

Publication date: 9 August 2024

Notice of and reasons for the Final Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Final Determination to remove *Eucalyptus* sp. Howes Swamp Creek (M. Doherty 19/7/85, NSW 207054) from the Schedules of the Act by omitting reference to this species from Part 2 of Schedule 1 (Endangered species). The omission of species from the Schedules is provided for by Part 4 of the Act.

The NSW Threatened Species Scientific Committee is satisfied that *Eucalyptus* sp. Howes Swamp Creek (M. Doherty 19/7/85, NSW 207054) has been duly assessed by the Commonwealth Threatened Species Scientific Committee under the Common Assessment Method, as provided by Section 4.14 of the Act. After due consideration of Commonwealth DCCEEW (2023), the NSW Threatened Species Scientific Committee has made a decision to remove *Eucalyptus* sp. Howes Swamp Creek (M. Doherty 19/7/85, NSW 207054) from the Schedules of the Act.

Summary of Conservation Assessment

The NSW Threatened Species Scientific Committee has found that:

1. *Eucalyptus* sp. Howes Swamp Creek (M. Doherty 19/7/85, NSW 207054) (family Myrtaceae) has never been formally described and has remained taxonomically unresolved for over 35 years after the first collection was made in 1985 (Bell *et al.* 2022). Since it has been known, the entity has been variously known as *E.* 'wollemiensis' ms, *E.* sp. aff. *dalrympleana*, *E.* sp. aff. *viminalis*, *E. bridgesiana*, and *E. bridgesiana* × *E. viminalis* hybrids (Bell *et al.* 2022).
2. The first collected specimen (M.Doherty 26) from which the phrase name is derived was collected by Michael Doherty in 1985 from a population of 20 adult and 12 juvenile trees in a small (200 m x 100 m) area of alluvium on Howes Swamp Creek in the Mellong Swamp Complex within eastern Wollemi National Park (DoE 2014; OEH 2019). This reference specimen was an anomalous sterile eucalypt that could not be determined at the time, though was recognised as belonging to *Eucalyptus* section *Maidenaria* based on the morphology of its juvenile leaves (Bell *et al.* 2022). A second collection from the same area was made in March 1988 (M.Doherty 27) (Bell *et al.* 2022). These earliest specimens consisted of mostly juvenile foliage, with the cordate, amplexicaul juveniles clearly blue-green, crenulate and soon alternating on the stem, typical of *E. bridgesiana* (Bell *et al.* 2022). The 7-flowered, ovoid buds and hemispherical fruits with a raised annular disc on M.Doherty 27 also align well with *E. bridgesiana*.
3. In the 1990s, eucalypt taxonomist Ken Hill (RBG-Sydney) collected from the site on three separate occasions. Hill identified his material by proposing the manuscript name *Eucalyptus* 'wollemiensis' for the specimens morphologically similar to Doherty's (K.D.Hill 4167 and K.D.Hill 4168) and *E.* sp. aff. *viminalis* for other material from the site (K.D.Hill 4169 and K.D.Hill 4170) (Bell *et al.* 2022). However, the specimens resembling Doherty's collections display features typical of *E. bridgesiana* and Hill's *E.* sp. aff. *viminalis* specimens, despite his initial assessment, appear typical of *E. viminalis* (Bell *et al.* 2022).

