Notice of Preliminary Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Preliminary Determination to support a proposal to list the shrub *Hibbertia superans* Toelken as a CRITICALLY ENDANGERED SPECIES in Part 1 of Schedule 1 of the Act and, as a consequence, to omit reference to *Hibbertia superans* Toelken in Part 2 of Schedule 1 (Endangered Species). Listing of Critically 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 3 October 2025

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.

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

Public Exhibition period: 01/09/2025 – 03/10/2025

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 the shrub *Hibbertia superans* Toelken as a CRITICALLY ENDANGERED SPECIES in Part 1 of Schedule 1 of the Act and, as a consequence, to omit reference to *Hibbertia superans* Toelken in Part 2 of Schedule 1 (Endangered Species). Listing of Critically Endangered species is provided for by Part 4 of the Act.

Summary of Conservation Assessment

Hibbertia superans Toelken was found to be Critically Endangered in accordance with the following provisions in the Biodiversity Conservation Regulation 2017: 4.2(1 a)(2 b) because it is projected to experience a very large population reduction of 78–96% over a three-generation period (30 years) as a result of clearing for urban development, adverse fire regimes, and competition from weeds.

The NSW Threatened Species Scientific Committee has found that:

1. *Hibbertia superans* Toelken (family Dilleniaceae) is described by Toelken (2000) as “Low spreading shrubs to 0.3 m high, with few to many, weak twisted stems and branches, villous when young, becoming tomentose with longer hairs more or less wearing off. Vestiture on all parts consisting of more or less long silky [hairs] over a dense layer of usually short stiffly erect simple hairs, but particularly on the branches and the undersurface of leaves there are often some scattered stellate hairs with 2–3(–5) equal erect branches (. . .). Leaves (none modified into hypsophylloids) with axillary hair tuft below flowers 1–1.2 mm long; petiole 0–0.2 mm long; lamina linear, rarely linear-elliptic, (5.6–)7.5–10(–12.3) x 0.9–1.2(–1.4) mm, acute, often becoming obtuse, scarcely constricted into petiole, slightly broadened central vein usually raised to same level as revolute margins and continued (0.4–0.6 mm wide in the middle) into the apex, with undersurface not visible, villous over or becoming tomentose above and below. Flowers single, sessile to slightly stalked, terminal on main branches or rarely on short shoot, younger ones freely overtopping older ones; bracts linear, 8.3–9.5 x 1.0–1.3 mm, like leaves with distinct central vein, villous sometimes becoming tomentose. Calyx not accrescent; outer calyx lobes linear-lanceolate, acute, with slender central vein and recurved margins in upper third, (6.8–)7.5–9(–9.8) x 1.5–1.6 mm, much longer than inner ones, outside villous over or becoming tomentose, inside at least upper half like outside; inner calyx lobes oblong-elliptic to obovate, obtuse to rounded, 4.2–6.5(–7.6) x 1.9–2.7 mm, outside villous over more or less appressed pubescent, inside rarely with a few appressed hairs towards the apex. Petals broadly obovate, 5.5–6.7 mm long, emarginate. Stamens 6–9, subequal; filaments basally connate, but often some more than others; anthers narrowly oblong, (1.4–)1.6–1.8 mm long, dehiscing mainly by lateral slits. Pistils 2; ovaries laterally compressed, each with 4 ovules; style from outer apex of ovary, curved outwards and around the cluster of stamens to end at the apex of the outer anthers. Fruit villous with very dense erect simple hairs. Seeds oblong-obovoid, often oblique, 1.5–1.7 x 1.1–1.4 mm, fleshy aril expanding into a scarcely lobed sheath adpressed to the base of seed, often to one side of base of seed.” Since this

original description, confirmed plants of *Hibbertia superans* have been recorded up to 40 cm high and spreading up to 1 m wide (R. Miller *in litt*. December 2022).

2. *Hibbertia superans* is a range-restricted species endemic to the Greater Sydney in region New South Wales (NSW). *Hibbertia superans* mainly occurs in northwest Sydney between Baulkham Hills and Wisemans Ferry, though has also been recorded in Dural, Berowra Valley National Park (NP), Hornsby Heights, and Ku-ring-gai Chase NP in northern Sydney and in Warrimoo, Winmalee and Faulconbridge in the lower Blue Mountains.

