



Consultation on Species Listing Eligibility and Conservation Actions

Hibbertia marginata (bordered guinea flower)

You are invited to provide your views and supporting reasons related to:

- 1) the eligibility of *Hibbertia marginata* (bordered guinea flower) for inclusion on the EPBC Act threatened species list; and
- 2) the necessary conservation actions for the above species.

The purpose of this consultation document is to elicit additional information to better understand the status of the species and help inform on conservation actions and further planning. As such, the below draft assessment should be considered to be **tentative** as it may change following responses to this consultation process.

Evidence provided by experts, stakeholders and the general public are welcome. Responses can be provided by any interested person.

Anyone may nominate a native species, ecological community or threatening process for listing under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or for a transfer of an item already on the list to a new listing category. The Threatened Species Scientific Committee (the Committee) undertakes the assessment of species to determine eligibility for inclusion in the list of threatened species and provides its recommendation to the Australian Government Minister for the Environment.

Responses are to be provided in writing by email to: species.consultation@awe.gov.au

Please include species scientific name in Subject field.

or by mail to:

The Director
Bushfire Affected Species Assessments Section
Department of Agriculture, Water and the Environment
John Gorton Building, King Edward Terrace
GPO Box 858
Canberra ACT 2601

Responses are required to be submitted by 24 March 2022.

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General background information about listing threatened species

The Australian Government helps protect species at risk of extinction by listing them as threatened under Part 13 of the EPBC Act. Once listed under the EPBC Act, the species becomes a Matter of National Environmental Significance (MNES) and must be protected from significant impacts through the assessment and approval provisions of the EPBC Act. More information about threatened species is available on the department's website at: <https://www.awe.gov.au/environment/biodiversity/threatened>.

Public nominations to list threatened species under the EPBC Act are received annually by the department. In order to determine if a species is eligible for listing as threatened under the EPBC Act, the Threatened Species Scientific Committee (the Committee) undertakes a rigorous scientific assessment of its status to determine if the species is eligible for listing against a set of criteria. These criteria are available on the Department's website at: <http://www.awe.gov.au/system/files/pages/d72dfd1a-f0d8-4699-8d43-5d95bbb02428/files/tssc-guidelines-assessing-species-2021.pdf>.

As part of the assessment process, the Committee consults with the public and stakeholders to obtain specific details about the species, as well as advice on what conservation actions might be appropriate. Information provided through the consultation process is considered by the Committee in its assessment. The Committee provides its advice on the assessment (together with comments received) to the Minister regarding the eligibility of the species for listing under a particular category and what conservation actions might be appropriate. The Minister decides to add, or not to add, the species to the list of threatened species under the EPBC Act. More detailed information about the listing process is at: <https://www.awe.gov.au/environment/biodiversity/threatened/nominations>.

To promote the recovery of listed threatened species and ecological communities, conservation advices and where required, recovery plans are made or adopted in accordance with Part 13 of the EPBC Act. Conservation advices provide guidance at the time of listing on known threats and priority recovery actions that can be undertaken at a local and regional level. Recovery plans describe key threats and identify specific recovery actions that can be undertaken to enable recovery activities to occur within a planned and logical national framework. Information about recovery plans is available on the department's website at: <https://www.awe.gov.au/environment/biodiversity/threatened/recovery-plans>.

Privacy notice

The Department will collect, use, store and disclose the personal information you provide in a manner consistent with the Department's obligations under the Privacy Act 1988 (Cth) and the Department's Privacy Policy.

Any personal information that you provide within, or in addition to, your comments in the threatened species assessment process may be used by the Department for the purposes of its functions relating to threatened species assessments, including contacting you if we have any questions about your comments in the future.

Further, the Commonwealth, State and Territory governments have agreed to share threatened species assessment documentation (including comments) to ensure that all States and Territories have access to the same documentation when making a decision on the status of a potentially threatened species. This is also known as the '[Common Assessment Method](#)' (CAM). As a result, any personal information that you have provided in connection with your comments may be shared between Commonwealth, State or Territory government entities to assist with their assessment processes.

The Department's Privacy Policy contains details about how respondents may access and make corrections to personal information that the Department holds about the respondent, how respondents may make a complaint about a breach of an Australian Privacy Principle, and how the Department will deal with that complaint. A copy of the Department's Privacy Policy is available at: <https://www.awe.gov.au/about/commitment/privacy> .

Information about this consultation process

Responses to this consultation can be provided electronically or in hard copy to the contact addresses provided on Page 1. All responses received will be provided in full to the Committee and then to the Australian Government Minister for the Environment.

In providing comments, please provide references to published data where possible. Should the Committee use the information you provide in formulating its advice, the information will be attributed to you and referenced as a 'personal communication' unless you provide references or otherwise attribute this information (please specify if your organisation requires that this information is attributed to your organisation instead of yourself). The final advice by the Committee will be published on the department's website following the listing decision by the Minister.

Information provided through consultation may be subject to freedom of information legislation and court processes. It is also important to note that under the EPBC Act, the deliberations and recommendations of the Committee are confidential until the Minister has made a final decision on the nomination, unless otherwise determined by the Minister.

CONSULTATION QUESTIONS FOR HIBBERTIA MARGINATA (BORDERED GUINEA FLOWER)

SECTION A - GENERAL

1. Is the information used to assess the nationally threatened status of the species/subspecies robust? Have all the underlying assumptions been made explicit? Please provide justification for your response.
2. Can you provide additional data or information relevant to this assessment?
3. Have you been involved in previous state, territory or national assessments of this species/subspecies? If so, in what capacity?

PART 1 – INFORMATION TO ASSIST LISTING ASSESSMENT

SECTION B DO YOU HAVE ADDITIONAL INFORMATION ON THE ECOLOGY OR BIOLOGY OF THE SPECIES? (If no, skip to section C)

Biological and ecological information

4. Do you have any additional information on the ecology or biology of the species/subspecies not in the current advice?
5. Can you provide any additional or alternative references, information or estimates on germination conditions, time/age to maturity from seed, duration of maturity, longevity (average life span)?
6. Can you provide any additional information on pollination ecology or dispersal mechanisms for the species?
7. Do you have any information on the biological responses of seeds and plants of this species in response to different intensity fires?
8. Can you provide any information on the habitat attributes that typify areas where *Hibbertia marginata* grows, or any information that may assist in describing habitat critical for the survival of the species?

SECTION C ARE YOU AWARE OF THE STATUS OF THE TOTAL NATIONAL POPULATION OF THE SPECIES/SUBSPECIES? (If no, skip to section D)

Population size

9. Has the survey effort for this taxon been adequate to determine its national adult population size? If not, please provide justification for your response.
10. Do you consider the way the population size has been derived to be appropriate? Are there any assumptions and unquantified biases in the estimates? Did the estimates measure relative or absolute abundance? Do you accept the estimate of the total population size of the species/subspecies? If not, please provide justification for your response.
11. If not, can you provide a further estimate of the current population size of mature adults of the species/subspecies (national extent)? Please provide supporting justification or other information.

If, because of uncertainty, you are unable to provide a single number, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of possible species/subspecies numbers, and also choose the level of confidence you have in this estimate:

Number of mature individuals is estimated to be in the range of:

☐ 500-1000 ☐ 1000-5000 ☐ 5000-10,000 ☐ 10,000-50,000 ☐ >50,000

Level of your confidence in this estimate:

- ☐ 0–30% - low level of certainty/ a bit of a guess/ not much information to go on
- ☐ 31–50% - more than a guess, some level of supporting evidence
- ☐ 51–95% - reasonably certain, information suggests this range
- ☐ 95–100% - high level of certainty, information indicates quantity within this range
- ☐ 99–100% - very high level of certainty, data are accurate within this range

SECTION D ARE YOU AWARE OF TRENDS IN THE OVERALL POPULATION OF THE SPECIES/SUBSPECIES? (If no, skip to section E)

12. Does the current and predicted rate of decline used in the assessment seem reasonable? Do you consider that the way this estimate has been derived is appropriate? If not, please provide justification of your response.

Evidence of total population size change

13. Are you able to provide an estimate of the total population size during the early 1990s (*at or soon after the start of the most recent three generation or 10-year period*)? Please provide justification for your response.

If, because of uncertainty, you are unable to provide a single number, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of possible species/subspecies numbers, and also choose the level of confidence you have in this estimate.

