

NSW Threatened Species Scientific Committee

Notice of Preliminary Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Preliminary Determination to support a proposal to remove *Boronia hapalophylla* Duretto, F.J.Edwards & P.G.Edwards from the Schedules of the Act by omitting reference to this species from Part 2 of Schedule 1 (Endangered species).

How to make a submission

The NSW TSSC welcomes public involvement in the assessment process and places preliminary determinations on public exhibition on the NSW TSSC pages on the Department of Planning, Industry and Environment (DPIE) website. This public exhibition provides an opportunity for the public to comment on this preliminary determination as well as provide any additional information that is relevant to the assessment.

Postal submissions regarding this Preliminary Determination may be sent to:

Secretariat
NSW Threatened Species Scientific Committee
Locked Bag 5022
Parramatta NSW 1481.

Email submissions in Microsoft Word or PDF formats may be sent to:
scientific.committee@environment.nsw.gov.au

Submissions close 9th December 2022.

What happens next?

After considering any submissions received during the public exhibition period the NSW TSSC will make a Final Determination and a notice will be placed on the DPIE website to announce the outcome of the assessment. If the Final Determination is to support a listing, then it will be added to the Schedules of the Act when the Final Determination is published on the legislation website. www.legislation.nsw.gov.au.

Privacy information

The information you provide in your submission may be used by the NSW TSSC in the assessment to determine the conservation status and listing or delisting of threatened or extinct species, threatened populations and threatened or collapsed ecological communities or to assess key threatening processes.

The NSW TSSC may be asked to share information on assessments with NSW Government agencies, the Commonwealth Government and other State and Territory governments to collaborate on national threatened species assessments using a common assessment method and to assist in the management of species and ecological communities.

If your submission contains information relevant to the assessment it may be provided to state and territory government agencies and scientific committees as part of this collaboration.

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If you wish your identity and personal information in your submission to be treated as confidential you must:

- ***request your name be treated as confidential, and***
- ***not include any of your personal information in the main text of the submission or attachments so that it can be easily removed.***

Professor Kristine French
Chairperson
NSW Threatened Species Scientific Committee

NSW Threatened Species Scientific Committee

Public Exhibition period: 09/09/2022 – 09/12/2022

Preliminary Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Preliminary Determination to support a proposal to remove *Boronia hapalophylla* Duretto, F.J.Edwards & P.G.Edwards 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.

Summary of Conservation Assessment

The NSW Threatened Species Scientific Committee has found that:

1. *Boronia hapalophylla* Duretto, F.J.Edwards & P.G.Edwards is described by Duretto *et al.* (2004) as an “erect, much branched shrub to 3 m tall, very open and spindly, often supported by other species when tall. Multiangular stellate hairs sessile, with up to 15 rays; rays to 0.5 mm long, unicellular, free, firm, straight, glossy, smooth, white to yellow. Branches terete to slightly quadrangular in cross section, decurrent leaf bases lacking, not obviously glandular, with no massive cork development, with a moderately dense stellate indumentum, becoming glabrous with age, regrowing from a rootstock after disturbance. Leaves simple, opposite, rarely sub-opposite or in whorls of three, not conspicuously glandular, sessile to subsessile, leaf base so strongly attenuate as to appear petiolate, apparent petiole to 1.5 mm long; lamina narrow-elliptic to elliptic to lanceolate, (13–)18–50(–70) mm long, (1–)3.5–12 mm wide, strongly discolourous, paler beneath, dorsiventral, with palisade mesophyll above and spongy mesophyll below; tip acute; base strongly attenuate; margins entire, slightly recurved to revolute; midrib prominently raised abaxially, with tightly packed parenchyma with secondary thickening between midvein and abaxial epidermis, impressed adaxially; adaxial surface with a sparse to moderately dense, stellate indumentum; abaxial surface with a dense, heterogenous indumentum of two hair types: a moderately dense layer of multiangular stellate hairs over a dense layer of peltate stellate hairs. Inflorescence axillary, 1–5-flowered, with a dense stellate indumentum; peduncle absent, or sometimes 2–5 mm long in inflorescences with 3–5 flowers; prophylls minutely unifoliolate, often leaf-like, 1.5–7(–20) mm long, with a dense stellate indumentum, or indumentum as leaves; anthopodia [pedicels] 2–6.5 mm long. Sepals broadly ovate-deltate, shorter and narrower than petals, acuminate, valvate in bud, 5–7 mm long, 3–4.5 mm wide, enlarging to 10 mm long and 7 mm wide with mature fruit, persistent; adaxial surface densely and minutely pubescent, becoming glabrous towards base; abaxial surface with a dense stellate indumentum. Petals pink, valvate in bud, (6–)8–10 mm long, enlarging to 15 mm long with mature fruit, with midvein raised abaxially, persistent; adaxial surface sparsely pilose, becoming glabrous towards base; abaxial surface with a dense stellate indumentum. Stamens all fertile, filaments bearing stiff, simple hairs abaxially and on margins below glandular tip; sepaline filaments clavate, tapering to anther connective, 2–2.5 mm long, the distal 0.5–1 mm prominently glandular; petaline filaments, c. 1.5 mm long, the distal end glandular; anthers monomorphic, glabrous; anther appendage erect or reflexed.

