

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 list *Hibbertia puberula* Toelken subsp. *puberula* as an ENDANGERED SPECIES in Part 2 of Schedule 1 of the Act and, as a consequence, to omit reference to *Hibbertia puberula* Toelken from Part 2 of Schedule 1 (Endangered Species) of the Act. Listing of Endangered species is provided for by Part 4 of the Act.

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 NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) 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 2124.

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

Submissions close 31 July 2026

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 NSW DCCEEW 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.

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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.

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 Angela Moles, FRSN
Chairperson
NSW Threatened Species Scientific Committee

NSW Threatened Species Scientific Committee

Public exhibition period: 8/05/2026 – 31/07/2026

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 list *Hibbertia puberula* Toelken subsp. *puberula* as an ENDANGERED SPECIES in Part 2 of Schedule 1 of the Act and, as a consequence, to omit reference to *Hibbertia puberula* Toelken from Part 2 of Schedule 1 (Endangered Species) of the Act. Listing of Endangered species is provided for by Part 4 of the Act.

Summary of Conservation Assessment

Hibbertia puberula Toelken subsp. *puberula* was found to be Endangered in accordance with the following provisions in the *Biodiversity Conservation Regulation 2017*: Clause 4.3(b)(d)(e i,ii,iii,iv) because: 1) the species has a highly restricted geographic range with an area of occupancy of 332–340 km²; 2) the population is inferred to be severely fragmented; and 3) there is an estimated and inferred continuing decline in the number of mature individuals, and the area, extent, and quality of habitat, and inferred continuing decline in the area of occupancy and number of subpopulations. These declines are due to clearing, fragmentation, and degradation of habitat from urban development, road widening, track maintenance, and recreational vehicle use and weed invasion.

The NSW Threatened Species Scientific Committee has found that:

1. *Hibbertia puberula* Toelken (family Dilleniaceae) is described as a decumbent to suberect shrublet “with few wiry branches to 30 cm long, pubescent, often glabrescent, with simple long and short hairs (hairs often curved or hooked). Leaves with petiole 0.2–0.5 mm long; lamina narrowly ovate to almost linear, (1.2–)3–5.5(–8) mm long, (0.6–) 0.8–1.4(–1.8) mm wide; base appearing abruptly constricted because margin strongly revolute (under surface not visible); apex more or less obtuse. Flowers single or rarely up to 3-flowered; pedicels short; bracts more or less elliptic, mostly 3–3.5(–4) mm long, leaf-like. Calyx with outer lobes ovate, more or less beaked with margin recurved distally, mostly 6–10 mm long, outer surface hispid, inner surface pubescent to silky hairy; inner calyx lobes oblong-elliptic to oblong-ovate, mostly 5–7 mm long, hispid with spreading bristles mainly along central ridge. Petals obovate, 6–8 mm long, broadly bilobed. Stamens (9–)10–14, inserted on one side of ovary, subequal; filaments fused on lower one-third. Carpels 2, slightly hairy, sometimes almost villous. Fruit puberulous with simple hairs.” (Toelken and Miller 2012; PlantNet 2023a).
2. The subspecies *Hibbertia puberula* Toelken subsp. *puberula* is described as a decumbent to suberect shrublet “with few wiry branches to 30 cm long, pubescent, often glabrescent, with simple long and short hairs (hairs often curved or hooked). Leaves with petiole 0.2–0.5 mm long; lamina narrowly ovate to almost linear, (1.2–)3–5.5(–8) mm long, (0.6–)0.8–1.4(–1.8) mm wide; base appearing abruptly constricted because margin strongly revolute (under surface not visible); apex more or less obtuse. Flowers single or rarely up to 3-flowered; pedicels short;

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- Hibbertia puberula* subsp. *puberula* is endemic to the Sydney Basin Bioregion of New South Wales (NSW) (Commonwealth DCCEEW 2012). The subspecies has a widely scattered distribution within this region, bounded roughly by Mellong in the northern Blue Mountains in the northwest, Peats Ridge on the Central Coast in the northeast, Warrimoo in the Lower Blue Mountains to the west, and Jerrawangala in the Shoalhaven to the south. *Hibbertia puberula* subsp. *puberula* has been recorded as locally occasional to frequent where it occurs (Toelken and Miller 2012). The distribution of *H. puberula* subsp. *puberula* spans the traditional lands of the Darkinjung, Dharug, Kuring-gai, Tharawal, Gundungurra, and Yuin peoples (NNTT 2013; AIATIS 2023).
- Hibbertia puberula* subsp. *puberula* has a highly restricted geographic range. The extent of occurrence (EOO) was calculated at 12,941 km² and is based on a minimum convex polygon enclosing all mapped occurrences of the species, the method of assessment recommended by IUCN (2024). The area of occupancy (AOO) is estimated to be 332–340 km² and was calculated using 2 x 2 km grid cells, the scale recommended by IUCN (2024). A bounded estimate is provided for AOO due to the possible loss of two subpopulations to urban development.
- The population size of *Hibbertia puberula* subsp. *puberula* is estimated to range from 2,400 to >10,000 mature individuals. The lower bound of the range was derived by quantifying all database records and data from reports. The upper bound of the range was derived through expert elicitation (A. Orme *in litt.* December 2023; R. Miller *in litt.* December 2023). However, this upper value of >10,000 considers a range of variability within the subspecies and an incomplete taxonomic review, which may result in some subpopulations being split into distinct entities in future (R. Miller *in litt.* December 2023; A. Orme pers. comm. May 2024), consequently resulting in a smaller maximum population estimate. Therefore, the actual number of mature individuals is very likely to be more than 2,500 and less than 10,000, and the median of these two values – 6,200 – is treated here as a current best estimate of mature individuals. There are no long-term monitoring data available for this subspecies and no information on long-term population trends.
- Hibbertia puberula* subsp. *puberula* has 63–65 known subpopulations, as defined by the IUCN (2024), based on a geographic separation of ≥1 km between clusters of occurrences. This is because gene flow from either pollination or seed dispersal is considered to be restricted over this distance. The largest subpopulation at Moorebank is estimated to support 1,065 individuals. However, given demographic information is not available for these records, it is considered likely that the number of mature individuals in this subpopulation is likely to be significantly less than 1,000. Furthermore, only two of the remaining 62–64 subpopulations support >100