Number of mature individuals is estimated to be in the range of:

☐ 500-1000 ☐ 1000-5000 ☐ 5000-10,000 ☐ 10,000-50,000 ☐ >50,000

Level of your confidence in this estimate:

- ☐ 0–30% - low level of certainty/ a bit of a guess/ not much information to go on
- ☐ 31–50% - more than a guess, some level of supporting evidence
- ☐ 51–95% - reasonably certain, information suggests this range
- ☐ 95–100% - high level of certainty, information indicates quantity within this range
- ☐ 99–100% - very high level of certainty, data are accurate within this range

14. Are you able to comment on the extent of decline in the species/subspecies' total population size over the last approximately 10 years (or three generations lengths if you know the generation length. If so please add this information to section 1). Please provide justification for your response.

If, because of uncertainty, you are unable to provide an estimate of decline, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of decline, and also choose the level of confidence you have in this estimated range.

Decline estimated to be in the range of:

☐ 1–30% ☐ 31–50% ☐ 51–80% ☐ 81–100% ☐ 90–100%

Level of your confidence in this estimated decline:

- ☐ 0–30% - low level of certainty/ a bit of a guess/ not much information to go on
- ☐ 31–50% - more than a guess, some level of supporting evidence
- ☐ 51–95% - reasonably certain, suggests this range of decline
- ☐ 95–100% - high level of certainty, information indicates a decline within this range
- ☐ 99–100% - very high level of certainty, data are accurate within this range

15. Please provide (if known) any additional evidence which shows the population is stable, increasing or declining.

SECTION E **ARE YOU AWARE OF INFORMATION ON THE TOTAL RANGE OF THE SPECIES/SUBSPECIES? (If no, skip to section F)**

Current Distribution/range/extent of occurrence, area of occupancy

- 16. Does the assessment consider the entire geographic extent and national extent of the species? If not, please provide justification for your response.
- 17. Has the survey effort for this species/subspecies been adequate to determine its national distribution? If not, please provide justification for your response.
- 18. Is the distribution described in the assessment accurate? If not, please provide justification for your response and provide alternate information.
- 19. Do you agree that the way the current extent of occurrence and/or area of occupancy have been estimated is appropriate? Please provide justification for your response.
- 20. Can you provide estimates (or if you disagree with the estimates provided, alternative estimates) of the extent of occurrence and/or area of occupancy?

If, because of uncertainty, you are unable to provide an estimate of extent of occurrence, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of extent of occurrence, and also choose the level of confidence you have in this estimated range.

Current extent of occurrence is estimated to be in the range of:

☐ <100 km² ☐ 100 – 5 000 km² ☐ 5 001 – 20 000 km² ☐ >20 000 km²

Level of your confidence in this estimated extent of occurrence

- ☐ 0–30% - low level of certainty/ a bit of a guess/ not much data to go on
- ☐ 31–50% - more than a guess, some level of supporting evidence
- ☐ 51–95% - reasonably certain, data suggests this range of decline
- ☐ 95–100% - high level of certainty, data indicates a decline within this range
- ☐ 99–100% - very high level of certainty, data is accurate within this range

If, because of uncertainty, you are unable to provide an estimate of area of occupancy, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of area of occupancy, and also choose the level of confidence you have in this estimated range.

Current area of occupancy is estimated to be in the range of:

☐ <10 km² ☐ 11 – 500 km² ☐ 501 – 2000 km² ☐ >2000 km²

Level of your confidence in this estimated extent of occurrence:

- ☐ 0–30% - low level of certainty/ a bit of a guess/ not much data to go on
- ☐ 31–50% - more than a guess, some level of supporting evidence
- ☐ 51–95% - reasonably certain, data suggests this range of decline
- ☐ 95–100% - high level of certainty, data indicates a decline within this range
- ☐ 99–100% - very high level of certainty, data is accurate within this range

SECTION F ARE YOU AWARE OF TRENDS IN THE TOTAL RANGE OF THE SPECIES/SUBSPECIES? (If no, skip to section G)

Past Distribution/range/extent of occurrence, area of occupancy

21. Do you consider that the way the historic distribution has been estimated is appropriate? Please provide justification for your response.
22. Can you provide estimates (or if you disagree with the estimates provided, alternative estimates) of the former extent of occurrence and/or area of occupancy?

If, because of uncertainty, you are unable to provide an estimate of past extent of occurrence, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of past extent of occurrence, and also choose the level of confidence you have in this estimated range.

Past extent of occurrence is estimated to be in the range of:

☐ <100 km² ☐ 100 – 5 000 km² ☐ 5 001 – 20 000 km² ☐ >20 000 km²

Level of your confidence in this estimated extent of occurrence

☐ 0–30% - low level of certainty/ a bit of a guess/ not much data to go on

☐ 31–50% - more than a guess, some level of supporting evidence

☐ 51–95% - reasonably certain, data suggests this range of decline

☐ 95–100% - high level of certainty, data indicates a decline within this range

☐ 99–100% - very high level of certainty, data is accurate within this range

If, because of uncertainty, you are unable to provide an estimate of past area of occupancy, you may wish to provide an estimated range. If so, please choose one of the ranges suggested in the table below of ranges of past area of occupancy, and also choose the level of confidence you have in this estimated range:

Past area of occupancy is estimated to be in the range of:

☐ <10 km² ☐ 11 – 500 km² ☐ 501 – 2000 km² ☐ >2000 km²

Level of your confidence in this estimated extent of occurrence:

☐ 0–30% - low level of certainty/ a bit of a guess/ not much data to go on

☐ 31–50% - more than a guess, some level of supporting evidence

☐ 51–95% - reasonably certain, data suggests this range of decline

☐ 95–100% -high level of certainty, data indicates a decline within this range

☐ 99–100% - very high level of certainty, data is accurate within this range

PART 2 – INFORMATION FOR CONSERVATION ADVICE ON THREATS AND CONSERVATION ACTIONS

SECTION G DO YOU HAVE INFORMATION ON THREATS TO THE SURVIVAL OF THE SPECIES/SUBSPECIES? (If no, skip to section H)

23. Do you consider that all major threats have been identified and described adequately? Do you have any knowledge of the presences of these threats in *Hibbertia marginata* habitats?
24. Have you observed any of the described threats having a direct impact on *Hibbertia marginata*? (e.g. *Phytophthora cinnamomi*, weeds, grazing, Bell Miner Associated habitat loss).
25. To what degree are the identified threats likely to impact on the species/subspecies in the future?
26. Are the threats impacting on different populations equally, or do the threats vary across different populations?

27. Can you provide additional or alternative information on past, current or potential threats that may adversely affect the species/subspecies at any stage of its life cycle?
28. Can you provide supporting data/justification or other information for your responses to these questions about threats?

SECTION H **DO YOU HAVE INFORMATION ON CURRENT OR FUTURE MANAGEMENT FOR THE RECOVERY OF THE SPECIES/SUBSPECIES?**
(If no, skip to section I)

29. What planning, management and recovery actions are currently in place supporting protection and recovery of the species/subspecies? To what extent have they been effective?
30. Can you recommend any additional or alternative specific threat abatement or conservation actions that would aid the protection and recovery of the species/subspecies?
31. Would you recommend translocation (outside of the species' historic range) as a viable option as a conservation actions for this species/subspecies?

SECTION I **DO YOU HAVE INFORMATION ON STAKEHOLDERS IN THE RECOVERY OF THE SPECIES/SUBSPECIES?**

32. Are you aware of other knowledge (e.g. traditional ecological knowledge) or individuals/groups with knowledge that may help better understand population trends/fluctuations, or critical areas of habitat?
33. Are you aware of any cultural or social importance or use that the species/subspecies has?
34. What individuals or organisations are currently, or potentially could be, involved in management and recovery of the species?
35. How aware of this species/subspecies are land managers where the species/subspecies is found?
36. What level of awareness is there with individuals or organisations around the issues affecting the species?
 - a. Where there is awareness, what are these interests of these individuals/organisations?

- b. Are there populations or areas of habitat that are particularly important to the community?

PART 3 – ANY OTHER INFORMATION

37. Do you have comments on any other matters relevant to the assessment of this species/subspecies?

DRAFT

Conservation advice for *Hibbertia marginata* (bordered guinea flower)

This draft document is being released for consultation on the species listing eligibility and conservation actions

The purpose of this consultation document is to elicit additional information to better understand the status of the species and help inform conservation actions, further planning and a potential recovery plan. The draft assessment below should therefore be considered **tentative** at this stage, as it may change as a result of responses to this consultation process.

Note: Specific consultation questions relating to the below draft assessment and preliminary determination have been included in the consultation cover paper for your consideration.

This document combines the approved conservation advice and listing assessment for the species. It provides a foundation for conservation action and further planning.