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Disc entire, glabrous, rarely with slight swelling opposite sepaline stamens. Ovary glabrous or rarely with few stellate hairs at apex; style glabrous or rarely with scattered stellate hairs at base; stigma slightly wider than style. Cocci c. 7 mm long, c. 3.5 mm wide, glabrous or hirsute. Seeds black, shiny, 5–6 mm long, 2.5–3 mm wide; surface at magnification tuberculate; tubercles free.”

- Boronia hapalophylla* is endemic to outcropping areas of the Kangaroo Creek Sandstone geological formation along the southern edge of the Clarence-Moreton Basin in northern NSW (NSW Scientific Committee 2004; NSW NPWS 2009). Initially considered to be restricted to a small area around Shannon Creek near Coutts Crossing (NSW Scientific Committee 2004), *B. hapalophylla* is now known from a number of sites across the southern Clarence Valley following extensive targeted surveys in the region (Sheringham 2021). There are now 13 known sites spread across four geographically distinct subpopulations, with five sites included in gazetted conservation reserves, four others in private or local government land set aside for conservation purposes, two in vacant Crown land and two in state forests.
- Currently, the population of *Boronia hapalophylla* is regarded as a minimum of 17,780 plants based on census data (P. Sheringham *in litt.* April 2022). However, the true population number is likely much higher considering this count does not include two confirmed but unsurveyed sites as well as considerable areas of unsurveyed potential habitat within other key subpopulations.
- The geographic distribution of *Boronia hapalophylla* is highly restricted. The Extent of Occurrence (EOO) is based on a minimum convex polygon enclosing all mapped occurrences of the species, the method of assessment recommended by IUCN (2022) and was measured at 572 km². Area of Occupancy (AOO) was calculated using 2 x 2 km grid cells, the scale recommended by IUCN (2022) and was calculated to be 208 km².
- Boronia hapalophylla* appears to be a facultative seeding species as it has been observed to both vigorously reshoot from rootstock after fire as well as producing numerous seedlings in the post-fire environment after wildfire (Duretto *et al.* 2004; Sheringham 2021; G. Phillips pers. obs. November 2021; J. Edwards *in litt.* April 2022). Mature plants in the northern Shannon Creek subpopulation, which are recorded as being larger plants on average, resprout vigorously from the base following fire, whereas fewer resprouting plants have been recorded in the southern subpopulations which tend to have smaller mature plants on average and post-fire seedling growth appears to be favoured (Sheringham 2021; J. Edwards *in litt.* April 2022). This however may be an artefact of the fire history of the sites, with most southern subpopulations being burnt far more regularly, and so the resulting smaller average mature individuals may be less likely to resprout and more likely to rely on seedling recruitment to replenish populations post fire (NSW NPWS 2022; J. Edwards *in litt.* April 2022).
- Observations from the Yuraygir subpopulation indicate a primary juvenile period of less than two years for *Boronia hapalophylla*, with seedlings germinating after wildfire in January 2020 becoming reproductively mature and bearing viable seed

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by November 2021 (G. Phillips pers. obs. November 2021; Sheringham 2021). Plants in the Shannon Creek catchment that have been observed resprouting after fire are also recorded as being reproductively mature within two years, indicating a secondary juvenile period of approximately that length (J. Edwards *in litt.* April 2022). *B. hapalophylla* also appears to have a high proportion of seedlings that reach reproductive maturity, with the majority of recruits at the Yuraygir site in November 2021 bearing fruit and viable seeds (G. Phillips pers. obs. November 2021).

