154.

James T (1997). Urban bushland biodiversity survey: native flora of western Sydney, flora appendices 2, National Parks & Wildlife Service, NSW, Hurstville.

National Parks and Wildlife Service, New South Wales (2002b). Interpretation guidelines for the native vegetation maps of the Cumberland Plain, western Sydney, final edition National Parks & Wildlife Service, NSW, Hurstville.

NSW Scientific Committee (2000a). Moist Shale Woodland in the Sydney Basin bioregion – endangered ecological community listing. NSW Scientific Community – final determination. Viewed: September 2011. Available on the Internet at:

[www.environment.nsw.gov.au/determinations/MoistShaleWoodlandSydneyEndComListing.htm](http://www.environment.nsw.gov.au/determinations/MoistShaleWoodlandSydneyEndComListing.htm).

NSW Scientific Committee (2000b). Western Sydney dry rainforest in the Sydney Basin bioregion – endangered ecological community listing. NSW Scientific Committee – final determination. Viewed: September 2011. Available on the Internet at:

[www.environment.nsw.gov.au/determinations/WesternSydneyDryRainforestSydneyEndComListing.htm](http://www.environment.nsw.gov.au/determinations/WesternSydneyDryRainforestSydneyEndComListing.htm).

Threatened Species Scientific Committee (2012). Listing Advice for the Western Sydney Dry Rainforest and Moist Woodland on Shale in the Sydney Basin Bioregion.

Available on the Internet at:

[www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl](http://www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl)

Tozer M (2003). The native vegetation of the Cumberland Plain, western Sydney: systematic classification and field identification of communities. *Cunninghamia* 8: 1-75.

Tozer MG, Turner K, Tindall D, Pennay C and Simpson C (2010). Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands. *Cunninghamia* 11: 359–406.

These prescriptions were current at the time of publishing; please refer to the relevant agency's website for any updated versions.