NSW Threatened Species Scientific Committee

4. Bell *et al.* (2022) states that *Eucalyptus* sp. Howes Swamp Creek is not a valid taxonomic concept. Bell *et al.* (2022) concludes that “the concept of *E.* sp. Howes Swamp Creek conflates two entities: 1) a small, disjunct and remnant stand of *E. bridgesiana*, which is now rare in the area and reduced to a few, stunted individuals after a history of repeated fire; and 2) a hybrid swarm of *E. bridgesiana* × *E. viminalis*, comprising a number of plants of various forms and trait combinations” (Bell *et al.* 2022). Most of the plants in the known population represent the hybrid swarm. This means that there are more plants which appear to be F1 hybrids (first generation of offspring from two distinct parental types) and backcrosses (subsequent generations with influence from either parental type) next to the relatively few confirmed *E. bridgesiana* plants. The hybrid plants also show a shifting admix of characters which trend toward pure *E. viminalis* upstream, where confirmed *E. viminalis* plants are found (Bell *et al.* 2022). Based on evidence of reduced vigour and wide variation in juvenile leaf morphology suggesting a hybrid origin, this is hypothesised in Bell *et al.* (2022) to be a result of back-crossing with *E. viminalis*, which is the more common and prevalent parent upstream (Bell *et al.* 2022).
5. Notably, Bell *et al.* (2022) suggests that the reference specimen for the phrase name *Eucalyptus* sp. Howes Swamp Creek, and several other specimens from Howes Swamp Creek are within the expected range of variation exhibited by *E. bridgesiana*. Indeed, other populations of *E. bridgesiana* have previously been linked to novel species (e.g., Hunter 2001) but the differences are questionable when examined in relation to the entire distribution of the species. Both Slee *et al.* (2015) and Klaphake (2012) note that specimens from Howes Swamp Creek exhibiting similarly slight differences from typical *E. bridgesiana* do not fall outside of the expected variation of that species (Bell *et al.* 2022).
6. *Eucalyptus bridgesiana* is widespread in drier grassy woodland on slopes and ranges from southern Queensland through New South Wales and into Victoria. *E. bridgesiana* occurs frequently in various parts of its range (PlantNet 2021). Accordingly, the species does not appear to be eligible for listing on the Schedules of the Act.
7. In view of the above, the NSW Threatened Species Scientific Committee is of the opinion that *Eucalyptus* sp. Howes Swamp Creek (M. Doherty 19/7/85, NSW 207054) is no longer eligible to be listed as a threatened species under the Schedules of the Act.

Assessment against Biodiversity Conservation Regulation 2017 criteria

The Clauses used for assessment are listed below for reference.

Overall Assessment Outcome:

Eucalyptus sp. Howes Swamp Creek (M. Doherty 19/7/85, NSW 207054) is not eligible to be considered a valid species in NSW under clause 4.3 of the Act.

Senior Professor Kristine French
Chairperson
NSW Threatened Species Scientific Committee

NSW Threatened Species Scientific Committee

Supporting Documentation:

Commonwealth DCCEEW (Department of Climate Change, Energy, the Environment and Water) (2023). Conservation Advice for *Eucalyptus* sp. Howes Swamp Creek (M. Doherty 26). Australian Government, Canberra, ACT.

References:

Bell SAJ, Phillips GP, Nicolle D (2022) Resolution of a 35-year taxonomic dilemma: *Eucalyptus* sp. Howes Swamp Creek (Myrtaceae) from eastern Wollemi National Park, New South Wales. *Telopea* **25**: 151-163.

DoE (Department of the Environment) (2014) *Approved Conservation Advice for Eucalyptus sp. Howes Swamp Creek (M.Doherty 26)*. Canberra: Department of the Environment. URL: <http://www.environment.gov.au/biodiversity/threatened/species/pubs/82281-conservation-advice.pdf>. In effect under the EPBC Act from 29-Apr-2014 (accessed 21 December 2021).

Hunter JT (2001) *Eucalyptus saxicola* (Myrtaceae), a new species from the Central Tablelands of New South Wales (section Maidenaria series Bridgesianae). *Telopea* **9**: 403-407.

Klaphake V (2012) *Eucalypts of the Sydney Region. Third edition*. (The Author, Byabarra)

OEH (Office of Environment and Heritage) (2019) *Eucalyptus* sp. Howes Swamp Creek profile. URL: <https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10900> (accessed 21 December 2021).

PlantNet (2021) Species page for *Eucalyptus bridgesiana* in the New South Wales Flora Online. URL: <https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Eucalyptus~bridgesiana> (accessed 21 December 2021)

Slee AV, Brooker MIH, Duffy SM, West JG (2015) *EUCLID: Eucalypts of Australia. Fourth Edition*. Centre for Australian National Biodiversity Research, Australian National Herbarium, Canberra.