Hibbertia marginata, Richmond Range, NSW (left) © Copyright, Nicholas Fisher (from [Flickr](#)). *Hibbertia marginata* seedlings after a low to medium intensity fire in Gibberagee State Forest 2021 (right) ©Copyright, Joshua Brown (from Forestry Corporation, NSW).

Conservation status

Hibbertia marginata (bordered guinea flower) was listed in the Vulnerable category of the threatened species list under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) effective from 16 July 2000. The species was eligible for listing because prior to the EPBC Act, it was listed as Vulnerable under the *Endangered Species Protection Act 1992* (Cwlth). There was no listing advice prepared for this species at that time.

Hibbertia marginata is proposed to remain in the Vulnerable category of the threatened species list under the EPBC Act.

Hibbertia marginata was assessed by the Threatened Species Scientific Committee and there was insufficient evidence to determine the species' eligibility against the listing criteria. The Committee's assessment is at Attachment A. The Committee's assessment of the species' eligibility against each of the listing criteria is:

- Criterion 1: Insufficient data
- Criterion 2: Insufficient data
- Criterion 3: Ineligible
- Criterion 4: Ineligible
- Criterion 5: Insufficient data

The main factors leading to this outcome are a restricted geographical distribution but with insufficient data on population trends, potential continuing decline and threats to the species.

However, under section 186(2A) of the EPBC Act, the Minister must not delete (whether as a result of a transfer or otherwise) a native species from a particular category unless satisfied that:

- (a) the native species is no longer eligible to be included in that category; or
- (b) the inclusion of the native species in that category is not contributing, or will not contribute, to the survival of the native species.

Although there is insufficient evidence to determine the species' eligibility, there is also insufficient evidence to determine that the species is no longer eligible to be included in the Vulnerable category. The species has a restricted distribution (Criterion 2), however there is insufficient evidence to define number of locations or possible continuing decline, and the species is not prone to extreme fluctuations. In addition, the species was burnt during the 2019-20 fires, but available evidence does not suggest a significant negative impact on the species.

Additionally, inclusion of the species in the Vulnerable category is having a beneficial impact on the continued survival of the species via its' inclusion in the New South Wales (NSW) Department of Planning, Industry and Environment (DPIE) 'Saving our Species' keep-watch management stream, as well as fire management plans.

Species can also be listed as threatened under state and territory legislation. For information on the current listing status of this species under relevant state or territory legislation, see the [Species Profile and Threat Database](#).

Species information

Taxonomy

Conventionally accepted as *Hibbertia marginata* B.J.Conn (Conn 1990). Closely related to *Hibbertia saligna*, which occurs in the Blue Mountains area of NSW (PlantNet 2021).

Description

The bordered guinea flower (family Dilleniaceae) is a small shrub to 50 cm high. The branches are moderate to densely covered in white hairs, which are straight, spreading and 0.5–1 mm long. Leaves are oval-shaped, tapering to a point at each end, 24–35 mm long and 4–7 mm wide. Both surfaces are sparsely hairy. The leaf petiole (leaf stalk) is 0.5–1 mm long. Flowers are terminal on short branchlets and are sessile (without a stalk or peduncle). Flower bracts (modified leaves) are 10 mm long. Flower sepals (which protect the flower buds) are ovate, 15–20 mm long, densely hairy, except for a broad marginal and apical region; apex acuminate. Petals are broad and rounded and tapered to the base and are 20 mm long and 16 mm wide. There are 30–40 pollen containing stamens arranged around the carpels, each 6.5–8 mm long. There are three carpels, and each are densely hairy (Conn 1990). *Hibbertia* flowers are weakly fragrant, with a characteristic honey and/or cow dung odour (Tucker & Bernhardt 2000). The fruits consist of three joined capsules that split at the top (DAWE 2008).

Distribution

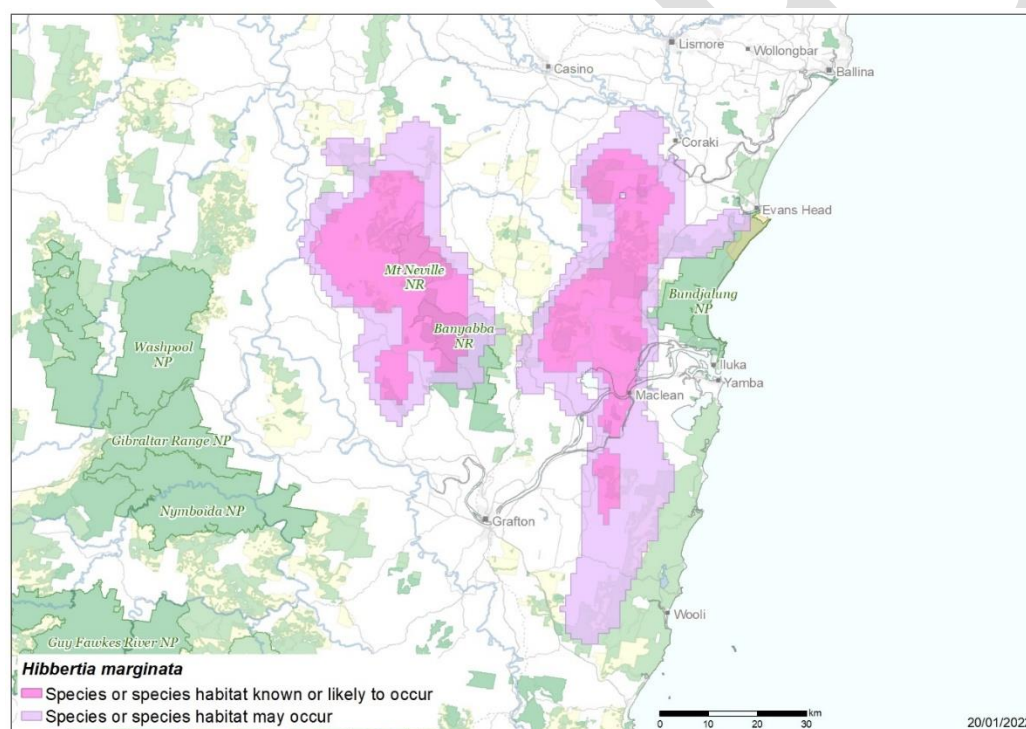
The bordered guinea flower is confined to coastal ranges in northeast NSW between Casino and Grafton (PlantNet 2021). Although restricted in range, the bordered guinea flower can be locally abundant where it occurs (Binns 2008). The bordered guinea flower occurs in two main areas: the ranges to the west of Whiporie, including Mount Belmore State Forest and adjacent Mount Neville Nature Reserve; and the ranges to the north and northwest of Maclean, including Doubleduke State Forest, Tabbimoble Forest, Bundjalung State Conservation Area, Mororo State Forest, Gibberagee State Forest and Kooyong State Conservation Area. Some plants occur on nearby private land (Binns 2008). The species was previously recorded from Yuraygir National Park, but the specimen associated with that record was examined and redetermined as *H. acuminata* (DPIE pers. comm. 18 January 2022).

Records sourced from the NSW BioNet atlas include a total of 6395 individuals (see Table 1) although this is likely to significantly underestimate total population size. Targeted surveys conducted in 2021, in areas not covered by NSW BioNet records, found a further 4517 plants which are likely to represent different individuals (DPIE pers. comm. 18 January 2022), bringing the known population size to over 11,000 individuals. However, the bordered guinea flower is locally abundant where it occurs, and a total population estimate of 50,000 individuals is considered plausible by experts familiar with the species (DPIE pers. comm. 18 January 2022).

Table 1 Details of bordered guinea flower distribution and abundance

Locality	Data from NSW BioNet atlas (1984–2020)	Targeted field surveys 2021 (DPIE pers. comm. 18 January 2022)	Total
Bundjalung State Conservation Area	0	123	123
Gibberagee State Forest	2164	151	2316
Mount Marsh State Forest	16		16
Tabbimoble State Forest	9	3601	3610
Doubleduke State Forest	25	144	169
Mororo State Forest		270	270
Mount Belmore State Forest	4178	19	4197
Kooyong State Conservation Area	1	209	210
Mount Neville Nature Reserve	2		2
Total	6395	4517	11126

Map 1 Modelled distribution of bordered guinea flower



Source: Base map Geoscience Australia; species distribution data [Species of National Environmental Significance](#) database.

Caveat: The information presented in this map has been provided by a range of groups and agencies. While every effort has been made to ensure accuracy and completeness, no guarantee is given, nor responsibility taken by the Commonwealth for errors or omissions, and the Commonwealth does not accept responsibility in respect of any information or advice given in relation to, or as a consequence of, anything containing herein.

