NSW SCIENTIFIC COMMITTEE

Final Determination

The Scientific Committee, established by the *Threatened Species Conservation Act 1995* (the Act), has made a Final Determination under Section 23 of the Act to list the Agnes Banks Woodland 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 Agnes Banks Woodland in the Sydney Basin Bioregion from Part 3 of Schedule 1 of the Act.

This determination contains the following information:

Parts 1 & 2: Section 4 of the Act defines an ecological community as "an assemblage of species occupying a particular area". These defining features of Agnes Banks Woodland in the Sydney Basin Bioregion are described in Parts 1 and 2 of this Determination, respectively.

Part 3: Part 3 of this Determination describes the eligibility for listing of this ecological community in Part 2 of Schedule 1A of the Act according to criteria as prescribed by the *Threatened Species Conservation Regulation* 2010.

Part 4: Part 4 of this Determination provides additional information intended to aid recognition of this community in the field.

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Part 1. Assemblage of species

1.1 Agnes Banks Woodland in the Sydney Basin Bioregion, hereafter known as Agnes Banks Woodland, is characterised by the assemblage of species listed below.

Acacia brownii
Acacia bynoeana
Acacia elongata
Acacia ulicifolia
Amperea xiphoclada
Angophora bakeri
Baeckea diosmifolia
Baloskion pallens
Banksia aemula
Banksia oblongifolia
Banksia serrata
Bossiaea rhombifolia
Brachyloma daphnoides
Caleana major
Callistemon citrinus
Callistemon linearis
Cassytha pubescens
Conospermum taxifolium
Cyathochaeta diandra
Dianella revoluta
Digitaria parviflora
Dillwynia floribunda
Dillwynia glaberrima
Entolasia stricta
Eragrostis brownii
Eucalyptus parramattensis
Eucalyptus sclerophylla
Gonocarpus micranthus
Haemodorum corymbosum
Hibbertia fasciculata
Imperata cylindrica
Isopogon anemonifolius
Kunzea capitata
Lepidosperma longitudinale
Leptocarpus tenax
Leptospermum polygalifolium
Leptospermum trinervium
Lepyrodia scariosa
Leucopogon ericoides
Leucopogon virgatus
Lomandra cylindrica
Lomandra glauca
Melaleuca thymifolia
Mitrasacme polymorpha
Monotoca scoparia
Olax stricta
Persoonia nutans
Philotheca myoporoides
Philotheca salsolifolia
Pimelea linifolia
Platysace ericoides
Pteridium esculentum
Ricinocarpos pinifolius
Schoenus brevifolius
Schoenus ericetorum
Stylidium graminifolium
Thelymitra aristata
Trachymene incisa
Xanthorrhoea minor
Xyris complanata

1.2 The total species list of the community across all occurrences is likely to be considerably larger than that given above. Due to variation across the range of the community, not all of the above species are present at every site and many sites may also contain species not listed above.

Characteristic species may be abundant or rare and comprise only a subset of the complete list of species recorded in known examples of the community. Some characteristic species show a high fidelity (are relatively restricted) to the community, but may also occur in other communities, while others are more typically found in a range of communities.

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The number and identity of species recorded at a site is a function of sampling scale and effort. In general, the number of species recorded is likely to increase with the size of the site and there is a greater possibility of recording species that are rare in the landscape.

Species presence and relative abundance (dominance) will vary from site to site as a function of environmental factors such as soil properties (chemical composition, texture, depth, drainage), topography, climate and through time as a function of disturbance (eg fire, logging, grazing) and weather (eg flooding, drought, extreme heat or cold).

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 bank or as dormant structures such as bulbs, corms, rhizomes, rootstocks or lignotubers.

The species listed above are vascular plants, however the community also includes micro-organisms, fungi, crypotgamic plants and a diverse vertebrate and invertebrate fauna. These components of the community are less well documented.

Part 2. Particular area occupied by the ecological community

2.1 The assemblage of species listed in Part 1.1 above which characterises the Agnes Banks Woodland occurs within the Sydney Basin Bioregion. This Bioregion is defined by 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

2.2 It is the intent of the Scientific Committee that all occurrences of the ecological community (both recorded and as yet unrecorded, and independent of their condition) that occur within this bioregion be covered by this Determination.

Part 3. Eligibility for listing

3.1.1 The extent of occurrence and area of occupancy (AOO) of Agnes Banks Woodland are estimated to be 16 km^2. This estimate of AOO is based on four 2 x 2 km grid cells, the scale recommended for assessing AOO by IUCN (2014). The geographic distribution of Agnes Banks Woodland in the Sydney Bioregion is considered to be very highly restricted.

3.1.2 Remnants of Agnes Banks Woodland are threatened with further clearing and sand extraction for rural and rural-residential development; while most of the area that has been cleared was lost prior to 1998, 15 ha were cleared between 1998 and 2011 (M. Tozer *in litt.* October 2013). Any future clearing for sand mining may target Agnes Banks Woodland on well-drained sand dunes that

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are floristically distinct from the surrounding Castlereagh Woodlands (M. Tozer *in litt*. October 2013). Other continuing threats include weed invasion by African Lovegrass (*Eragrostis curvula*), Black Locust (*Robinia pseudoacacia*), Camphor Laurel (*Cinnamomum camphora*) and Privet (*Ligustrum* spp.) (J. Sanders *in litt.* October 2013; G. Steenbeeke *in litt*. October 2013). 'Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants', 'Clearing of native vegetation' and 'Invasion of native plant communities by exotic perennial grasses' are listed as Key Threatening Processes under the Act. Illegal rubbish dumping and access by four-wheel drive vehicles and motorbikes are an ongoing threat.

