Approved Conservation Advice for the Lowland Rainforest of Subtropical Australia

(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

Location

The **Lowland Rainforest of Subtropical Australia** ecological community primarily occurs from Maryborough in Queensland to the Clarence River (near Grafton) in New South Wales (NSW). The ecological community also includes isolated areas between the Clarence River and Hunter River such as the Bellinger and Hastings Valleys.

Physical environment

The ecological community occurs on basalt and alluvial soils, including sand and old/elevated alluvial soils as well as floodplain alluvia. It also occurs occasionally on historically enriched rhyolitic soils and basaltically enriched metasediments. Lowland Rainforest mostly occurs in areas <300 m above sea level. Aspect can result in the community being found at >300 m altitude on north-facing slopes, but typically 300 m defines the extent of the lowlands. In addition, Lowland Rainforest typically occurs in areas with high annual rainfall (>1300 mm).

The ecological community is differentiated from the Littoral Rainforest and Coastal Vine Thickets of Eastern Australia ecological community (hereafter referred to as Littoral Rainforest) by the level of coastal or estuarine influence (such as windshear). Lowland Rainforest of Subtropical Australia typically occurs more than 2 km from the coast, however, it can (and does) intergrade with Littoral Rainforest in some coastal areas.

Vegetation structure

The ecological community is generally a moderately tall (≥20 m) to tall (≥30 m) closed forest (canopy cover ≥70%). Tree species with compound leaves are common and leaves are relatively large (notophyll to mesophyll). Typically there is a relatively low abundance of species from the genera *Eucalyptus*, *Melaleuca* and *Casuarina*. Buttresses are common as is an abundance and diversity of vines.

The ecological community has the most diverse tree flora of any vegetation type in NSW (Floyd, 1990) and the species composition of the canopy varies between local stands and between regions (Keith, 2004). The canopy comprises a range of tree species but in some areas a particular species may dominate e.g. palm forest, usually dominated by *Archontophoenix cunninghamiana* (bangalow palm) or *Livistona australis* (cabbage palm); and riparian areas dominated by *Syzygium floribundum* (syn. *Waterhousea floribunda*) (weeping satinash/weeping lilly pilly).

The canopy is often multilayered consisting of an upper, discontinuous layer of emergents, over the main canopy and subcanopy. Below the canopy is an understorey of sparse shrubs and seedlings.

The upper, discontinuous layer includes **canopy emergents** that may be 40–50 m tall and have large spreading crowns. This layer is composed of species such as *Araucaria cunninghamii* (hoop pine), *Ficus* spp. (figs), *Lophostemon confertus* (brushbox), and in some sites, *Eucalyptus* spp.. Typically non-rainforest species such as eucalypts and brushbox comprise <30% of canopy emergents.

The **canopy/subcanopy layer** contains a diverse range of species. Representative species include: hoop pine, figs, *Argyrodendron trifoliolatum/ Heritiera trifoliolata* (white booyong), *Castanospermum australe* (black bean), *Cryptocarya obovata* (white walnut, pepperberry tree), *Dendrocnide excelsa* (giant stinging tree), *Diploglottis australis* (native tamarind), *Dysoxylum fraserianum* (rosewood), *Dysoxylum mollissimum* (red bean), *Endiandra pubens* (hairy walnut), *Elattostachys nervosa* (green tamarind), *Flindersia schottiana* (bumpy ash, cudgerie, silver ash), *Gmelina leichhardtii* (white beech), *Neolitsea dealbata* (white bolly gum), *Neolitsea australiensis* (bolly gum), *Sloanea australis* (maiden's blush), *Sloanea woolsii* (yellow carabeen), *Toona ciliata* (red cedar), and epiphytes such as *Platycerium* spp. and *Asplenium australasicum* (bird's nest fern).

In areas where the canopy is lower (<25 m) due to coastal or estuarine influences the Littoral Rainforest ecological community typically replaces the Lowland Rainforest ecological community.

The **understorey** contains a sparse layer of species such as *Cordyline stricta* (narrow-leaved palm lily), *Linospadix monostachya* (walking stick palm), *Neolitsea dealbata* (white bolly gum), *Notelaea johnsonii* (veinless mock olive), *Pittosporum multiflorum* (orange thorn), *Triunia youngiana* (native honey-suckle bush), *Wilkiea austroqueenslandica* (smooth wilkiea) and *Wilkiea huegeliana* (veiny wilkiea) as well as seedlings of a variety of canopy species. A variety of vines may be present such as *Calamus muelleri* (Southern lawyer vine), *Cissus antarctica* (native grape vine, water vine), *Cissus hypoglauca* (giant water vine), *Dioscorea transversa* (native yam), *Flagellaria indica* (whip vine), *Morinda jasminoides* (sweet morinda), *Pandorea floribunda* (wonga wonga vine) and *Smilax australis* (sarsaparilla). Ferns such as *Adiantum hispidulum* (rough maidenhair fern), *Doodia aspera* (rasp fern), *Lastreopsis decomposita* (trim shield fern) and *Lastreopsis marginans* (bordered shield fern, glossy shield fern) may also be present.