Species distribution mapping: The species distribution mapping categories are indicative only and aim to capture (a) the specific habitat type or geographic feature that represents recent observed locations of the species (known to occur) or preferred habitat occurring in close proximity to these locations (likely to occur); and (b) the broad environmental envelope or geographic region that encompasses all areas that could provide habitat for the species (may occur). These presence categories are created using an extensive database of species observations records, national and regional-scale environmental data, environmental modelling techniques and documented scientific research.

Relevant biology and ecology

Habitat

The bordered guinea flower occurs in coastal ranges on sandstone substrates, where it grows in a range of habitats in deep sandy loam or shallow skeletal soil on exposed rocky outcrops (Binns 2008). It occurs in either dry sclerophyll forest with sandstone outcrops (Mt Belmore and Kooyong subpopulations) or in wet sclerophyll forest (Tabbimoble, Doubleduke and Bundjalung subpopulations) (DPIE pers. comm. 18 January 2022). Subpopulations in dry sclerophyll forest occur in areas dominated by *Eucalyptus pilularis* (blackbutt), *Eucalyptus planchoniana* (needlebark stringybark) and *Corymbia gummifera* (red bloodwood), with a mid-storey of *Banksia serrata* (old-man banksia), *Leptospermum polygalifolium* (tanton), *Acacia complanata* (flat-stemmed wattle), *Pultenaea rostrata*, *Xanthorrhoea latifolia* and *Persoonia stradbokensis*, and an understorey of *Platylobium formosum* (handsome flat pea), *Platysace ericoides* and *Entolasia stricta* (wiry panic) (DPIE pers. comm. 18 January 2022). Subpopulations in wet sclerophyll forest occur in areas dominated by blackbutt, *Syncarpia glomulifera* (turpentine), *Corymbia intermedia* (pink bloodwood), with a midstorey of *Schizomeria ovata* (crabapple), *Bursaria spinosa* (blackthorn), *Ceratopetalum gummiferum* (Christmas bush) and flat-stemmed wattle, and an understorey of *Dodonaea triquetra* (large-leaf hot-bush), handsome flat-pea, *Austromyrtus dulcis* (midyim) and *Zieria minutifolia* (twiggy zieria), wiry panic, *Lepidosperma laterale* and *Goodenia hederacea* (forest goodenia) (DPIE pers. comm. 18 January 2022).

The bordered guinea flower may form small discrete stands or be diffusely distributed over large areas (tens of hectares) (Binns 2008).

Reproductive biology and ecology

The bordered guinea flower flowers from late winter to summer (Conn 1990; DPIE pers. comm. 18 January 2022) and possibly at other times of the year if conditions are favourable. The secondary juvenile period (i.e., time from resprouting to flowering post-fire) is less than two years (DPIE pers. comm. 18 January 2022), while the primary juvenile period (i.e., time from seed germination to flowering) is unknown.

Little is known about the pollination of the bordered guinea flower. Native bees are thought to be the primary pollinators of most *Hibbertia* species (Bernhardt 1984, 1986; Tucker & Bernhardt 2000), despite early reports of primarily beetle pollination (Keighery 1975; Armstrong 1979). The bright yellow flowers do not produce nectar (Bernhardt 1984, 1986). Instead, depending on floral morphology, the bees collect pollen either by directly feeding on exposed pollen, or by buzz pollination (using thoracic vibrations to dislodge pollen) (Tucker & Bernhardt 2000). Beetles and hoverflies are frequently observed floral visitors on some *Hibbertia* species, but their overall importance in pollination is thought to be secondary to that of bees (Hawkeswood 1989; Tucker & Bernhardt 2000). The introduced honeybee, *Apis mellifera*, has been observed occasionally visiting flowers and carrying pollen of the Western Australian species *H. hypericoides* (Keighery 1975), although it is unclear whether honeybees regularly act as pollinators.

The exact germination requirements for the bordered guinea flower are unknown. Other *Hibbertia* species generally have morphophysiological dormancy. After seed has fully developed, dormancy may be relieved by exposure to a specific pattern of either day/night temperatures,

wet/dry periods and/or heat shock and chemicals associated with fire events (Ralph 2011; Hidayati et al. 2012; Dalziell et al. 2018; Trezise et al. 2021; PlantBank pers. comm. 10 September 2021). Several other *Hibbertia* species display dormancy in both the embryo and the seed coat, so that even after removal of the coat, dormancy persists for some seeds (Schatral 1996, Schatral et al. 1997, Allen et al. 2004). The relative effects of various germination treatments (e.g. scarification, smoke water, gibberellic acid) appear variable between species and even individual seed, although in many species germination is improved by scarification and/or smoke water (Dixon et al. 1995; Schatral 1996; Schatral et al. 1997; Allan et al. 2004). Variation in dormancy length among individual seed may result in naturally staggered germination over several years (Schatral et al. 1997; Ralph 2011; Hidayati et al. 2012). Some spontaneous germination may also be possible.

On NSW Forestry tenures, seedlings of the bordered guinea flower were reported to be generally uncommon, and pulses of recruitment were observed to be low unless fire or other disturbance occurred (Binns 2008), indicating possible fire-cued germination. In other *Hibbertia* species, germination cues are variable between species. For example, seedlings of the NSW species *H. spanantha* (Julian's hibbertia) were only observed in burnt patches, suggesting that fire cues may trigger germination (Toelken & Robinson 2015). In contrast, *H. calycina* (lesser guinea flower) in Tasmania does not require fire to germinate, as successful recruitment can occur in long-unburnt areas (Turner et al. 2020).

Seed longevity in the seedbank is unknown, though the species is hypothesised to have high levels of seed viability maintained for up to 10–15 years (PlantBank pers. comm. 10 September 2021). *Hibbertia tenuis* was inferred to have a long seedbank viability, as it was found to germinate from swamp soil samples taken from areas where the species had long been absent in above-ground surveys (Trezise et al. 2021).

Seed dispersal in other *Hibbertia* species is by ants (myrmecochory), which are likely to move the seed only short distances (Berg 1975; Rice & Westoby 1981).

Fire ecology

The bordered guinea flower was observed to resprout and regenerate from seedlings following low, medium and high intensity fires (DPIE pers. comm. 18 January 2022). For example, the species was observed to resprout and flower in the second year following a medium intensity fire on Mount Belmore (DPIE pers. comm. 13 October 2021), while a medium intensity fire in Gibberagee State Forest killed the two to three adult individuals recorded at a single site but resulted in the germination of ~50 seedlings (FC NSW pers. comm. 18 October 2021). The combination of post-fire resprouting and seedling emergence is typical of other *Hibbertia* species (Bell et al. 1993). For example, in Julian's hibbertia, burnt individuals successfully resprouted via coppicing and resprouting from rootstock following moderate intensity fire, while fire also triggered germination of the soil seedbank (Toelken & Robinson 2015). The bordered guinea flower may vary in response to fires, and survival and resprouting may depend on other biological and ecological factors such as age, plant health and post fire environmental conditions (e.g., precipitation and temperature).

Cultural and community significance

The significance of the ecological community, particular species, spiritual and other cultural values are diverse and varied for the many Indigenous peoples that live in the area and care for Country. This section describes some examples of this significance but is not intended to be comprehensive or applicable to, or speak for, all Indigenous people. Such knowledge may be only held by Indigenous groups and individuals who are the custodians of this knowledge.

The bordered guinea flower occurs on Bundjalung Country (north of the Clarence River). The Bundjalung Nation are custodians and Traditional Owners of the area known as the Northern Rivers, in NSW. Bundjalung Nation represents over 20 different language groups (Fuller 2020).

The cultural significance of the bordered guinea flower is currently unknown. However, given the acknowledged importance to Aboriginal peoples of Connection to Country and the widespread importance of Caring for Country (which includes biodiversity, 'place', custom and totemic elements) it is considered likely that the species has or is associated with some cultural and/or community significance.

The climbing guinea flower, *H. scandens*, occurs locally, and the leaves are used for the treatment of sores and skin complaints by Yaegl peoples (a small group on the south side of the Clarence River near the sea at Yamba and Maclean, NSW) (Packer et al. 2012). The traditional uses are supported by findings using phytochemical screening of the climbing guinea flower, which revealed the presence of phenols, flavonoids, steroids, terpenoids and tannins in combinations that suggest good antioxidant and antibacterial properties (Akter et al. 2016). It is possible that the bordered guinea flower may be of similar value to Bundjalung and possibly also neighbouring Yaegl and Gumbayngirr communities, though further community engagement and ethnobotanical research is needed. The bordered guinea flower is regarded as part of Bundjalung country which is rich in cultural history and significance (Fuller 2020), and will continue to be integral to ceremony, learning and inspiration.