3.2 Criteria for listing

Agnes Banks Woodland in the Sydney Basin Bioregion is eligible to be listed as a Critically Endangered Ecological Community in accordance with Section 12 of the Act 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.

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:

(d) change in community structure,
(e) change in species composition,
(g) invasion and establishment of exotic species,
(h) degradation of habitat.

Dr Mark Eldridge
Chairperson
NSW Scientific Committee

Exhibition period: 22/05/15 – 17/07/15 Proposed Gazettal date: 22/05/15

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Part 4. Additional information about the ecological community

The following information is additional to that required to meet the definition of an ecological community under the Act, but is provided to assist in the recognition of Agnes Banks Woodland in the field. Given natural variability, along with disturbance history, Agnes Banks Woodland may sometimes occur outside the typical range of variation in the features described below.

4.1 The vegetation of Agnes Banks Woodland is described under the same name in Benson (1992), James (1997), National Parks and Wildlife Service Threatened Species Unit (2000), Tozer (2003) and Tozer *et al.* (2010).

4.2 Agnes Banks Woodland is restricted to small areas of sand dunes overlying Tertiary Alluvium at Agnes Banks on the east bank of the Hawkesbury River in Western Sydney. 'The vegetation of the Agnes Banks sand deposit includes several assemblages which intergrade in a continuum along soil drainage gradients and collectively comprise the Endangered Ecological Community' (M. Tozer *in litt*. Oct. 2013). Stands of Agnes Banks Woodland found on deep, well-drained sands are recognised as a separate community from the surrounding communities of Castlereagh Ironbark Forest and Castlereagh Scribbly Gum Woodland (Tozer *et al.* 2010).

4.3 Agnes Banks Woodland is a low woodland dominated by *Eucalyptus sclerophylla* and *Angophora bakeri* with a diverse understorey of sclerophyllous shrub species including *Acacia brownii, Acacia elongata, Amperea xiphoclada, Baeckea diosmifolia, Banksia aemula, Banksia oblongifolia, Bossiaea rhombifolia, Callistemon citrinus, Callistemon linearis, Conospermum taxifolium, Dillwyina floribunda, Hibbertia fasiculata, Kunzea capitata, Leptospermum trinervium, Leucopogon virgatus, Monotoca scoparia, Olax stricta, Persoonia nutans, Philotheca salsolifolia,* and *Ricinocarpus pinifolius.* Ground layer species include *Caleana major, Haemodorum corymbosum, Leptocarpus tenax, Mitrasacme polymorpha, Pimelia linifolia, Platysace ericoides, Stylidium graminifolium* and *Trachymene incisa.* The species listed above were identified as diagnostic for this community (M. Tozer *in litt*. 2003, revised by M. Tozer *in litt*. October 2013). A diagnostic species is defined as one with a higher probability of occurring in the target community than expected, based on their frequency of occurrence in the data set for the Cumberland Plain (Tozer 2003).

4.4 Two of the plant species found in Agnes Banks Woodland (*Acacia bynoeana* and *Persoonia nutans*) are listed as Endangered species under the Act. James *et al.* (1999) identify a further five species that occur in Agnes Banks Woodland as being of conservation importance in western Sydney (*Banksia aemula, Callistemon linearis, Dillwynia glaberrima, Lepidosperma longitudinale* and *Xyris complanata*).

4.5 Agnes Banks Woodland has been heavily cleared in the past. The original extent of the community is uncertain as much of the community has been

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cleared due to sandmining. Independent estimates of the pre-European extent range from 475 to 627 ha (Benson 1981, Tozer 2003, M. Tozer *et al*. 2010). A reappraisal of a range of primary data including quantitative survey plots, field-verified aerial photo-pattern and soil landscape mapping (Bannerman and Hazelton 1990) suggests that the original extent of the community was at the low end of this range (475 ha; M. Tozer *in litt*. October 2013). Agnes Banks Woodland has been extensively cleared for sand extraction (68 – 84%; M. Tozer *in litt*. October 2013). About 75 - 151 ha still survive (M. Tozer *in litt.* October 2013) and the community has limited representation (45 ha) in Agnes Banks Nature Reserve.

4.6 Agnes Banks Woodland has currently been recorded in the local government area of Penrith however unrecorded stands of the ecological community may occur elsewhere in the Bioregion.

References:

Bannerman SM, Hazelton PA (1990) Soil landscapes of the Penrith 1:100 000 map sheet. Soil Conservation Service of NSW, Sydney.

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Tozer MG, Turner K, Keith DA, Tindall D, Pennay C, Simpson C, MacKenzie B, Beukers P, Cox S (2010) Native vegetation of southeast NSW: a revisited classification and map for the coast and eastern tableands. *Cunninghamia* **11**, 359–406.

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