7. Species related to *Boronia hapalophylla* in *Boronia* section *Valvatae* have been found to germinate faster and more abundantly only at spring and summer temperatures after treatment with heat shock and smoke, with little to no germination at low temperatures, indicating faster seedling emergence following spring and summer fires and a considerable delay in germination following autumn and winter fires (Mackenzie *et al.* 2016). It is highly likely that *B. hapalophylla* responds similarly, with observations of large germination events in wild populations following the 2019/20 fires supporting this (G. Phillips pers. obs. November 2021). Seed viability in *Boronia* is also typically high (Mackenzie *et al.* 2016, Ma *et al.* 2018) and the moving of seeds underground by ants may also affect dormancy breaking, germination and seedling emergence depending on the depth of burial, providing further buffering against stochastic effects of disturbances such as fire and the exhaustion of soil seedbanks in a single disturbance event (Hughes and Westoby 1992; Auld 2001; NSW NPWS 2002).
8. *Boronia hapalophylla* is regarded as having four threat-defined locations when the most serious plausible threat of changed fire regimes is considered, with these locations in line with the four geographically defined subpopulations the species is distributed across.
9. The Shannon Creek subpopulation of *B. hapalophylla* was considered at risk from clearing for infrastructure projects related with the Shannon Creek Dam when initially described and listed as a threatened species in 2004 (Duretto *et al.* 2004; NSW Scientific Committee 2004). The provision of an access road and infrastructure for the dam resulted in the clearing of 1.2 ha of habitat and 100–200 plants of *B. hapalophylla* when the dam was constructed (Greenloaning 2004). Given the subsequent discovery of substantially more plants away from Shannon Creek, this clearing now represents less than 2% of the current known population.
10. Continuing decline is not currently evident in the known subpopulations of *Boronia hapalophylla* despite plausible threats being present. The previous removal of a portion of the Shannon Creek subpopulation for the construction of an access road and infrastructure to support the construction of Shannon Creek Dam resulted in some localised population loss, however decline is no longer continuing, and this subpopulation is currently regarded as secure (J. Edwards *in litt.* April 2022) and the remaining plants are now protected in a conservation reserve (McPherson 2008).

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11. *Boronia hapalophylla* appears to be adapted to persist in fire prone environments and recent surveys have found numerous seedling plants already producing seed less than two years post-fire (Sheringham 2021; G. Phillips pers. obs. November 2021). A number of subpopulations are subject to high fire frequencies shorter than the recommended fire free thresholds (NSW NPWS 2019; NSW BioNet 2022) and demographic shifts toward smaller plants (J. Edwards *in litt.* April 2022) and obligate seeding life strategies (Sheringham 2021) may be resulting from this. However, these subpopulations are reported to be in good health and stable, with no decline apparent post-fire and an appropriate mosaic of burnt and unburnt habitat being maintained (Sheringham 2021).
12. Clearing for rural development, agriculture, quarries, roads, tracks and forestry operations and the fragmentation these activities may cause are also plausible localised threats. However, the large proportion of *Boronia hapalophylla* in conservation reserves and protected areas and the fact that core habitat is largely not conducive to clearing means that clearing is not regarded as contributing to continuing decline except in highly localised instances on individual plants (Sheringham 2021; P. Sheringham *in litt.* June 2022). Given this, no observed, estimated, inferred or suspected decline in Extent of Occurrence, Area of Occupancy, extent and/or quality of habitat, number of locations or subpopulations or number of mature individuals is yet evident and future declines resulting from identified threats are only regarded as plausible, not satisfying the definition for continuing decline (IUCN 2022).
13. The identified plausible future threats to *Boronia hapalophylla* of changes in fire regimes and the clearing of habitat and habitat fragmentation are also likely to be localised in nature if and when they do become apparent. Thus, these threats are not considered likely to rapidly drive the species to extinction in a very short time (1-2 generations) across its full distribution.
14. In view of the above, the NSW Threatened Species Scientific Committee is of the opinion that *Boronia hapalophylla* Duretto, F.J.Edwards & P.G.Edwards is not eligible to be listed as a threatened species in any category under the Act.

Prof Kristine French
Chairperson
NSW Threatened Species Scientific Committee

Supporting Documentation:

Phillips G.P. (2022) Conservation Assessment of *Boronia hapalophylla* Duretto, F.J.Edwards & P.G.Edwards (Rutaceae). NSW Threatened Species Scientific Committee.

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