

NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion, as an ENDANGERED ECOLOGICAL COMMUNITY in Part 3 of Schedule 1 of the Act and as a consequence to omit reference to Pittwater Spotted Gum Forest from Part 3 of Schedule 1 (Endangered Ecological Communities) of the Act. Listing of Endangered Ecological Communities is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion is the name given to the ecological community characterised by the species assemblage listed in paragraph 2. Bioregions are as defined by Thackway and Cresswell (1995). A map of this version of the Interim Biogeographic Regionalisation of Australia is available at: <http://www.environment.nsw.gov.au/committee/ListofScientificCommitteeDeterminations.htm>
2. Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion is characterised by the following assemblage of species:

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| <i>Acacia ulicifolia</i> | <i>Livistona australis</i> |
| <i>Adiantum aethiopicum</i> | <i>Lomandra confertifolia</i> |
| <i>Allocasuarina littoralis</i> | <i>Lomandra filiformis</i> |
| <i>Allocasuarina torulosa</i> | <i>Lomandra longifolia</i> |
| <i>Angophora costata</i> | <i>Lomandra multiflora</i> subsp. <i>multiflora</i> |
| <i>Billardiera scandens</i> | <i>Macrozamia communis</i> |
| <i>Breynia oblongifolia</i> | <i>Marsdenia rostrata</i> |
| <i>Caesia parviflora</i> | <i>Microlaena stipoides</i> |
| <i>Calochlaena dubia</i> | <i>Morinda jasminoides</i> |
| <i>Cissus hypoglauca</i> | <i>Myrsine variabilis</i> |
| <i>Clematis aristata</i> | <i>Notelaea longifolia</i> |
| <i>Corymbia gummifera</i> | <i>Oplismenus imbecillis</i> |
| <i>Corymbia maculata</i> | <i>Pandorea pandorana</i> |
| <i>Desmodium rhytidophyllum</i> | <i>Panicum simile</i> |
| <i>Desmodium varians</i> | <i>Persoonia levis</i> |
| <i>Dianella caerulea</i> | <i>Persoonia linearis</i> |
| <i>Digitaria parviflora</i> | <i>Phyllanthus hirtellus</i> |
| <i>Dodonaea triquetra</i> | <i>Pittosporum revolutum</i> |
| <i>Elaeocarpus reticulatus</i> | <i>Pittosporum undulatum</i> |
| <i>Entolasia marginata</i> | <i>Platylobium formosum</i> |
| <i>Entolasia stricta</i> | <i>Poa affinis</i> |
| <i>Eucalyptus botryoides</i> | <i>Podolobium ilicifolium</i> |
| <i>Eucalyptus paniculata</i> | <i>Polyscias sambucifolia</i> |
| <i>Eucalyptus umbra</i> | <i>Pomax umbellata</i> |
| <i>Eustrephus latifolius</i> | <i>Pratia purpurascens</i> |
| <i>Geitonoplesium cymosum</i> | <i>Pseuderanthemum variabile</i> |
| <i>Glochidion ferdinandi</i> | <i>Pteridium esculentum</i> |
| <i>Glycine clandestina</i> | <i>Pultenaea flexilis</i> |