3. The Area of Occupancy (AOO) of *Hibbertia superans* is estimated to be 140 km^2 using 2 x 2 km grid cells, the scale recommended by IUCN (2024). The Extent of Occurrence (EOO) is estimated to be 1,048 km^2 and is based on a minimum convex polygon enclosing a cleaned dataset of known occurrences of the species, the method of assessment recommended by IUCN (2024).

4. As of 2025, there is an estimated 453 mature individuals in the population of *Hibbertia superans*, with the population consisting of 16 subpopulations following the IUCN (2024) definition. Despite the fact that numbers of *Hibbertia superans* fluctuate over time dependent on the frequency of fire which stimulates germination (James 2012), the population appears to be in long-term decline.

5. *Hibbertia superans* is considered severely fragmented. Almost all subpopulations consist of low numbers of individuals, with eight of 16 subpopulations estimated to contain 13 mature individuals or less in 2025, and five others having unknown but likely very low numbers. The three remaining subpopulations have 240, 141 and 42 mature individuals, and it is likely that these subpopulations are also reducing in size. This means that all subpopulations can be considered small and at high risk of extinction, especially with the heightened risk of clearing for urban development in the larger subpopulations that can rapidly reduce abundance. All subpopulations of *Hibbertia superans* are also considered isolated, as the maximum seed dispersal distances are highly unlikely to ever breach the 1 km subpopulation delineation distance. This means that all subpopulations are relatively small and isolated and therefore meet the definition of being severely fragmented (IUCN 2024).

6. *Hibbertia superans* occurs in woodlands on sandstone ridgetops and plateaus in sandy soils with some clay influence close to shale/sandstone transitions (Toelken 2000; James 2012). The species prefers open areas in heath or open woodlands (James 2012). Associated vegetation often includes *Allocasuarina littoralis*, *Angophora bakeri*, *A. hispida, Corymbia gummifera, C. eximia*, *Eucalyptus piperita, E. racemosa, E. squamosa, Gaudium trinervium, G. parvifolium, Pultenaea tuberculata, Dillwynia retorta, Grevillea buxifolia, Baeckea* spp. and *Calytrix tetragona* (James 2012; Miller 2022).

7. *Hibbertia superans* is a facultative seeder, meaning it both resprouts and germinates from seed in response to fire. The species primarily recovers after fire by reshooting from the rootstock (James 2012). Seed germination may be stimulated by higher severity fire events (James 2012), with seedling emergence observed to coincide with occurrences of at least moderate intensity fire in other *Hibbertia* species that occur in similar habitat to *H. superans* (*e.g., H. spanantha*; Toelken and Robinson 2015). The abundance of *H. superans* fluctuates around

fire events, with large numbers recorded 2-4 years after fire and then subsequently falling over time as surrounding vegetation increases in height and density (James 2012). Dense, long unburnt vegetation becomes unsuitable habitat for *H. superans* in the long-term, and if a no-fire regime is maintained the species is unlikely to persist as standing plants in an area with an absence of fire of over 25 years currently considered the maximum allowable period (OEH 2024). The generation length of *H. superans* is estimated to be at least 6–10 years.

8. The primary threats operating on *Hibbertia superans* are adverse fire regimes, vegetation clearing for urban and rural development, habitat degradation from human activity including illegal dumping and competition from exotic weeds (Brogan 2004; James 2012; Miller 2022; OEH 2024). These threats often do not act independently, and the cumulative effects of these threats, such as illegal dumping facilitating the spread of weeds, have also been noted as placing significant pressure on the often-small stands of *H. superans* and its habitat (Miller 2022). Infection from pathogens such as *Phytophthora cinnamomi* has also been identified as a plausible threat to the species and its habitat (Miller 2022). 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition', 'Clearing of native vegetation', 'Invasion and establishment of exotic vines and scramblers', '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 a Key Threatening Process under the Act.

9. *Hibbertia superans* is considered to occur at 5–7 threat-defined locations as per the IUCN (2024) definition when the most serious plausible threats of adverse fire regimes or habitat degradation and clearing due to urbanisation are considered.

