

**Approved Conservation Advice for
Turpentine–Ironbark Forest in the Sydney Basin Bioregion**

(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 **Turpentine–Ironbark Forest in the Sydney Basin Bioregion** ecological community is typically a type of open forest that is endemic to the Sydney Basin bioregion. The ecological community comprises a canopy of eucalypts and related trees that may reach a height of over 30 metres, above a midstorey of shrubs and small trees over a ground layer of herbs and grasses. Some patches may show a woodland structure in response to site condition and disturbance history.

The tree canopy of the **Turpentine–Ironbark Forest in the Sydney Basin Bioregion** is typically dominated to co-dominated by *Syncarpia glomulifera* (turpentine). Turpentine occurs throughout the ecological community but the associated tree species varies with local site conditions. Ironbark species are commonly present, such as *Eucalyptus paniculata* (grey ironbark), *E. crebra* (narrow-leaved ironbark) and/or *E. fibrosa* (red ironbark). On the Cumberland Plain, grey ironbark, narrow-leaved ironbark and red ironbark are common co-dominants, as is *E. punctata* (grey gum). On the plateaux shale caps, grey ironbark and *E. notabilis* (mountain mahogany) may become common in association with turpentine. At the upper end of its rainfall/elevation range the Turpentine–Ironbark Forest of the Sydney Basin Bioregion may be dominated to co-dominated by *E. saligna* (blue gum), *E. cypellocarpa* (mountain grey gum), *E. deanei* (round-leaved gum) or grey gum (NSW NPWS, 2002; Tozer, 2003).

A stratum of small trees may occur, including *Pittosporum undulatum* (sweet pittosporum), *Trema aspera* (native peach) and *Acacia parramattensis* (Parramatta wattle). Where present, a shrub layer may include *Polyscias sambucifolia* (elderberry panax), *Notelaea longifolia* (mock olive), *Leucopogon juniperinus* (prickly beard-heath), *Pittosporum revolutum* (rough-fruit pittosporum), *Breynia oblongifolia* (breynia), *Maytenus silvestris* (narrow-leaved orangebark) and *Ozothamnus diosmifolius* (white dogwood).

Where present in its natural state, the ground layer may include *Oplismenus aemulus* (basket grass), *Pseuderanthemum variabile* (pastel flower), *Echinopogon ovatus* (forest hedgehog-grass) *Microlaena stipoides* (weeping grass) and *Themeda triandra* (kangaroo grass).

The ecological community likely supports a range of animal species, including small mammals, larger grazing mammals, insectivorous and seed-foraging ground-dwelling birds, birds of prey, skinks, snakes, frogs and a large range of invertebrates. 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.

No detailed studies of fauna specific to the **Turpentine–Ironbark Forest of the Sydney Basin Bioregion** have been undertaken and the interactions between the faunal and floral components are poorly known. However, faunal surveys of the Cumberland Plain region identified the key animal species that now remain. Approximately 60 species of mammals were thought to be originally present on the Cumberland Plain (NSW NPWS, 1997; Leary, 2007). Recent surveys have detected the presence of 37 native mammal species, of which

only 14 are considered relatively common and widespread on the Cumberland Plain. The mammal species that remain relatively common in western Sydney include *Macropus giganteus* (eastern grey kangaroo), *Trichosurus vulpecula* (common brushtail possum), *Pteropus poliocephalus* (grey-headed flying-fox) and several micro-bat species (Leary, 2007). Microbats represent the largest mammalian group in surveys. Some mammals, such as native rodents and dasyurids, have only been captured at the margins of the plain, close to larger vegetated areas within reserves.

The NSW Scientific Committee (2011a) noted that the Blue Mountain Shale Cap Forest component of the national ecological community provides a rich habitat for fauna and supports a greater diversity and abundance of bird and mammal species than the drier eucalypt forests. Round-leaved gum, in particular, is a major source of nest hollows that supports owls, parrots, cockatoos, gliders and other animals dependent on hollows.