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Hardenbergia violacea

Hibbertia dentata

Hibbertia empetrifolia subsp. *empetrifolia*

Imperata cylindrica

Lepidosperma laterale

Schelhammera undulata

Smilax glycyphylla

Themeda australis

Xanthorrhoea macronema

3. The total species list of the community is considerably larger than that given above, with many species present in only one or two sites or in low abundance. The species composition of a site will be influenced by the size of the site, recent rainfall or drought condition and by its disturbance (including fire) history. The number of species, and the above ground relative abundance of species will change with time since fire, and may also change in response to changes in fire regime (including changes in fire frequency). At any one time, above ground individuals of some species may be absent, but the species may be represented below ground in the soil seed banks or as dormant structures such as bulbs, corms, rhizomes, rootstocks or lignotubers. The list of species given above is of vascular plant species; the community also includes micro-organisms, fungi, cryptogamic plants and a diverse fauna, both vertebrate and invertebrate. These components of the community are poorly documented.
4. Vegetation mapping studies have previously treated vegetation dominated by Spotted Gum (*Corymbia maculata*) and Grey Ironbark (*Eucalyptus paniculata*) from the Pittwater and Gosford local government areas, respectively, as two distinct but related communities. These are now considered to be variations of the one ecological community (Bell and Stables 2012). Bell and Stables (2012) also consider that within Pittwater local government area there are two forms of the community, a 'dry' and a 'mesic' form. This variation may be related to aspect, soil moisture and fire regime (Bell and Stables 2012) or nutrient enrichment and an absence of fire (Smith and Smith 2000). Pittwater and Wagstaffe Spotted Gum Forest is referable to 'Coastal Dry Spotted Gum Forest' (Map Unit S_DS25) and 'Coastal Moist Spotted Gum Forest' (Map Unit S_WSF11) of Bangalay Ecological & Bushfire and Eastcoast Flora Survey (2011); 'Wagstaff Spotted Gum Ironbark Forest' (map unit E15b) of Bell (2004, 2009); 'Open-forest: *Eucalyptus gummifera*-*Eucalyptus maculata*-*Eucalyptus pilularis*' (Map Unit 9g (ii)) in Benson and Howell (1994); and 'Open-forest on shales of the Narrabeen Group dominated by Spotted Gum and Grey Ironbark' (Community 5) in Thomas and Benson (1985). Pittwater and Wagstaffe Spotted Gum Forest is included in the broader vegetation types 'Illawarra Wet Gully Forest' (Map Unit p99) of Tozer *et al.* (2010); 'Woodland/low woodland on ridges, slopes and gullies' (Map Unit 1.5) of McRae (1990) and Payne (1997); and in 'Coastal Foothills Spotted Gum-Ironbark Forest' (Map Unit 15) of NPWS (2000). Pittwater and Wagstaffe Spotted Gum Forest belongs to the Southern Lowlands Wet Sclerophyll Forests vegetation class in the NSW statewide vegetation classification of Keith (2004).
5. Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion is known to occur on shale-derived soils from Narrabeen series geology (Bell & Stables 2012). The ecological community has been recorded from the local government areas of Pittwater and Gosford, within the Sydney Basin Bioregion, and may occur elsewhere in the Bioregion.
6. The total extant area of Pittwater and Wagstaffe Spotted Gum Forest is c. 227 ha, (Bell and Stables 2012). This is equivalent to an area of occupancy of c. 88 km² based on 2 x 2

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km grid cells, the scale recommended for assessing area of occupancy by IUCN (2010), and an extent of occurrence of c. 104 km² (based on a minimum convex polygon, as recommended by IUCN 2010). The geographic distribution is therefore inferred to be highly restricted.

7. Approximately 33% of the remaining stands of the community are reserved, including c. 47 ha in Bouddi National Park and c. 3 ha in Brisbane Water National Park (Bell 2009). Thomas and Benson (1985) mapped c. 37 ha within Ku-ring-gai Chase National Park but this has not been substantiated in more recent studies. Within Pittwater local government area, c. 50 ha of the community occur in Council reserves (Bangalay Ecological & Bushfire and Eastcoast Flora Survey 2011), including Stapleton Park and McKay, Crown of Newport, and Angophora bushland reserves.
8. The structure of Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion was originally open-forest however, it now exists outside of reserves as woodland or remnant trees with few large stands remaining. Remnant trees may have particular ecological and genetic significance and may be important sources of propagation material for use in rehabilitation projects. The community has been extensively cleared, particularly in the Pittwater Local government area, and is threatened by further clearing for housing, bushfire mitigation and onsite wastewater disposal. The total reduction in geographic distribution of Pittwater and Wagstaffe Spotted Gum Forest since European settlement is estimated to be c. 75% (Bell 2009, Bangalay Ecological & Bushfire and Eastcoast Flora Survey 2011, Bell and Stables 2012). The community is therefore inferred to have undergone a large reduction in geographic distribution. 'Clearing of native vegetation' is listed as a Key Threatening Process under the *Threatened Species Conservation Act 1995*.
9. Weed invasion poses a significant threat to Pittwater and Wagstaff Spotted Gum Forest in the Sydney Basin Bioregion. Weed species affect the structure of the community and reduce its ecological function by smothering native plants, reducing both reproduction and survival, and inhibiting emergence and establishment of their seedlings. The exotic taxa listed below, many of which are escaped garden plants, have been recorded from Pittwater and Wagstaffe Spotted Gum Forest (DECCW 2012, *in litt.*) and include several Weeds of National Significance:

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| <i>Acetosa sagittata</i> | Rambling Dock |
| <i>Agapanthus africanus</i> | Lily of the Nile |
| <i>Agave americana</i> | Century Plant |
| <i>Ageratina adenophora</i> | Crofton Weed |
| <i>Aloe maculata</i> | Common Soap Aloe |
| <i>Amaryllis belladonna</i> | Belladonna Lily |
| <i>Andropogon virginicus</i> | Whisky Grass |
| <i>Araujia sericifera</i> | Moth Vine |
| <i>Asparagus aethiopicus</i> | Asparagus Fern |
| <i>Axonopus fissifolius</i> | Narrow-leafed Carpet Grass |
| <i>Bidens pilosa</i> | Cobbler's Pegs |
| <i>Bromus catharticus</i> | Praire Grass |
| <i>Bryophyllum delagoense</i> | Mother of millions |
| <i>Canna indica</i> | Tous-les-mois Arrowroot |

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| <i>Cardiospermum grandiflorum</i> | Balloon Vine |
| <i>Chlorophytum comosum</i> | Spider Plant |
| <i>Chrysanthemoides monilifera</i> | Bitou Bush |
| <i>Cinnamomum camphora</i> | Camphor Laurel |
| <i>Cirsium vulgare</i> | Spear Thistle |
| <i>Conyza bonariensis</i> | Flaxleaf Fleabane |
| <i>Conyza</i> spp. | Fleabane |
| <i>Coprosma repens</i> | Taupata |
| <i>Coreopsis lanceolata</i> | Coreopsis |
| <i>Crassocephalum crepidioides</i> | Thickhead |
| <i>Crassula sarmentosa</i> var. <i>sarmentosa</i> | |
| <i>Ehrharta erecta</i> | Panic Veldtgrass |
| <i>Erechtites valerianifolia</i> | Brazilian Fireweed |
| <i>Eriobotrya japonica</i> | Loquat |
| <i>Gamochaeta americana</i> | Cudweed |
| <i>Gamochaeta spicata</i> | Cudweed |
| <i>Genista monspessulana</i> | Montpellier Broom |
| <i>Hedychium gardnerianum</i> | Ginger Lily |
| <i>Hypochaeris radicata</i> | Catsear |
| <i>Ipomoea indica</i> | Morning Glory |
| <i>Lantana camara</i> | Lantana |
| <i>Ligustrum lucidum</i> | Large-leaved Privet |
| <i>Ligustrum sinense</i> | Small-leaved Privet |
| <i>Lilium formosanum</i> | Formosan Lily |
| <i>Lonicera japonica</i> | Japanese Honeysuckle |
| <i>Monstera deliciosa</i> | Fruit Salad Plant |
| <i>Ochna serrulata</i> | Mickey Mouse Plant |
| <i>Olea europaea</i> subsp. <i>cuspidata</i> | African Olive |
| <i>Oxalis corniculata</i> | Creeping Oxalis |
| <i>Oxalis purpurea</i> | |
| <i>Paspalum urvillei</i> | Vasey Grass |
| <i>Passiflora edulis</i> | Common Passionfruit |
| <i>Philodendron</i> spp. | |
| <i>Phoenix canariensis</i> | Canary Island Date Palm |
| <i>Physalis peruviana</i> | Cape Gooseberry |
| <i>Phytolacca octandra</i> | Inkweed |
| <i>Plantago lanceolata</i> | Lamb's Tongues |
| <i>Plantago major</i> | Large Plantain |
| <i>Potentilla indica</i> | Indian Strawberry |
| <i>Psoralea pinnata</i> | African Scurf-pea |
| <i>Ravenala madagascariensis</i> | |
| <i>Rhaphiolepis indica</i> | Indian Hawthorn |
| <i>Rubus fruticosus</i> sp. agg. | Blackberry complex |
| <i>Rubus ulmifolius</i> | Blackberry |
| <i>Schefflera actinophylla</i> | Umbrella Tree |
| <i>Senecio madagascariensis</i> | Fireweed |
| <i>Senecio tamoides</i> | |
| <i>Senna pendula</i> var. <i>glabrata</i> | |
| <i>Setaria parviflora</i> | |