Habitat critical to the survival

The bordered guinea flower occurs in wet and dry sclerophyll forest along coastal ranges in northern NSW on sandstone substrates. The habitat critical to the survival of the bordered guinea flower includes the area of occupancy of known subpopulations; areas of similar habitat adjoining known subpopulations, which provide potential habitat for natural range extension; areas of similar habitat that may contain the species or be suitable for translocations; and the local catchment for the surface and/or groundwater that maintains the habitat of the species.

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

Important populations

In this section, the word population is used to refer to subpopulation, in keeping with the terminology used in the EPBC Act and state/territory environmental legislation.

All populations of the bordered guinea flower are important for the long-term recovery and survival of this species.

Threats

Threats to the bordered guinea flower include inappropriate fire regime (too frequent and possibly also too intense), potential dieback from *Phytophthora cinnamomi*, clearing and timber harvesting activities and changes in rainfall patterns and temperature due to climate change (Table 2).

In addition, there are a number of potential threats that are considered minor or unlikely and have not been included in Table 2. For example, cattle have been recorded in the north-east of Banyabba Nature Reserve, in the Cabbage Tree Creek area of Mount Neville Nature Reserve, and along trails and spurs in Mount Pikapene and Fortis Creek national parks (NSW Government 2016). However, little to no herbivory has been observed in the bordered guinea flower (DPIE pers. comm. 13 October 2021, 18 January 2022), and therefore grazing by introduced species has not been included in Table 2. Weeds that are likely to impact the bordered guinea flower have not been observed co-occurring with it, although *Lantana camera* (lantana) was observed at low frequency elsewhere in Mount Belmore State Forest (DPIE pers. comm. 18 January 2022).

Table 2 Threats impacting the bordered guinea flower

Threats in Table 2 are noted in approximate order of highest to lowest impact, based on available evidence.

Threat	Status ^a	Evidence
Habitat loss, degradation or fragmentation		
Inappropriate fire regime (too frequent or intense)	<ul style="list-style-type: none"> • Timing: current • Confidence: suspected • Consequence: moderate • Trend: increasing • Extent: across the entire range 	<p><i>High severity fire</i></p> <p>The bordered guinea flower is resilient to fire (see fire ecology section above), although high intensity fires may lead to some adult plant mortality and mortality of some seed in the soil seed bank close to the surface, particularly in areas where the species grows in deep eucalypt leaf litter. In mallee shrublands of NSW, eucalypt fuels (~2 cm deep) resulted in longer and hotter soil temperatures (50 minutes at 60–120 °C at 5 cm soil depth), which may prove too hot for seed survival. However, only seeds near the surface (i.e., the top 3–5 cm) are exposed to extreme temperatures and many shrubs with larger seed are able to germinate from a depth of 5 cm or more (Palmer et al. 2018; Tangney et al. 2020).</p> <p>On current knowledge, high severity fire alone is unlikely to lead to major population decline in the bordered guinea flower. High seedling recruitment has been observed in the bordered guinea flower post-fire (Binns 2008; DPIE pers. comm. 18 January 2022) and these are likely to offset potential losses of adult plants (see also high frequency fires).</p> <p><i>High frequency fire</i></p> <p>It is possible that the bordered guinea flower may be negatively impacted by high frequency fires, where they are severe enough to kill adult plants and they occur at short enough timescales to kill regenerating seedlings and resprouting plants before they are able to replenish the soil seed bank or develop sufficient woody tissue to withstand further fires.</p> <p>The impact of high frequency fire on the bordered guinea flower remains unknown. However, the species has been observed both resprouting and regenerating from seedlings following fire, and has a relatively short secondary juvenile period ~2 years (DPIE pers. comm. 13 October 2021; FC NSW pers. comm. 18 October 2021). In addition, the variable seed</p>

Threat	Status ^a	Evidence
		<p>dormancy in many <i>Hibbertia</i> species (e.g. Schatral et al. 1997; Hidayati et al. 2012) suggests that the soil seed bank is unlikely to be completely exhausted by a single fire event. Therefore, while it is possible that high frequency fires may cause population decline, they are unlikely to drive subpopulations to extinction. Further research is required to determine the optimal fire intensity and frequency thresholds for the bordered guinea flower, including germination cues, length of the primary juvenile period, and patterns of seedbank accumulation.</p> <p><i>Season of fire</i></p> <p>Fires preceding dry conditions can affect plants which germinate in response to fire, as the vulnerable seedlings are exposed to desiccation and thus post-recruitment mortality (Keith 1996).</p> <p><i>Fire interactions</i></p> <p>Climate change is predicted to increase both the frequency and intensity of bushfires (as the average number of fire weather and severe fire weather days) and result in changes in rainfall patterns (NSW Government 2014)(see climate change section below). Fires followed by periods of drought or intense rainfall events may have a negative impact on the bordered guinea flower e.g. seedlings may struggle to regenerate during post-fire drought, or intense rainfall following fire may wash away soil and part of the soil seedbank. Post-fire environments can also facilitate the spread of weeds (Coutts-Smith & Downey 2006) and <i>Phytophthora cinnamomi</i> (Moore et al. 2014) (see related section below).</p> <p>High frequency and high severity fires may also lead to declines in pollinator abundance and therefore declines in seed set and recruitment, although the impact of fire regimes on invertebrates in Australia remains poorly understood. In a global meta-analysis, Carbone et al. (2019) found a positive effect of fire on hymenopteran abundance and diversity, but with a negative effect of frequent fire. In Australia, Dorey et al. (2021) predicted that many bee species were negatively impacted by the widespread 2019-20 fires, although further empirical evidence is needed (e.g. Marquart 2018). There are at least twelve native bee species in the region, and many are solitary, forming burrows in soils and nests in foliage (Clarence Landcare 2017) which are lost during fires (Santos et al. 2020). The patchy nature of the fire intensity across the Clarence region in 2019–2020 may have provided refuges for some native bee species, though research is needed to confirm this.</p>
Timber harvesting activities	<ul style="list-style-type: none"> • Timing: historical • Confidence: inferred • Consequence: minor • Trend: static • Extent: across part of its range 	<p>The bordered guinea flower occurs on multiple forestry tenures across its distribution (see Distribution section above). The forestry land is managed under the Coastal Integrated Forestry Operations Approvals (IFOA) (NSW Government 2018), and the bordered guinea flower is protected by a 20 m exclusion zone under the Coastal IFOA protocols (where it occurs in the Upper NE and Lower NE subregions).</p> <p>The bordered guinea flower may be directly damaged on forestry lands by felling activities, but the same activities may also enhance recruitment. In State Forests where the bordered guinea flower occurs, harvests and post-harvest fires are implemented every ~15 years. Increased sunlight and mechanical disturbance of the soils resulting from harvest activities can result in the germination of the bordered guinea flower (Binns 2008), but the subsequent survival rates of recruits are not known.</p> <p>In addition, most bordered guinea flower plants grow in areas of low commercial timber value which are not likely to be</p>