Occurrences of the **Turpentine–Ironbark Forest in the Sydney Basin Bioregion** ecological community are considered to be part of the nationally listed ecological community if patches are in good condition.

- Good condition is generally determined as:
 - the vegetation has some characteristic components from all structural layers (tree canopy, small tree/shrub midstorey, and understorey); and
 - the tree canopy cover is greater than 10%; and
 - the patch size is greater than one hectare.
- However, patches with a tree canopy cover of less than 10% are also included in the ecological community, if:
 - the patch of the ecological community is greater than one hectare in size; and
 - it is part of a remnant of native vegetation that is 5 hectares or more in area.

These areas enhance the potential for connectivity and viability of the ecological community. They support native flora and fauna species by facilitating gene flow among remnants and buffering against disturbance.

The nationally listed ecological community excludes patches where either the native midstorey/understorey or native canopy trees are absent. Occurrences of isolated single trees or shrubs characteristic of the ecological community therefore are excluded from the ecological community. Although these degraded occurrences have some value for biodiversity, their structure has been so severely modified, that they fall outside the definition of the ecological community.

Conservation Status

The **Turpentine–Ironbark Forest in the Sydney Basin Bioregion** is listed as **critically endangered** under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It was listed by the Minister after the Threatened Species Scientific Committee advised (TSSC, 2005) that this ecological community met three of the six eligibility criteria for listing as threatened under the EPBC Act. The Committee found that the ecological community had:

- undergone a very severe decline in its geographic distribution, of more than 95%;
- a restricted geographic distribution that makes it likely that the action of a threatening process could cause it to be lost in the near future; and
- experienced a reduction in its ecological integrity across most its range that is substantial, as indicated by degradation, weed invasion and loss of species.

Two ecological communities listed as endangered under the *NSW Threatened Species Conservation Act 1995* equate to the national **Turpentine–Ironbark Forest in the Sydney Basin Bioregion** ecological community. These are the:

- Sydney Turpentine–Ironbark Forest; and
- Blue Mountains Shale Cap Forest in the Sydney Basin Bioregion.

Distribution and Habitat

The **Turpentine–Ironbark Forest of the Sydney Basin Bioregion** is limited to the Sydney Basin Bioregion. Its occurrence is transitional between the Cumberland Plain Shale Woodlands and Shale–Gravel Transition Forest that occupies drier areas on the plain, and the Blue Gum High Forest that occurs on the higher rainfall ridges.

The **Turpentine–Ironbark Forest of the Sydney Basin Bioregion** predominantly occurs in areas with rainfall between 800-1100 mm/year (Benson and Howell, 1994; NSW NPWS, 2002). Elevation ranges from less than 320 m on the Cumberland Plain (NSW NPWS, 2002) up to 750 m on shale caps of the surrounding Woronora, Blue Mountains and Hornsby Plateaux (Keith and Benson, 1988). This ecological community is predominantly associated with relatively fertile clay soils derived from Wianamatta shale, and clay lenses of shale within Hawkesbury sandstone, less commonly occurring on transitional areas between soils derived from the Wianamatta shale and Hawkesbury sandstone, or on soils derived from Holocene alluvium, or the Mittagong formation.

The ecological community occurs within the Hawkesbury–Nepean Catchment Management Authority (merged with the former Sydney Metro Catchment Management Authority as of January 2014) and the Greater Sydney Local Land Services. It is also known from a wide range of local government areas in the Sydney region.

Threats

As the soil on which **Turpentine–Ironbark Forest of the Sydney Basin Bioregion** is found is of relatively higher fertility than the surrounding sandy soils, the ecological community has been selectively cleared for agriculture and urban development (Benson and Howell, 1990; Haworth, 2003). Most remnants are now degraded and highly fragmented, occurring within a matrix of modified urban and agricultural landscapes. The key threat to the survival of the ecological community is vegetation clearance and fragmentation. While much clearing occurred in the past for agriculture or forestry, it is an ongoing threat that is now largely due to urban development, though there are also lagged effects of fragmentation from past clearing.