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individuals. As such, it is considered probable that no subpopulation supports >1000 mature individuals.

7. *Hibbertia puberula* subsp. *puberula* is considered to be severely fragmented as it is inferred that >50% of its population occurs in habitat patches that are smaller than would be required to support a viable population and separated from other habitat patches by a large distance relative to dispersal kernel of the species, as per the IUCN (2024) guidelines.
8. *Hibbertia puberula* subsp. *puberula* occurs in a wide range of habitats, but typically in low heath on sandy soil, or rarely in clay, with or without exposed bedrock (Toelken and Miller 2012). The subspecies also commonly occurs in dry sclerophyll woodland (Arcadis 2016; ALA 2023; ANHSIR 2023a, 2023b; BioNet 2023; RBGDT 2023). *Hibbertia puberula* subsp. *puberula* occurs at elevations ranging from 0–850 m above sea level.
9. Commonly co-occurring species include *Eucalyptus parramattensis*, *E. racemosa*, *E. punctata*, *Angophora bakeri*, *Corymbia gummifera*, *Gaudium trinervium*, *Banksia spinulosa*, *Hakea laevipes*, and *Calytrix tetragona* (ALA 2023; ANHSIR 2023a, 2023b; BioNet 2023; RBGDT 2023; Miller *et al.* 2024).
10. *Hibbertia puberula* subsp. *puberula* is a facultative seeder (R. Miller pers. comm. December 2023) and resprouts after fire (G. Phillips pers. comm. December 2023).
11. *Hibbertia puberula* subsp. *puberula* generally flowers from October to December but may flower as late as January (Toelken and Miller 2012). Native bees and/or beetles are likely to be the primary pollinators (Tucker and Bernhardt 2000).
12. *Hibbertia puberula* subsp. *puberula* seeds possess a fleshy aril (Toelken and Miller 2012), a structure that has been demonstrated to aid dispersal by ants (myrmecochory) in other *Hibbertia* species (Berg 1975). However, it is unlikely that seeds of *H. puberula* subsp. *puberula* are transported far from parent plants by ants, as ants are reported to typically transport seeds over distances of <2 m in sclerophyllous vegetation (Gómez *et al.* 1998). *Hibbertia puberula* is known to have a persistent seedbank (Cuneo *et al.* 2018).
13. *Hibbertia puberula* subsp. *puberula* is threatened by the clearing, fragmentation, and degradation of habitat, particularly due to urban development, recreational vehicle use, and track maintenance, adverse fire regimes, particularly high frequency fire and high severity fire, and weed invasion. 'Clearing of native vegetation', 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition', 'Invasion of native plant communities by exotic perennial grasses', and 'Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants' are listed as Key Threatening Processes under the Act.
14. The clearing, fragmentation, and degradation of habitat due to urban development is estimated and inferred to causing continuing decline in the number of mature individuals, and the area, extent, and quality of habitat, and inferred to be causing

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continuing decline in the area of occupancy and number of subpopulations. Urban development has been documented to have resulted in the loss of >700 individuals in the southwest and south of Sydney. Another 100+ individuals are in the preferred strategic corridor of the Princes Highway upgrade between Falls Creek and Sussex Inlet and are inferred to be at risk of being lost in the near future. Weed invasion is inferred to be causing continuing decline in the area, extent, and quality of habitat. Weeds compete for available habitat and resources and can smother understorey plants like *Hibbertia puberula* subsp. *puberula*.