Threat	Status ^a	Evidence
		prioritised for timber harvesting (Binns 2008). Therefore, while it is possible that timber harvesting activities may negatively impact the bordered guinea flower, the consequences are considered likely to be minor.
Clearing and disturbance from road maintenance	<ul style="list-style-type: none"> • Timing: current • Confidence: suspected • Consequence: minor • Trend: static • Extent: across part of its range 	Past disturbances of the bordered guinea flower include habitat clearing and road maintenance as a result of quarry and illegal timber harvesting operations. These sites are all now managed in National Parks and State Conservation Areas (NSW Government 2016). There may be disturbance by roadside maintenance and weed control on all tenures, though the magnitude of threat to the bordered guinea flower is unknown.
Disease		
Dieback from <i>Phytophthora cinnamomi</i>	<ul style="list-style-type: none"> • Timing: future • Confidence: inferred • Consequence: moderate • Trend: unknown • Extent: across the entire range 	<p><i>Phytophthora cinnamomi</i> is an introduced soil-borne pathogenic oomycete that results in plant death through the destruction of root systems. <i>Phytophthora cinnamomi</i> is listed as a Key Threatening Process under the EPBC Act (Department of Energy and Environment 2018). <i>Phytophthora cinnamomi</i> is thought to be present in the Richmond region (NSW Government 2016), though the extent and disease expression is not well understood (NSW Government 2008).</p> <p>The bordered guinea flower has not been observed to suffer from <i>P. cinnamomi</i> dieback (DPIE pers. comm. 18 January 2022) and no data are available on the susceptibility of the species to <i>P. cinnamomi</i>. However, many other <i>Hibbertia</i> species are known to be susceptible to <i>P. cinnamomi</i> (Weste & Ashton 1994; McDougall 2005; Cahill et al. 2008; Wan et al. 2019; Turner et al. 2020), although susceptibility to the infection varies spatially for reasons yet unknown (Wan et al. 2019; Turner et al. 2020). The susceptibility of <i>Hibbertia hypericoides</i> varied with habitat type in WA (Cahill et al. 2008), although whether the variability was genotypic or site related was unknown. A few species of <i>Hibbertia</i> are known to be field resistant to <i>P. cinnamomi</i> (Reiter et al. 2004; McDougall 2005).</p> <p>Given the evidence for some <i>Hibbertia</i> species to be susceptible, dieback caused by <i>P. cinnamomi</i> is inferred as a potential threat to the bordered guinea flower.</p>
Climate Change		
Increased temperatures and changes in precipitation	<ul style="list-style-type: none"> • Timing: current • Confidence: projected • Consequence: moderate • Trend: increasing • Extent: across the entire range 	<p>On the north coast region of NSW, there is a projected increase in minimum and maximum temperatures (maximum temperature increase of 0.4–1.0°C by 2039 and 1.5–2.4°C by 2060–2079) and an increase in the number of hot days (above 35 °C). Precipitation is projected to decrease in winter and increase in autumn and spring (NSW Government 2014). From 2017–19, north-eastern NSW experienced severe drought (Bureau of Meteorology & CSIRO 2020).</p> <p>Changes in temperature, rainfall patterns and the frequency of drought conditions may impact seed set, fecundity and survival in the bordered guinea flower, although plants were not observed to show signs of drought stress during the 2017–19 drought (DPIE pers. comm. 18 January 2022). In Julian's hibbertia, the extent of flowering is related to environmental conditions, such as rainfall, as successful flowering and seed production occurred with post fire autumn and winter rainfall (Toelken & Robinson 2015). The extent to which these changes may impact the bordered guinea flower in the future is unknown.</p>

Each threat has been described in Table 2 in terms of the extent that it is operating on the species. The risk matrix (Table) provides a visual depiction of the level of risk being imposed by a threat and supports the prioritisation of subsequent management and conservation actions. In preparing a risk matrix, several factors have been taken into consideration, they are: the life stage they affect; the duration of the impact; and the efficacy of current management regimes, assuming that management will continue to be applied appropriately. The risk matrix and ranking of threats has been developed in consultation with experts and using available literature.

Table 3 Bordered guinea flower risk matrix

Likelihood	Consequences				
	Not significant	Minor	Moderate	Major	Catastrophic
Almost certain	Low risk	Moderate risk	Very high risk	Very high risk	Very high risk
Likely	Low risk	Moderate risk	High risk Inappropriate fire regimes (too frequent or intense)	Very high risk	Very high risk
Possible	Low risk	Moderate risk Clearing and disturbance from road maintenance	High risk Increased temperatures and changes in precipitation	Very high risk	Very high risk
Unlikely	Low risk	Low risk Timber harvest activities	Moderate risk	High risk	Very high risk
Unknown	Low risk	Low risk	Moderate risk Dieback from <i>Phytophthora cinnamomi</i>	High risk	Very high risk

Categories for likelihood are defined as follows:

Almost certain – expected to occur every year
Likely – expected to occur at least once every five years
Possible – might occur at some time
Unlikely – such events are known to have occurred on a worldwide bases but only a few ties
Unknown – currently unknown how often the incident will occur

Categories for consequences are defined as follows:

Not significant – no long-term effect on individuals or populations
Minor – individuals are adversely affected but no effect at population level
Moderate – population recovery stalls or reduces
Major – population decreases
Catastrophic – population extirpation/extinction

Priority actions have then been developed to manage the threat particularly where the risk was deemed to be ‘very high’ (red shading) or ‘high’ (yellow shading). For those threats with an unknown or low-risk outcome (green and blue shading), it may be more appropriate to identify further research or maintain a watching brief.

Conservation and recovery actions

Primary conservation objective

By 2030, the threatening processes and habitat critical to survival for the bordered guinea flower will be well understood and defined. The bordered guinea flower will be secure in viable subpopulations, which are successfully protected and monitored.

Conservation and management priorities

Fire

- Fires should be managed to ensure that fire regimes (fire frequency, season and intensity) do not disrupt the life cycle of the bordered guinea flower, and that they support rather than degrade the habitat necessary to the bordered guinea flower.
- Fire plans should integrate precipitation history and forecasting and ensure that planned fires are sufficient to break seed dormancy, and following precipitation supports the survival of seedlings.
- Physical damage to the habitat and individuals of the bordered guinea flower should be avoided during and after fire operations.
- Fire management authorities and land management agencies should use suitable maps and, if required, install field markers to avoid damage to the bordered guinea flower.

Habitat loss, disturbance and modifications

- Identify if and where habitat disturbance and modifications may occur on various tenures and protected areas (e.g. track maintenance, fire, intentional and accidental damage) where the bordered guinea flower occurs. Avoid future loss or damage to standing plants or the species habitat.
- Identify roadside populations and protect them during road works and timber harvesting activities

Disease

- As a precaution, pending further investigation into the susceptibility of the bordered guinea flower to *P. cinnamomi*, ensure that appropriate hygiene protocols are adhered to when entering or exiting the known location of the threatened species, such as those outlined in O’Gara et al. (2005) and the Arrive Clean, Leave Clean guidelines (Commonwealth of Australia 2015)

Ex situ recovery actions

- To manage the risk of losing genetic diversity, undertake appropriate seed collection and storage, and determine the viability of stored seeds, according to Martyn Yenson et al. (2021).
- Collate knowledge from seed germination and survival trials and integrate it into future management plans for the species.

Climate change and severe weather

- Identify current and future parameters that define suitable microhabitats for the species within the distribution and ensure that future suitable habitat and climate refuges remain protected.

Stakeholder engagement/community engagement

- Co-develop and support monitoring and management actions with Traditional Owners in culturally significant areas where the bordered guinea flower are present.
- Coordinate protection and recovery actions with non-government stakeholders (e.g. Landcare and bush regeneration groups, landowners and managers) as well as with Local and State government environmental field and extension officers.
- Consider citizen science methods to collect relevant population data (e.g. presence/absence and reproductive seasons and pollination ecology of the bordered guinea flower) with interested stakeholder groups. Ensure method enables quality-assured data for integration with species distribution mapping.
- Where appropriate, alert landowners to the species occurrence on their property and provide guidance on how to protect standing plants and mitigate site-specific threats.

Survey and monitoring priorities

- Survey and monitor a representative subset of plants across the species range, different habitat types, and different tenures. Monitoring should focus on trends in population size, and, if possible, age structure, plant health, reproduction and recruitment, fire response and potential threats. Monitoring should be scheduled at a minimum of 5-yearly frequencies, more often after disturbance or when threats intensify.
- Integrate and share new knowledge on the biology and ecology of the species as it becomes available.

Information and research priorities

- Develop an adequate biological and ecological understanding of the species to determine key attributes for management and recovery and enable the identification of important populations and habitats critical to survival.
 - Key attributes should include (but are not limited to): life history information (e.g. maturation times from seed, seed bank accumulation rates, seed longevity, germination biology and dormancy mechanisms, reproductive period), population abundance, structure, demographic rates, and habitat attributes relevant to species distribution mapping.
 - Key processes should include (but are not limited to): response to land clearing, disturbances of different intensities (most notably fire, but also diseases, land management regimes, grazing, weeds, drought), seed bank dynamics, pollination ecology (including species of native bee and/or beetle pollinators), dispersal, gene flow and landscape connectivity
- Undertake surveys in suitable habitats to locate additional subpopulations.

Recovery plan decision

No recovery plan is in place for the bordered guinea flower. This consultation document will elicit the additional information needed to inform the requirement of a Recovery Plan for the species.

Links to relevant implementation documents

[DAWE. Threat abatement plan for disease in natural ecosystems caused by *Phytophthora cinnamomi*](#)

[NSW Government. A strategic approach to managing fire in parks and reserves](#)

[NSW Government. Coastal Integrated forestry operations approvals.](#)

[NSW Government. Northern Rivers Regional Biodiversity Management Plan. National Recovery Plan for the Northern Rivers Region.](#)

[NSW Government. Southern Richmond Range Parks plan of management](#)

[NSW Government. Southern Richmond Range Reserves fire management strategy](#)

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THREATENED SPECIES SCIENTIFIC COMMITTEE

Established under the *Environment Protection and Biodiversity Conservation Act 1999*

The Threatened Species Scientific Committee finalised this assessment on DD Month Year.