Other major threats include:

- increased nutrient load and sedimentation from urban runoff and stormwater discharge;
- weed invasion;
- inappropriate fire regimes;
- mowing, which stops regrowth;
- grazing of remnants on agricultural land;
- damage through recreational activities; and
- pathogen invasion and dieback (e.g. myrtle rust).

More detail about these threats is contained in the Listing Advice (TSSC, 2005), 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 **Turpentine–Ironbark Forest in the Sydney Basin Bioregion** ecological community:

- land clearance;
- loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants; and
- novel biota and their impact on biodiversity.

Research and Monitoring Priorities

- Determine the dependencies of plant recruitment and establishment that operate within Turpentine–Ironbark Forest, particularly in relation to fire regimes and fauna interactions.
- Identify and map priority sites for protection of Turpentine–Ironbark Forest remnants, including habitat for threatened species.
- Investigate the impact of disturbances and experimentally evaluate alternative strategies to restore long-term ecological function and biodiversity, including for listed threatened and migratory species.
- Develop and implement a threat management monitoring program.
- Undertake monitoring of bush regeneration pre- and post- both disturbance (e.g. burning) and restorative actions.

Priority Actions

The following priority recovery and threat abatement actions can be undertaken to support the recovery of **Turpentine–Ironbark Forest in the Sydney Basin Bioregion**:

Habitat Loss, Disturbance and Modification

- Prevent any further clearing or fragmentation of the ecological community, through the protection of remnants and surrounding vegetation, including through appropriate local council zoning and/or the development of conservation agreements or covenants with landholders.
- Restore and enhance remaining areas of Turpentine–Ironbark Forest so that they meet the condition criteria for the ecological community or to create buffer zones and to link fragments with remnants of other native vegetation.
- Avoid removal of isolated canopy trees characteristic of the ecological community or isolated patches of remnant vegetation <1 hectare in the local government areas where it occurs, as these provide important connectivity and habitat refugia functions.
- Develop and implement appropriate management regimes to prevent further loss or decline of functionally important species and reduction in community integrity.
- Control run-off entering sites where it would cause erosion or detrimental change in nutrient or sediment levels, and undertake restoration works to restore natural hydrology.
- Liaise with planning authorities to ensure that planning and nearby development takes the protection of remnants into account, with due regard to principles for long-term conservation.

Invasive Species

- Eradicate or manage weed infestation through appropriate weeding and bush regeneration methods.

- Ensure chemicals, or other mechanisms used to manage weeds, do not have significant adverse, non-target impacts on the ecological community, e.g. undertake manual removal of weeds or spot application of herbicides.
- Manage introduced pest animals to allow natural regeneration and recovery of habitats and any threatened species, at known sites through coordinated landscape-scale control programs.

Trampling, Browsing or Grazing

- Avoid unnecessary mowing of understorey to promote regeneration of native species.
- Manage the impacts of damaging recreational activities, e.g. access by mountain bikes and other vehicles, within bushland remnants through appropriate signage and selectively limiting access to tracks.
- Identify and fence important remnants to minimise impacts from grazing and damaging recreational activities at key sites.

Fire

- Implement appropriate fire regimes necessary to maintain floristic and structural diversity. Fire management should take into account results from any research that determines if and when patches require fire for biodiversity conservation, and the requirements of both flora and fauna in the ecological community.
- Remove weeds from the ecological community and manage fuel loads in surrounding areas, to minimise the risk of inappropriate fire regimes affecting the ecological community.
- Provide maps of known occurrences and negotiate appropriate procedures with local fire brigades, including in relation to establishing fire control lines in native vegetation areas, to avoid unnecessary destruction of the ecological community.

Conservation Information

- Ensure land managers are aware of, and follow, any best practice adaptive management guidelines and other technical material developed for the Turpentine–Ironbark Forest ecological community.
- Support landholders to prepare site-specific management plans and secure protection and management of priority sites.
- In consultation with land managers, develop or support existing education programs, information products and signage to help the public recognise the presence and importance of the Turpentine–Ironbark Forest ecological community, and their responsibilities under state and local regulations and the EPBC Act.
- Raise awareness about the benefits of native biodiversity, and programs and funding opportunities to support landholders with environmental protection.