Fauna

Lowland Rainforest is characterised by a high proportion of frugivorous birds, epiphyte and litter foraging vertebrates, micro- and mega-chiropteran bats, and a broad range of invertebrate groups associated with the decomposition cycle (such as insects and snails).

A more comprehensive description of the ecological community is contained in the Listing Advice which is available on the Internet at:
http://www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl

Conservation Status

The Lowland Rainforest of Subtropical Australia ecological community 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 (TSSC) advice (TSSC, 2011) and amended the list under section 184 to include the Lowland Rainforest of Subtropical Australia ecological community. The TSSC determined that this ecological community met criteria 1, 2, 3 and 4 of the eligibility criteria for listing as threatened under the EPBC Act because its decline in geographic distribution is severe; 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; it has undergone a severe decline in functionally important species; and because the reduction in integrity across most its range is severe, as indicated by degradation of the ecological community.

Distribution and Habitat

The ecological community primarily occurs from Maryborough in Queensland to the Clarence River (near Grafton) in NSW. The ecological community also includes isolated areas between the Clarence River and Hunter River such as the Bellinger Valley. Patches of Lowland Rainforest are generally small in size (<10 ha). The ecological community occurs in the following Interim Biogeographic Regionalisation for Australia Version 6.1 (IBRA) Bioregions: South Eastern Queensland Bioregion and NSW North Coast Bioregion.

The ecological community is known to occur in the following Natural Resource Management (NRM) and Catchment Management Authority (CMA) regions: SE Queensland Catchments, Burnett Mary Regional Group, Hunter-Central Rivers and Northern Rivers.

Lowland rainforest mostly occupies areas on highly fertile basaltic and alluvial soils. These areas have been heavily cleared as they are the most suitable for agricultural use.

Most of the remaining patches of this ecological community are small and scattered.

The ecological community provides habitat for a large number of animals including a high proportion of frugivorous birds and large number of threatened species.

Threats

The main ongoing threats to the ecological community include: vegetation clearance, impacts associated with fragmentation of remnants and weeds.

The **Lowland Rainforest of Subtropical Australia** ecological community has been extensively cleared for agricultural purposes because it primarily occurs on flat and relatively fertile soils. Clearing has dramatically decreased its extent and the resulting fragmentation has made the ecological community more vulnerable to threats such as weed invasion.

Weeds compete with native species for space, light, water and nutrients. They also suppress and out-compete mid-storey and canopy trees.

Ongoing incremental clearing of vegetation for agricultural activities (in particular macadamias and fruit crops), horticultural industry (and the subsequent introduction of new potential weeds), hobby farming, peri-urban and rural residential development (including vegetation removal for bush fire protection) and also private native forestry are further adding to isolation and fragmentation of Lowland Rainforest remnants.

Urbanisation results in impacts such as the invasion of bushland by domestic dogs and cats, rubbish dumping, trampling, garden escapes, firewood collection, impacts from vehicles, the creation of informal trails, and arson. Urbanisation also increases pressure to reduce bushfire fuel loads that may be detrimental to 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 considered relevant to Lowland Rainforest of Subtropical Australia:

- Land clearance;
- Predation by European red fox;
- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants and;
- The biological effects, including lethal toxic ingestion, caused by Cane Toads (*Rhinella marina*).

Research Priorities

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

- Undertake surveys to locate and map remnants and other occurrences of the ecological community, as well as threatened species that occur in 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.
- Further develop sustainable management guidelines and technical material to assist landowners, including measures to address inappropriate fertiliser application, stock management, ecological fire management and spray drift.
- Develop effective control methods for the most damaging weed species that infest the ecological community e.g. madeira vine (*Anredera cordifolia*), cats claw creeper (*Macfadyena unguis-cati*), morning glory (*Ipomoea* spp.), wandering jew (*Tradescantia fluminensis*), climbing asparagus (*Asparagus plumosus*), ochna (*Ochna serrulata*) and small-leaved privet (*Ligustrum sinense*).
- Investigate the importance of landscape scale geneflow and its implications for management of remnants, associated fauna, plant and animal interactions and longer term ecological function. This includes research into optimal distances between remnants and remnant sizes that are crucial for a range of flora and fauna movements.
- Undertake research, monitoring and evaluation to determine the relative biodiversity, conservation benefits of remnants, areas of regeneration and supplementary planting.
- Assess the vulnerability of the ecological community to climate change.
- Investigate the likely impacts of nearby eucalypt plantations on groundwater and fire potential of the ecological community.
- Undertake analysis of cost effectiveness of landscape connectivity and the importance of small isolates.

Priority Actions

The following priority recovery and threat abatement actions should be done to support the recovery of the **Lowland Rainforest of Subtropical Australia** ecological community.

