

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Hygrocybeae community of Lane Cove Bushland Park in the Sydney Basin Bioregion, as a CRITICALLY ENDANGERED ECOLOGICAL COMMUNITY in Part 2 of Schedule 1A of the Act, and as a consequence, to omit reference to the Hygrocybeae community of Lane Cove Bushland Park from Part 3 of Schedule 1 (Endangered Ecological Community) of the Act. Listing of Critically Endangered Ecological Communities is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. The Hygrocybeae community of Lane Cove Bushland Park in the Sydney Basin Bioregion is the name given to the ecological community characterised by the species assemblage of macrofungi listed in paragraph 2. This Bioregion is defined by SEWPaC (2012) Interim Biogeographic Regionalisation for Australia, Version 7. A map of IBRA 7 is available at: <http://www.environment.gov.au/parks/nrs/science/bioregion-framework/ibra/maps.html>
2. The Hygrocybeae community of Lane Cove Bushland Park in the Sydney Basin Bioregion is characterised by the assemblage of macrofungi in the tribe Hygrocybeae (Fungi, Basidiomycota, Agaricales, Hygrophoraceae) listed below.

<i>Camarophyllopsis kearneyi</i>	<i>Humidicutis lewelliniae</i>
<i>Hygrocybe anomala</i> var. <i>ianthinomarginata</i>	<i>Hygrocybe arcohastata</i>
<i>Hygrocybe astatogala</i>	<i>Hygrocybe aurantiopallens</i>
<i>Hygrocybe aurantipes</i>	<i>Hygrocybe austropratensis</i>
<i>Hygrocybe bolensis</i>	<i>Hygrocybe cantharellus</i>
<i>Hygrocybe cheelii</i>	<i>Hygrocybe chromolimonea</i>
<i>Hygrocybe collucera</i>	<i>Hygrocybe erythrocala</i>
<i>Hygrocybe erythrocrenata</i>	<i>Hygrocybe helicoides</i>
<i>Hygrocybe graminicolor</i>	<i>Hygrocybe involutus</i>
<i>Hygrocybe griseoramosa</i>	<i>Hygrocybe kula</i>
<i>Hygrocybe irrigata</i>	<i>Hygrocybe lanecovensisi</i>
<i>Hygrocybe mavis</i>	<i>Hygrocybe miniata</i>
<i>Hygrocybe reesiaae</i>	<i>Hygrocybe rubronivea</i>
<i>Hygrocybe stevensoniae</i>	<i>Hygrocybe taekeri</i>
<i>Hygrocybe virginea</i>	<i>Hygrocybe viscidibrunea</i>

3. The Hygrocybeae community is likely to be more diverse than described above as other specimens of *Hygrocybe* have been collected but are currently undescribed. A number of other macrofungi are expected to be associated with the Hygrocybeae assemblage listed. In general, the occurrence of macrofungi is indicated by presence of a fruiting body which usually appears in the cooler, wetter months of autumn and winter. The production of fruiting bodies varies from year to year and when fruiting bodies do appear they are often only present for a short period of time (Halme *et al.* 2012). The list of species given above consists only of macrofungi; the broader community at the site also includes microfungi and other microorganisms, cryptogamic and vascular plants, and a diverse fauna, both vertebrate and invertebrate. The total species composition of a site will be influenced by

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the size of the site, recent rainfall or drought condition and by its disturbance (including fire) history.