Other Recovery Actions

- Ensure local flora species are planted for any revegetation and recovery actions.
- Retain trees, logs and leaf litter and re-introduce habitat features (e.g. rocks, logs) at disturbed sites.
- Investigate options to maintain and improve connectivity, including the protection of adjoining vegetation and the replanting of key local flora species.

- Support seed harvesting and propagation techniques (having acquired the necessary permits and land access permission required) for native species not already available from nurseries, to facilitate restoration/maintenance of species diversity in revegetation sites.
- Ensure that any revegetation is undertaken in an appropriate manner (e.g. with no significant detrimental impacts on local hydrology or threatened species).

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

Blue Mountains City Council (2005). Lapstone Sportsground Tunnel Gully Reserve Draft Plan of Management. City of Blue Mountains.

Available on the Internet at:

<http://www.bmcc.nsw.gov.au/files/Council20050802Item18Enclosure.pdf>

Hornsby Shire Council (2000). Significant Areas – Bushland: Plans of management and action plans. Hornsby Shire Council.

Available on the Internet at:

<http://www.hornsby.nsw.gov.au/media/documents/about-council/corporate-documents-and-reports/poms/Significant-Areas-Bushland-Plan-of-Management.pdf>

New South Wales Department of Environment and Climate Change (2008). *Best practice guidelines for Sydney Turpentine–Ironbark Forest*. Department of Environment and Climate Change, Sydney.

Available on the Internet at:

<http://www.environment.nsw.gov.au/resources/threatenedspecies/08528tsdssydturpironforestbpg.pdf>

New South Wales National Parks and Wildlife Service (1999). Wallumatta Nature Reserve Plan of Management. New South Wales National Parks and Wildlife Service
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Available on the Internet at:

<http://www.environment.nsw.gov.au/resources/parks/pomfinalwallumatta.pdf>

New South Wales Office of Environment and Heritage Action Statement for Sydney Turpentine–Ironbark Forest.

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Available on the Internet at:

<http://www.environment.nsw.gov.au/savingourspeciesapp/project.aspx?ProfileID=10789>

New South Wales Rural Fire Service (2004). *Threatened species hazard reduction list – Part 3 – Endangered Ecological Communities*. New South Wales Rural Fire Service.

Available on the Internet at:

http://www.rfs.nsw.gov.au/file_system/attachments/State/Attachment_20050304_61C9CAC7.pdf

Parramatta City Council (2002). *Galarangi, Cox Park, Dandarbong Reserve, Eric Mobbs Memorial Park Plan of Management*. Parramatta City Council.

Available on the Internet at:

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Sydney Olympic Park Authority and New South Wales National Parks and Wildlife Service (2003). *Plan of Management for Newington Nature Reserve, Sydney Olympic Park*.

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Botanic Gardens, Sydney.
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Available on the Internet at:
[http://www.environment.gov.au/cgi-
bin/sprat/public/publicshowcommunity.pl?id=38&status=Critically+Endangered](http://www.environment.gov.au/cgi-bin/sprat/public/publicshowcommunity.pl?id=38&status=Critically+Endangered)
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ecological communities information sheet: Turpentine–Ironbark Forest of the Sydney
Basin Bioregion.
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sydney-basin-bioregion](http://www.environment.gov.au/resource/turpentine%E2%80%93ironbark-forest-sydney-basin-bioregion)
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second edition, Royal Botanic Gardens, Sydney.
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Vegetation of the Cumberland Plain*, final edition, CD ROM version.
ISBN 0 7313 6921 1.
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<http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10095>

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Available on the Internet at:
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<http://www.environment.nsw.gov.au/determinations/BlueMountainsShaleCapForestSydneyEndComListing.htm>
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<http://www.environment.nsw.gov.au/determinations/bluemtsshalecap36a.htm>
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