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.
- 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.
- Manage any adverse effects on groundwater and altered fire potential due to nearby eucalypt plantations e.g. ensure appropriate fuel load and fire break management is undertaken to minimise the risk of fire in the ecological community.
- Develop and implement best practice standards for management of the ecological community on private and public lands.
- 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.
- Involve landowners in, and promote community programs that assist with, the conservation of the ecological community.

Impacts from residential and peri-urban development

- Fence significant remnants in or adjacent to residential areas and limit access for vehicles and pets.
- Exclude fire.
- 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.
- Implement staged removal of camphor laurel (*Cinnamomum camphora*) to provide site stability and on-going functionality to facilitate regeneration.
- Discourage the clearing of camphor laurel using heavy machinery. This style of weed control does not help the recovery of the ecological community unless it incorporates ecological restoration as an integrated component of the action.
- 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.

Trampling, Browsing or Grazing

- Ensure that livestock are excluded from patches of the ecological community, through exclusion fencing or other barriers.

Fire

- Discourage the use of fire as a means to control lantana or other weeds in or near to rainforest remnants.
- Ensure that managed fires and, where possible, wildfires do not enter buffer zones around 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.

Conservation Information

- Develop sustainable management guidelines and technical material to assist landowners, including measures to address inappropriate fertiliser application, stock management, weed management and spray drift.
- 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.
- Raise awareness about the importance of large trees, and coarse woody debris (dead trees, logs) as faunal habitat.
- Maintain liaison with private landholders and land managers of land on which the ecological community occurs.

Enable Recovery of Additional Sites

- Patches of the Lowland Rainforest ecological community should be considered a priority for conservation funding (priority repair sites are identified in the Border Ranges Rainforest Biodiversity Management Plan (DECCW, 2010)).
- Plant local indigenous rainforest species to facilitate landscape processes and regeneration.
- Investigate options to maintain and improve connectivity, including the protection of paddock trees and the replanting of key canopy tree species.
- Develop seed harvesting and propagation techniques (having acquired the necessary permits required) for Lowland Rainforest species not already available from rainforest nurseries to facilitate the species diversity in revegetation sites.
- Ensure that any revegetation is undertaken in an appropriate manner.

This list does not necessarily encompass all actions that may be of benefit to the **Lowland Rainforest of Subtropical Australia** ecological community, but highlights those that are currently considered to be a priority.

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

- Big Scrub Rainforest Landcare Group (2005). Subtropical Rainforest Restoration: A practical manual and data source for landcare groups, land managers and rainforest regenerators. Big Scrub Rainforest Landcare Group, Bangalow NSW.
- Big Scrub Rainforest Landcare Group (2008). Common weeds of subtropical rainforests of eastern Australia. Big Scrub Rainforest Landcare Group, Bangalow NSW.
- DECCW (2010). Border Ranges Rainforest Biodiversity Management Plan - NSW and Queensland. Department of Environment, Climate Change and Water NSW, Sydney.

  http://www.environment.gov.au/biodiversity/threatened/publications/recovery/border-ranges/pubs/brrb-management-plan.pdf
- DECCW (2010). Northern Rivers Regional Biodiversity Management Plan, National Recovery Plan for the Northern Rivers Region. Department of Environment, Climate Change and Water NSW, Sydney. http://www.environment.gov.au/biodiversity/threatened/publications/recovery/pubs/northern-rivers.pdf

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

Other Information Sources:

- Qld Department of Environment and Resource Management (2011). Regional Ecosystem details for 12.3.1, 12.5.13, 12.8.3, 12.8.4, 12.11.1, 12.11.10, 12.12.1 and 12.12.16. Available on the Internet at: http://www.derm.qld.gov.au/wildlife-ecosystems/biodiversity/regional_ecosystems
- NSW Scientific Committee (1999). Lowland Rainforest on Floodplain in the NSW North Coast Bioregion – endangered ecological community listing. Viewed 26 January 2011. Available on the Internet at: http://www.environment.nsw.gov.au/determinations/LowlandRainforestNorthCoastEndComListing.htm
- NSW Scientific Committee (2006). Lowland Rainforest in NSW North Coast and Sydney basin Bioregion – endangered ecological community listing. Viewed 26 January 2011. Available on the Internet at: http://www.environment.nsw.gov.au/determinations/LowlandRainforestEndCom.htm
- TSSC (2011). Listing advice for the Lowland Rainforest of Subtropical Australia ecological community.

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DECCW (2010). Border Ranges Rainforest Biodiversity Management Plan - NSW and Queensland. Department of Environment, Climate Change and Water NSW, Sydney.

Floyd AG (1990). Australian Rainforests in New South Wales. Surrey Beatty and Sons Pty Limited, Chipping Norton, NSW.

Keith DA (2004). Ocean shores to desert dunes: the native vegetation of New South Wales and the ACT. NSW Department of Environment and Conservation, Sydney.

TSSC (2011). Listing Advice for the Lowland Rainforest of Subtropical Australia ecological community.