10. The estimated three-generation timespan of *Hibbertia superans* is 18–30 years. This timespan covers the periods of the most recent surveys of the species, with comprehensive surveys being undertaken in 2004, 2007/2008 and 2022 allowing population reductions to be estimated over this period. When comparing five sites surveyed in 2004 (Brogan 2004) that were re-surveyed in 2022 (Miller 2022), there is an observed 78% decline (520 to 113 mature individuals) over this 18-year period. Similarly, when comparing seven sites surveyed in 2007/2008 (BioNet 2024) that were re-surveyed in 2022 (Miller 2022), there is also an observed 78% decline (1,494 mature individuals to 336) over a 14-year period. To assess the decline over the longer three-generation period estimate of 30 years, an exponential decay model can be used to project population reductions as the proportion of decline appears to be constant over time (IUCN 2024). This model results in projected reductions of 92% using data from sites surveyed in 2004 and 2022, or 96% using data from sites surveyed in 2007/2008 and 2022. These reductions are likely due to a combination of adverse fire regimes, urban development, and competition from invasive weeds. Given almost all sites have low numbers of mature individuals at the time of the last record, it is considered likely that the full population of *H. superans* has undergone similar reductions to those observed in the sites surveyed in 2004, 2007/2008 and 2022, and are projected to do suffer similar reductions into the future.

11. Given the above reductions are projected to continue into the future, the causes of reduction have not ceased and may not be reversible, and taking a precautionary approach as it is possible that the primary juvenile period, lifespan and generation length may be longer than currently estimated, it is considered that realised population reductions in *Hibbertia superans* over a three-generation period of 18–30 years will be greater than 80%.

12. *Hibbertia superans* Toelken is eligible to be listed as a Critically Endangered species as, in the opinion of the NSW Threatened Species Scientific Committee, it is facing an extremely high risk of extinction in Australia in the immediate 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: Critically Endangered under Clause 4.2(1 a)(2 b)

Clause 4.2 – Reduction in population size of species
(Equivalent to IUCN criterion A)
Assessment Outcome: Critically Endangered under Clause 4.2(1 a)(2 b)

(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,	
	(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 Clause 4.3(b)(d)(e i,iii)

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: Endangered under Clause 4.4(b)(d ii)(e i,ii A(II))

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:				
		(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: Vulnerable under Clause 4.5(c)

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: Vulnerable under Clause 4.7

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.

Professor Angela Moles, FRSN
Chairperson
NSW Threatened Species Scientific Committee

Supporting Documentation:

Phillips GP, Wong V (2025) Conservation Assessment of *Hibbertia superans* Toelken (Dilleniaceae). NSW Department of Climate Change, Energy, the Environment and Water.

References:

BioNet (2025) Records of Plants (Species: *Hibbertia superans*) recorded until 20 Feb 2025 [dataset]. NSW Department of Climate Change, Energy, the Environment and Water.

Brogan C (2004) Survey for Hibbertia superans Cattai Creek Drive Kellyville. Unpublished report carried out for Graham Trilby Pty Ltd. 53 pp.

IUCN (2024) Guidelines for Using the IUCN Red List Categories and Criteria. Version 16 (March 2024). Standards and Petitions Committee of the IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK.

James T (2012) Threatened Species Management Plan for a significant area along Paulls Road, South Maroota. An unpublished report prepared for the Hills Shire Council. 30 pp.

Miller R (2022) Key sites survey for *Hibbertia superans* in north-west Sydney, NSW. Cumberland Flora and Fauna Interpretive Services. An unpublished report for the NSW Department of Planning and Environment. 48 pp.

OEH (Office of Environment and Heritage) (2024) *Hibbertia superans* – profile. URL: https://threatenedspecies.bionet.nsw.gov.au/profile?id=10403 (accessed 24 February 2025).

Toelken H (2000) Notes on *Hibbertia* (Dilleniaceae) 3. *H. sericea* and associated species. *Journal of the Adelaide Botanic Gardens* **19**: 1–53.

Toelken HR, Robinson AF (2015) Notes on *Hibbertia* (Dilleniaceae) 11. *Hibbertia spanantha,* a new species from the central coast of New South Wales. *Journal of the Adelaide Botanic Gardens* **29**: 11–14.