Attachment A: Listing Assessment for *Hibbertia marginata*

Reason for assessment

The bordered guinea flower was listed as Vulnerable under the *Endangered Species Protection Act 1992* and transferred to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) when it commenced in July 2000.

This reassessment follows prioritisation of a nomination from the TSSC.

Assessment of eligibility for listing

This assessment uses the criteria set out in the [EPBC Regulations](#). The thresholds used correspond with those in the [IUCN Red List criteria](#) except where noted in criterion 4, sub-criterion D2. The IUCN criteria are used by Australian jurisdictions to achieve consistent listing assessments through the Common Assessment Method (CAM).

Key assessment parameters

Table 4 includes the key assessment parameters used in the assessment of eligibility for listing against the criteria.

Table 4 Key assessment parameters

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Number of mature individuals	>11,000	11,000	50,000	Targeted field surveys (DPIE pers. comm. 12 October 2021, 18 January 2022), in addition to data from NSW BioNet, suggest that the total population number is likely to be well over 11,000 individuals. Counts of 9000 plants (total population includes adults and juveniles) were recorded from sites within State Forest tenure, with a statement that true numbers may exceed this estimate, probably by an order of magnitude (Binns 2008). A total population estimate of 50,000 individuals is considered plausible by experts familiar with the species (DPIE pers. comm. 18 January 2022), therefore a value of 50,000 is used as the maximum plausible estimate in this assessment.

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Trend	unknown			There is insufficient evidence to infer an increase or decrease in the population size of the bordered guinea flower. It is possible that some adult plants were killed during the 2019-20 bushfires. However, estimates for the number of mature individuals must be assessed at the appropriate point in the species life cycle (IUCN 2019). Both resprouting and seedling recruitment have been observed following the 2019-20 bushfires (DPIE pers. comm. 18 January 2021) and these are likely to offset potential losses of mature individuals. On current knowledge, it is unknown whether the fires will have had a net positive or negative impact on the number of mature individuals.
Generation time (years)	unknown	unknown	unknown	There is no information for the age at first reproduction for the bordered guinea flower, nor is there any data that may indicate the longevity of the species or the length of the reproductive period. Resprouts of the bordered guinea flower have been observed to flower two years after fire (Binns 2008), though this is not enough information to estimate generation time.
Extent of occurrence	800-1000 km ²	789 km ²	>1000 km ²	The extent of occurrence (EOO) of the bordered guinea flower based on known records was estimated to be 789 km ² . Additional subpopulations are likely to exist that may increase the EOO slightly. However, given the apparently restricted distribution of the species, these are not likely to substantially increase the EOO. Therefore, an EOO estimate of 800-1000 km ² is used here as a plausible estimate which reflects the current knowledge on the species' distribution.
Trend	stable			The EOO appears to be stable and there is no evidence of an increase or decrease in EOO.
Area of Occupancy	150-200 km ²	136 km ²	>200 km ²	The area of occupancy (AOO) of the bordered guinea flower based on known records was estimated to be 136 km ² . However, given the species appears to be locally abundant in suitable habitat within its range, there are likely to be additional undiscovered populations which may increase the AOO. An AOO estimate of 150–200 km ² is used here as a plausible estimate which reflects the current knowledge on the species' distribution and abundance.
Trend	stable			The AOO appears to be stable and there is no evidence of an increase or decrease in AOO.

Metric	Estimate used in the assessment	Minimum plausible value	Maximum plausible value	Justification
Number of subpopulations	3	3	Unknown.	The bordered guinea flower occurs between Grafton and Casino in NSW and is locally abundant (Binns 2008). The minimum number of subpopulations is estimated to be three (see basis of assessment below). The maximum is unknown as pollination patterns and habitat fragmentation may have resulted in further divisions of the population. Further research is needed to determine if the bordered guinea flower population is a single panmictic population or a number of smaller subpopulations that have restricted gene flow and are isolated by distance.
Trend	Unknown			The trend in the number of subpopulations is unknown, as there are no clear data on the variation in abundance between the three identified areas (subpopulations for the purposes of the assessment).
Basis of assessment of subpopulation number	<p>Panmixis is not assumed for this species. The bordered guinea flower is likely fertilised by bees and other small insects. <i>Tetragonula carbonaria</i> (the stingless bee) has a maximum ranging distance from home of 712 m (Smith et al. 2017) though butterflies and other flying insects may travel much further (Compton 2002). <i>Hibbertia stricta</i> is pollinated by the native <i>Lasioglossum</i> genus of bees (Bernhardt 1994) which are larger than the stingless bee so may travel further (Greenleaf et al. 2007).</p> <p>Mount Belmore and Mount Neville plants (subpopulation one) are separated by 24 km and different habitat types from the Gibberagee and Kooyong plants (subpopulation two). It is possible that the bordered guinea flower is present at locations in between, but their presence here is unlikely as they are on State Conservation Area and State Forest tenures, which are all well known to local <i>Hibbertia</i> experts. Subpopulation two is separated by low-lying agricultural land and six km in distance from subpopulation three (the Richmond Range records). The Richmond Range records are connected by similar forested habitats, which extend from Jackywalbin in the north through to Bundjalung and Chatsworth Hill State Conservation area.</p> <p>These form the three areas, which for the purposes of the assessment, are assumed to be isolated enough to be considered separate subpopulations.</p>			
No. locations	unknown	unknown	unknown	If, as available evidence suggests, dieback caused by <i>P. cinnamomi</i> is not a threat to the bordered guinea flower, there is no available evidence to suggest there is a threat that is likely to rapidly impact the species within 1 generation (IUCN 2019), as frequent/intense fire is unlikely to lead to rapid subpopulation decline or extinction.
Trend	unknown			
Basis of assessment of location number	If, as available evidence suggests, dieback caused by <i>P. cinnamomi</i> is not a threat to the bordered guinea flower, there is no available evidence to suggest there is a threat that is likely to rapidly impact the species within 1 generation (IUCN 2019), as frequent/intense fire is unlikely to lead to rapid subpopulation decline or extinction.			
Fragmentation	The extant three subpopulations may be fragmented but are unlikely to be severely fragmented (reduced probability of recolonization should a subpopulation go extinct). Further research is required to determine dispersal mechanisms and if connectivity exists between subpopulations.			
Fluctuations	Not subject to extreme fluctuations in EOO, AOO, number of subpopulations, locations or mature individuals – no parameter was changed by an order of magnitude by the 2019/20 fire. The species is capable of both resprouting and regenerating from seed following fire, and it is unlikely that all seed are exhausted by a single fire event. Therefore, the species is unlikely to be prone to extreme fluctuations.			

Criterion 1 Population size reduction

Reduction in total numbers (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered Very severe reduction	Endangered Severe reduction	Vulnerable Substantial reduction
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%
<p>A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p>A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p>A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3]</p> <p>A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p>Based on any of the following</p> <ul style="list-style-type: none"> (a) direct observation [except A3] (b) an index of abundance appropriate to the taxon (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat (d) actual or potential levels of exploitation (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites 			

Criterion 1 evidence

Insufficient data

Generation time

Many life history parameters are unknown for the bordered guinea flower including: the age at maturity, life span (though they certainly live more than three years), fecundity, duration of reproduction. For this reason, it was not possible to estimate generation time. Therefore, a ten-year time frame was used (IUCN 2019).

Impact of the 2019-2020 bushfires

It is possible that some adult plants were killed during the 2019-20 fires. However, estimates for the number of mature individuals must be assessed at the appropriate point in the species life cycle (IUCN 2019). The species was observed resprouting and regenerating from seedlings following the 2019-20 fires in areas burnt at low, medium and high intensity (DPIE pers. comm. 12 October 2021, 18 January 2022). On available knowledge, it is unclear whether the level of post-fire recruitment will result in a net increase or decrease in the number of mature individuals. However, there is currently no evidence to suggest the fires have had a significant negative impact on the bordered guinea flower (DPIE pers. comm. 18 January 2022).

Conclusion

The Committee considers that there is insufficient evidence to determine whether the species has undergone a population size reduction. Therefore, the species has not met the relevant elements of Criterion 1 due to Insufficient data.

However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 2 Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy

	Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1. Extent of occurrence (EOO)	< 100 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			

Criterion 2 evidence

Insufficient data

Extent of occurrence (EOO) and area of occupancy (AOO) - restricted

The EOO is estimated to be 800–1000 km² and the AOO is estimated to be 150–200 km². Therefore, the bordered guinea flower has a restricted distribution.