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| <i>Sida rhombifolia</i> | Paddy's Lucerne |
| <i>Solanum nigrum</i> | Black-berry Nightshade |
| <i>Sonchus oleraceus</i> | Common Sowthistle |
| <i>Sporobolus africanus</i> | Parramatta Grass |
| <i>Taraxacum officinale</i> | Dandelion |
| <i>Toxicodendron succedaneum</i> | Rhus Tree |
| <i>Tradescantia fluminensis</i> | Wandering Jew |
| <i>Tropaeolum majus</i> | Nasturtium |
| <i>Watsonia meriana</i> | |
| <i>Wisteria sinensis</i> | Chinese wisteria |

'Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants', 'Invasion and establishment of exotic vines and scramblers', 'Invasion, establishment and spread of Lantana (*Lantana camara* L. *sens. lat.*)', 'Invasion of native plant communities by *Chrysanthemoides monilifera*', and 'Invasion of Native Plant Communities by African Olive *Olea europaea* L. subsp. *cuspidata* (Wall. ex G.Don Ciferri)' are listed as Key Threatening Processes under the *Threatened Species Conservation Act 1995*.

10. Inappropriate fire regimes are a major threat to Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion. In the Pittwater local government area, most remnants of the community have not been burnt in a high intensity fire since at least the 1960's (Holden 1999). An absence of regular fire has also allowed the proliferation of bird-dispersed species, such as *Pittosporum undulatum*, *Glochidion ferdinandi*, *Livistona australis* and *Elaeocarpus reticulatus*, which have responded well to elevated nutrient levels and are increasing their abundance within the community (Smith and Smith 2000, Pittwater Council 2002, Bangalay Ecological & Bushfire and Eastcoast Flora Survey 2011). Prolonged absence of fire within this community is likely to result in a decline in abundance of short lived species with fire-cued germination and recruitment (Smith and Smith 2000).
11. Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion is threatened by clearing for urban development, urban runoff, dumping of rubbish and garden refuse, weed invasion, inappropriate fire regimes, fragmentation, and demographic and environmental stochasticity due to the small size of most remaining remnants (Bell 2009, Bangalay Ecological & Bushfire and Eastcoast Flora Survey 2011). Collectively, these threats have led to changes in community structure and species composition, habitat degradation and fragmentation, and invasion and establishment of exotic species, and are indicative of a large reduction in ecological function of the community.
12. Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion provides important habitat and food sources for the Endangered Population of the Squirrel Glider (*Petaurus norfolcensis*) on the Barrenjoey Peninsula, north of Bushrangers Hill, which is listed under the *Threatened Species Conservation Act 1995* (Smith and Smith 2000). The ecotone between Pittwater and Wagstaffe Spotted Gum Forest and Hawkesbury Sandstone Open-Forest is also one of several key habitats for the Endangered Population of the Koala (*Phascolarctos cinereus*) in the Pittwater local government area, which is listed under the *Threatened Species Conservation Act 1995* (Smith and Smith 2000). Both the Squirrel Glider and the Koala are listed as Vulnerable Species in New South Wales.

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13. Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion is not eligible to be listed as a Critically Endangered Ecological Community.
14. Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion is eligible to be listed as an Endangered Ecological Community as, in the opinion of the Scientific Committee, it is facing a very high risk of extinction in New South Wales in the near future, as determined in accordance with the following criteria as prescribed by the *Threatened Species Conservation Regulation 2010*:

Clause 17 Reduction in geographic distribution of 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:

- (b) a large reduction in geographic distribution.

Clause 18 Restricted geographic distribution of ecological community

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

- (b) 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.

Clause 19 Reduction in ecological function of 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:

- (b) a large reduction in ecological function,
as indicated by any of the following:
- (d) change in community structure,
 - (e) change in species composition,
 - (f) disruption of ecological processes,
 - (g) invasion and establishment of exotic species,
 - (h) degradation of habitat,
 - (i) fragmentation of habitat.

Associate Professor Michelle Leishman
Chairperson
Scientific Committee

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