15. It is inferred that up to two subpopulations have been lost due to urban development – the Holsworthy South and Kellyville subpopulations. However, given uncertainty around the location of the single record which represents the Holsworthy South subpopulation, only the Kellyville subpopulation is considered to have been lost. The site of the single record from 2015 representing the Kellyville subpopulation has now been developed with an extensive housing estate, which includes most of the habitat within 1 km of the record. Consequently, continuing decline in AOO and the number of subpopulations is inferred.
16. *Hibbertia puberula* Toelken subsp. *puberula* is not eligible to be listed as a Critically Endangered species.
17. *Hibbertia puberula* Toelken subsp. *puberula* is eligible to be listed as an Endangered species as, in the opinion of the NSW Threatened Species Scientific Committee, it is facing a very high risk of extinction in Australia in the near future as determined in accordance with the following criteria as prescribed by the *Biodiversity Conservation Regulation 2017*:

Assessment against *Biodiversity Conservation Regulation 2017* criteria

The Clauses used for assessment are listed below for reference.

Overall Assessment Outcome: *Hibbertia puberula* subsp. *puberula* was found to be Endangered under Clause 4.3(b)(d)(e i,ii,iii,iv).

Clause 4.2 – Reduction in population size of species (Equivalent to IUCN criterion A)

Assessment Outcome: Data Deficient.

(1) - The species has undergone or is likely to undergo within a time frame appropriate to the life cycle and habitat characteristics of the taxon:			
	(a)	for critically endangered species	a very large reduction in population size, or
	(b)	for endangered species	a large reduction in population size, or
	(c)	for vulnerable species	a moderate reduction in population size.
(2) - The determination of that criteria is to be based on any of the following:			
	(a)	direct observation,	

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	(b)	an index of abundance appropriate to the taxon,
	(c)	a decline in the geographic distribution or habitat quality,
	(d)	the actual or potential levels of exploitation of the species,
	(e)	the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

Clause 4.3 - Restricted geographic distribution of species and other conditions (Equivalent to IUCN criterion B)

Assessment Outcome: Endangered under 4.3(b)(d)(e i,ii,iii,iv).

The geographic distribution of the species is:			
	(a)	for critically endangered species	very highly restricted, or
	(b)	for endangered species	highly restricted, or
	(c)	for vulnerable species	moderately restricted,
and at least 2 of the following 3 conditions apply:			
	(d)	the population or habitat of the species is severely fragmented or nearly all the mature individuals of the species occur within a small number of locations,	
	(e)	there is a projected or continuing decline in any of the following:	
		(i)	an index of abundance appropriate to the taxon,
		(ii)	the geographic distribution of the species,
		(iii)	habitat area, extent or quality,
		(iv)	the number of locations in which the species occurs or of populations of the species,
	(f)	extreme fluctuations occur in any of the following:	
		(i)	an index of abundance appropriate to the taxon,
		(ii)	the geographic distribution of the species,
		(iii)	the number of locations in which the species occur or of populations of the species.

Clause 4.4 - Low numbers of mature individuals of species and other conditions

(Equivalent to IUCN criterion C)

Assessment Outcome: Vulnerable under Clause 4.4(c)(d iii)(e i,ii A(III)).

The estimated total number of mature individuals of the species is:				
	(a)	for critically endangered species	very low, or	
	(b)	for endangered species	low, or	
	(c)	for vulnerable species	moderately low,	
and either of the following 2 conditions apply:				
	(d)	a continuing decline in the number of mature individuals that is (according to an index of abundance appropriate to the species):		
		(i)	for critically endangered species	very large, or
		(ii)	for endangered species	large, or
		(iii)	for vulnerable species	moderate,
	(e)	both of the following apply:		

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		(i)	a continuing decline in the number of mature individuals (according to an index of abundance appropriate to the species), and		
		(ii)	at least one of the following applies:		
		(A)	the number of individuals in each population of the species is:		
			(I)	for critically endangered species	extremely low, or
			(II)	for endangered species	very low, or
			(III)	for vulnerable species	low,
		(B)	all or nearly all mature individuals of the species occur within one population,		
		(C)	extreme fluctuations occur in an index of abundance appropriate to the species.		

Clause 4.5 - Low total numbers of mature individuals of species

(Equivalent to IUCN criterion D)

Assessment Outcome: Not met.

The total number of mature individuals of the species is:			
	(a)	for critically endangered species	extremely low, or
	(b)	for endangered species	very low, or
	(c)	for vulnerable species	low.

Clause 4.6 - Quantitative analysis of extinction probability

(Equivalent to IUCN criterion E)

Assessment Outcome: Data Deficient.

The probability of extinction of the species is estimated to be:			
	(a)	for critically endangered species	extremely high, or
	(b)	for endangered species	very high, or
	(c)	for vulnerable species	high.

Clause 4.7 - Very highly restricted geographic distribution of species—vulnerable species

(Equivalent to IUCN criterion D2)

Assessment Outcome: Not met.

For vulnerable species,	the geographic distribution of the species or the number of locations of the species is very highly restricted such that the species is prone to the effects of human activities or stochastic events within a very short time period.
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Professor Angela Moles, FRSN
 Chairperson
 NSW Threatened Species Scientific Committee

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Supporting Documentation:

Saunders M (2025) *Hibbertia puberula* Toelken subsp. *puberula* (Dilleniaceae). NSW Department of Climate Change, Energy, the Environment and Water.

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PlantNet (2023a) *Hibbertia puberula* Toelken (Online). Royal Botanic Gardens and Domain Trust, Sydney. Available at: <https://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Hibbertia~puberula> (accessed 11 December 2023)

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