Severely fragmented and number of locations – insufficient data

The bordered guinea flower is fragmented and possibly had a broader distribution in the past. There are three distinct areas which are geographically distant and separated by agricultural or urban land types (see Table 4 above), which may inhibit gene flow (via pollination). The method of seed dispersal is not known for this species, although likely to be ant-dispersed, and more research is needed (particularly to determine if geographic fragmentation is resulting in genetic isolation by distance). Due to this lack of information, the severely fragmented subcriterion could not be addressed.

The number of locations is unknown as it is unclear which threats may be operating that could rapidly drive the decline or extinction of the subpopulations. Therefore, the species has not met this required element of this criterion.

Projected continuing decline – insufficient data

In Australia, average temperatures have increased by approximately 1.5°C since 1910, leading to increased frequency of extreme heat events (Bureau of Meteorology and CSIRO 2020). Additionally, in south-eastern Australia, rainfall has declined by approximately 12 percent in the cool season (April–October) from the late 1990s–2020 (Bureau of Meteorology and CSIRO 2020). In southern and eastern Australia, cool season rainfall is predicted to continue to decrease, while temperatures are predicted to continue to increase, leading to more time in drought (as well as more intense, short duration heavy rainfall events) due to climate change (NSW Government 2014; CSIRO & Bureau of Meteorology 2015; Bureau of Meteorology & CSIRO 2020).

In addition, the frequency and intensity of bushfires is predicted to increase (as the average number of fire weather and severe fire weather days) (NSW Government 2014). Repeat high intensity fires at a short interval may result in gradual declines of recruits and adults over time, if fires are hot enough to negatively impact both mature individuals and the soil seed bank. The bordered guinea flower has a relatively short secondary juvenile period (Binns 2008; NSW NPSW pers. comm. 12 October 2021) and is capable of both resprouting and regenerating from seed following fire. These traits suggest the species may be able to withstand moderate increases in fire frequency and intensity. However, further research on the primary juvenile period and seedbank accumulation rate is needed to better understand the species' response to increasing fire frequency and intensity.

Changes to rainfall patterns, temperature, frequency of drought, and frequency and intensity of bushfires may result in a decline in the quality of habitat and/or population size of the species in the future. However, the bordered guinea flower was not observed to show signs of drought stress during the 2017-19 drought, and post-fire observations do not suggest the species was significantly negatively impacted by the 2019-20 fires. Therefore, there is insufficient evidence at the time of this assessment to project a continuing decline in the quality of habitat and/or population size with a high degree of certainty (IUCN 2019).

Extreme fluctuations in number of mature individuals – not present

The bordered guinea flower is capable of both resprouting and regenerating from seed following fire, and it is unlikely that all seed are exhausted by a single fire event. Therefore, the species is unlikely to be prone to extreme fluctuations.

Conclusion

The Committee considers that the species Extent of Occurrence (EOO) and Area of Occupancy (AOO) is restricted, but there is insufficient data to define severe fragmentation or number of locations. In addition, there is currently insufficient evidence to suggest a continuing decline and there are unlikely to be extreme fluctuations in the number of mature individuals. Therefore, the species has not met the relevant elements of Criterion 2 due to Insufficient data.

However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 3 Population size and decline

	Critically Endangered Very low	Endangered Low	Vulnerable Limited
Estimated number of mature individuals	< 250	< 2,500	< 10,000
AND either (C1) or (C2) is true			
C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future)	Very high rate 25% in 3 years or 1 generation (whichever is longer)	High rate 20% in 5 years or 2 generation (whichever is longer)	Substantial rate 10% in 10 years or 3 generations (whichever is longer)
C2. An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on at least 1 of the following 3 conditions:			
(i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
(a) (ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b) Extreme fluctuations in the number of mature individuals			

Criterion 3 evidence

Not eligible

The total number of mature individuals is greater than 11,000, which is not considered limited. Therefore, the species has not met this required element of this criterion.

However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 4 Number of mature individuals

	Critically Endangered Extremely low	Endangered Very Low	Vulnerable Low
D. Number of mature individuals	< 50	< 250	< 1,000
D2.¹ Only applies to the Vulnerable category Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to critically endangered or Extinct in a very short time			D2. Typically: area of occupancy < 20 km ² or number of locations ≤ 5

¹ The IUCN Red List Criterion D allows for species to be listed as Vulnerable under Criterion D2. The corresponding Criterion 4 in the EPBC Regulations does not currently include the provision for listing a species under D2. As such, a species cannot currently be listed under the EPBC Act under Criterion D2 only. However, assessments may include information relevant to D2. This information will not be considered by the Committee in making its recommendation of the species' eligibility for listing under the EPBC Act, but may assist other jurisdictions to adopt the assessment outcome under the [common assessment method](#).

Criterion 4 evidence

Not eligible

The total number of mature individuals is estimated to be greater than 11,000, which is not considered low. Therefore, the species has not met this required element of this criterion.

However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Criterion 5 Quantitative analysis

	Critically Endangered Immediate future	Endangered Near future	Vulnerable Medium-term future
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)	≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)	≥ 10% in 100 years

Criterion 5 evidence

Insufficient data to determine eligibility

Population viability analysis has not been undertaken. Therefore, there is insufficient information to determine the eligibility of the species for listing in any category under this criterion.

However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Adequacy of survey

The survey effort has been considered adequate and there is sufficient scientific evidence to support the assessment.

Consideration for delisting

The bordered guinea flower was listed in the Vulnerable category of the threatened species list under the EPBC Act effective from 16 July 2000. The species was eligible for listing because prior to the EPBC Act, it was listed as Vulnerable under the ESP Act.

The bordered guinea flower is proposed to remain in the Vulnerable category of the threatened species list under the EPBC Act.

Under section 186(2A) of the EPBC Act, the Minister must not delete (whether as a result of a transfer or otherwise) a native species from a particular category unless satisfied that:

- (a) the native species is no longer eligible to be included in that category; or
- (b) the inclusion of the native species in that category is not contributing, or will not contribute, to the survival of the native species.

Insufficient evidence to demonstrate species is no longer eligible for inclusion in the threatened species list

There is insufficient evidence to determine that the species is no longer eligible to be included in the Vulnerable category. In particular, continuing decline under future fire regimes and climate conditions is suspected but there is insufficient evidence to project continuing decline with a high degree of confidence.

As the bordered guinea flower was grandfathered onto the EPBC Act, there is no listing advice. Consequently, there is little information regarding the reasons that the species was originally listed, so it is difficult to evaluate change in the species status.

In this case, it is possible that the bordered guinea flower may undergo a continuing decline habitat quality and/or population size in the future. The Committee has adopted a precautionary approach in advocating retaining the species on the threatened list until sufficient data are available to confidently demonstrate that the species is ineligible under any category.

Inclusion of the species is contributing, or will contribute to its survival

The inclusion of the species in the Vulnerable category is having a beneficial impact on the continued survival of the species via its' inclusion in the NSW DPIE 'Saving our Species' keep-watch management stream. As part of this program, the species is monitored to detect changes in population status, and if declines are detected (e.g., following impacts from further fires, disease, drought or herbivory), then management actions can be developed and implemented immediately (DPIE 2021).

Additionally, as listed Threatened Flora, the bordered guinea flower has been included in fire risk management plans and operations maps e.g. NSW RFS Threatened Species Hazard Reduction List (2013). If delisted, it is likely that the species would be removed from such plans and would be vulnerable to decline following both planned burns and bushfires.

Other considerations

If delisted under the EPBC Act, the bordered guinea flower is also likely to be delisted in NSW, as they are now signatory to the Memorandum of Understanding for the Common Assessment Method.

Conclusion

There is insufficient evidence to determine if the bordered guinea flower is no longer eligible to be included in the Vulnerable category and it is likely that delisting would adversely impact on its' survival, placing the species at risk of ongoing decline. Accordingly, the bordered guinea flower is proposed to remain in the Vulnerable category of the threatened species list under the EPBC Act.

However, the purpose of this consultation document is to elicit additional information to better understand the impact that delisting would have. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

Listing and Recovery Plan Recommendations

A decision about whether there should be a Recovery Plan for this species has not yet been determined. The purpose of this consultation document is to elicit additional information to help inform this decision.

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Department of Agriculture, Water and the Environment

GPO Box 858, Canberra ACT 2601

Telephone 1800 900 090

Web awe.gov.au

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Document type	Title	Date [dd mm yyyy]
Conservation advice	Approved conservation advice for <i>Hibbertia marginata</i>	03 07 2008