4. The Hygrocybeae community of Lane Cove Bushland Park contains nine species that are currently listed as Endangered or Vulnerable under the *Threatened Species Conservation Act* 1995. These include: *Camarophyllopsis kearneyi* (Endangered), *Hygrocybe austropratensis* (Endangered), *H. collucera* (Endangered), *H. griseoramosa* (Endangered), *H. lanecovensensis* (Endangered), *H. anomala* var. *ianthinomarginata* (Vulnerable), *H. aurantipes* (Vulnerable), *H. reesiae* (Vulnerable) and *H. rubronivea* (Vulnerable). Lane Cove Bushland Park is the Type locality for the nine species listed above. The number of species in the tribe Hygrocybeae found in Lane Cove Bushland Park is considered to be very high when compared to other sites in Australia (Young 2005), and when compared to species lists compiled from areas in the Sydney Basin Bioregion known for the occurrence of fungi from this taxonomic group (records for 2005-2011 provided by the Sydney Fungal Group Studies Group Inc., December 2012). Since the community was first described (Young 1999), 12 species have been added to the assemblage (Young *et al.* 2001). Despite the restricted nature of most of the species in the assemblage, several species are described as being widespread or cosmopolitan (e.g. *Humidicutis lewellinae*, *Hygrocybe miniata*, *Hygrocybe graminicolor*, Young 2005).
5. The Hygrocybeae Community of Lane Cove Bushland Park has been recorded in the Lane Cove local government area within the Sydney Basin Bioregion. The majority of fungal species included in the assemblage occur in gallery rainforest centred on the banks of the north-eastern arm of Gore Creek and its tributaries in Lane Cove Bushland Park (Young 1999, NSW Scientific Committee 2000, Martyn 2010). This core zone also extends to the wet sclerophyll forest north of the tributary junction with Gore Creek (NSW Scientific Committee 2000). A few of the fungal species in the assemblage are also found in a buffer zone of wet sclerophyll forest between the perimeter of Lane Cove Bushland Park and outer edges of the gallery rainforest canopy and along Gore Creek in Osborne Park (NSW Scientific Committee 2000). The fungal community is found in gullies that have a dense tree canopy with little light penetration (Kearney and Kearney 2000). Overstorey trees in the core zone include Grey Ironbark (*Eucalyptus paniculata*), Blackbutt (*E. pilularis*), Sydney Blue Gum (*E. saligna*) and Smooth-barked Applebox (*Angophora costata*), deeper in the gully are small to medium-sized Lillypilly (*Syzygium smithii*) and Sweet Pittosporum (*Pittosporum undulatum*), and higher up the slopes are Turpentine (*Syncarpia glomulifera*) and Grey Myrtle (*Backhousia myrtifolia*) (Martyn 2010). Wet sclerophyll forest on gully walls act as a protective barrier and help to maintain a high humidity environment (Young 1999). The combination of vegetation structure and environmental conditions has been suggested to be critical for formation of the unique Hygrocybeae community found in Lane Cove Bushland Park (Young 1999). Sandy soils in the area are derived from Hawkesbury Sandstone (Kearney and Kearney 2000), but valley slopes are fertile due to shale soil downwash (Martyn 2010). Species of *Camarophyllopsis*, *Humidicutis* and *Hygrocybe* are mostly saprophytic and live in soil or humus (Young 2005). It is not yet known if any of the species in the Hygrocybeae assemblage form mycorrhizal associations (Young 2005), but the associated plant community contributes to formation of humus and development of soil fertility from which the fungi derive some or all of their nutrition and energy.

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6. The geographic distribution of the Hygrocybeae community of Lane Cove Bushland Park is very highly restricted. Both the area of occupancy (AOO) and extent of occurrence (EOO) were estimated to be 4 km². The AOO was based on 2 x 2 km grid cells, the scale recommended for assessing area of occupancy by IUCN (2011).
7. The fungal community in Lane Cove Bushland Park is under threat from a number of sources. The tributary of Gore Creek that runs through Lane Cove Bushland Park is contaminated with pollution from sewage over-flow, garden fertiliser, animal wastes and petroleum-derived residues washed from nearby road surfaces (Martyn 2010). Evidence for contamination by certain chemicals such as diesel oil vapour comes from changes in fruiting bodies known as 'rosecomb' (Flegg 1983). This condition has recently been recorded for *Hygrocybe reesia*, *H. graminicolor* and an unnamed species of *Camarophyllopsis* in Lane Cove Bushland Park (<http://australianmuseum.net.au/image/Rosecomb/>, Kearney and Kearney *in litt.* 2013). In *Agaricus bisporus* (Button Mushroom), the disease is thought to result from a combination of genetic instability and an external promoting factor (e.g. pollution), and is of concern as it may affect the formation and functioning of spore-bearing gills (Umar and van Griensven 1999). The fungal and plant communities in Lane Cove Bushland Park are also under threat from increases in nutrient availability due to runoff from surrounding urban areas (Martyn 2010), trampling by visitors to the park and weed invasion (Department of Environment and Climate Change NSW 2008). 'Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants' and 'Invasion and establishment of exotic vines and scramblers' are listed as Key Threatening Processes under the *Threatened Species Conservation Act* 1995. Due to the combination of a very highly restricted geographic distribution and only occurring in one location, the Hygrocybeae community of Lane Cove Bushland Park is likely to be subject to stochastic changes in its immediate environment.
8. The Hygrocybeae Community of Lane Cove Bushland Park in the Sydney Basin Bioregion is eligible to be listed as a Critically Endangered Ecological Community as, in the opinion of the Scientific Committee, it is facing an extremely high risk of extinction in New South Wales in the immediate future, as determined in accordance with the following criteria as prescribed by the *Threatened Species Conservation Regulation* 2010:

Clause 18 Restricted geographic distribution of the ecological community

The ecological community's geographic distribution is estimated or inferred to be:

- (a) very highly restricted,

and the nature of its distribution makes it likely that the action of a threatening process could cause it to decline or degrade in extent or ecological function over a time span appropriate to the life cycle and habitat characteristics of the ecological community's component species.

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Clause 19 Reduction in ecological function of the ecological community

The ecological community has undergone, is observed, estimated, inferred or reasonably suspected to have undergone or is likely to undergo within a time span appropriate to the life cycle and habitat characteristics of its component species:

- (a) a very large reduction in ecological function, as indicated by any of the following:
- (f) disruption of ecological processes,
- (g) invasion and establishment of exotic species,
- (h) degradation of habitat.

Professor Michelle Leishman
Chairperson
Scientific Committee

Exhibition period: 21/02/14 – 18/04/14

Proposed Gazettal date: 21/02/14

References:

Department of Environment and Climate Change NSW (2008) Hygrocybeae Community of Lane Cove Bushland Park, Best Practices Guidelines (Department of Environment and Climate Change NSW: Sydney).

Flegg PB (1983) Response of the sporophores of the cultivated mushroom (*Agaricus bisporus*) to volatile substances. *Scientia Horticulturae* **21**, 301-310.

Halme P, Heilmann-Clausen J, Rämä T, Kosonen T, Kunttu P (2012) Monitoring fungal biodiversity – towards an integrated approach. *Fungal Ecology* **5**, 750-758.

IUCN Standards and Petitions Subcommittee (2011). Guidelines for Using the IUCN Red List Categories and Criteria. Version 9.0. Prepared by the Standards and Petitions Subcommittee in September 2011.

<http://intranet.iucn.org/webfiles/doc/SSC/RedList/RedListGuidelines.pdf>

Kearney R, Kearney E (2000) Significance of the Hygrocybeae community of Lane Cove Bushland Park in listings under the *NSW Threatened Species Conservation Act 1995* and under the *Australian Heritage Commission Act 1975*. *Australasian Mycologist* **19**, 64-70.

Martyn J (2010) Field guide to the bushland of the Lane Cove Valley. (STEP Inc.: Turramurra, NSW)

NSW Scientific Committee (2000) Hygrocybeae community of the Lane Cove Bushland Park – ecological community listing. Final determination.

<http://www.environment.nsw.gov.au/determinations/HygrocybeaeCommunityOfLaneCoveBushlandParkEndComListing.htm>

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SEWPaC (2012) Interim Biogeographic Regionalisation for Australia, Version 7. Department of Sustainability, Environment, Water, Population and Communities.

<http://www.environment.gov.au/parks/nrs/science/bioregion-framework/ibra/maps.html>

Umar MH, van Griensven LJLD (1999) Studies on the morphogenesis of *Agaricus bisporus*: the dilemma of normal versus abnormal fruit body development. *Mycological Research* **103**, 1235-1244.

Young AM (1999) The Hygrocybeae (Fungi, Basidiomycota, Agaricales, Hygrophoraceae) of the Lane Cove Bushland Park, New South Wales. *Austrobaileya* **5**, 535-564.

Young AM (2005) Fungi of Australia: Hygrophoraceae. ABRS, Canberra (CSIRO: Melbourne)

Young AM, Kearney R, Kearney E (2001) Additions to the Hygrophoraceae of Lane Cove Bushland Park. *Australasian Mycologist* **20**, 79-86.