

Abridged Threatened Species Nomination Form

For nominations/assessments under the Common Assessment Method (CAM) where supporting information is available, but not in a format suitable for demonstrating compliance with the CAM, and assessment against the IUCN Red List threat status.

Cover Page *(Office use only for Assessment)*

Species name (scientific and common name):	<i>Hypocalymma</i> sp. Cascade (R. Bruhn 20896)
Nomination for (addition, deletion, change):	Addition
Nominated conservation category and criteria:	EN B1ab(iii,v)+2ab(iii,v)

Scientific committee assessment of eligibility against the criteria:		
This assessment is consistent with the standards set out in Schedule 1, item 2.7 (h) and 2.8 of the Common Assessment Method Memorandum of Understanding.		Yes <input type="checkbox"/> No <input type="checkbox"/>
A.	Population size reduction	•
B.	Geographic range	•
C.	Small population size and decline	•
D.	Very small or restricted population	•
E.	Quantitative analysis	•

Outcome:			
Scientific committee Meeting date:			
Scientific committee comments:			
Recommendation:			
Ministerial approval:		Date of Gazettal/ Legislative effect:	

Nomination/Proposal summary *(to be completed by nominator)*

Current conservation status				
Scientific name:	Hypocalymma sp. Cascade (R. Bruhn 20896)			
Common name:	None			
Family name:	Myrtaceae	Fauna <input type="checkbox"/>	Flora <input checked="" type="checkbox"/>	
Nomination for:	Listing <input checked="" type="checkbox"/>	Change of status/criteria <input type="checkbox"/>	Delisting <input type="checkbox"/>	
1. Is the species currently on any conservation list, either in a State or Territory, Australia or Internationally? 2. Is it present in an Australian jurisdiction, but not listed?		Provide details of the occurrence and listing status for each jurisdiction in the following table		
Jurisdiction	State / Territory in which the species occurs	Date listed or assessed (or N/A)	Listing category i.e. critically endangered or 'none'	Listing criteria i.e. B1ab(iii)+2ab(iii)
International(IUCN Red List)				
National (EPBC Act)				
State/ Territory	1. WA	2015	Vulnerable	D2
		5/4/2017	Endangered	B1ab(iii,v)+2ab(iii,v)
Consistent with Schedule 1, item 2.7 (h) and 2.8 of the Common Assessment Method Memorandum of Understanding, it is confirmed that:				
<ul style="list-style-type: none"> this assessment meets the standard of evidence required by the Common Assessment Method to document the eligibility of the species under the IUCN criteria; 			Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Comments:				
<ul style="list-style-type: none"> surveys of the species were adequate to inform the assessment; 			Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Comments:	No further surveys have been undertaken since 2014. A potential new subpopulation located in 2013, prior to the assessment, has yet to be confirmed in the field as no plants were found when surveyed in 2014. It is suspected that they were removed by road works.			
<ul style="list-style-type: none"> the conclusion of the assessment remains current and that any further information that may have become available since the assessment was completed supports or is consistent with the conclusion of the assessment. 			Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Comments:	It is not possible to determine whether the total population size has increased or declined since the assessment in 2015. However the habitat within which the species occurs is highly threatened by road maintenance activities, with a loss of approximately 50 individuals from one subpopulation and potentially another five individuals at another subpopulation from road grading in 2014. This may directly and indirectly contribute to a decline in the area, extent and/or quality of habitat in the subpopulation. Without ongoing management a projected decline is expected. Meets criteria for Endangered B1ab(iii,v)+B2ab(iii,v).			

Nominated national conservation status: category and criteria		
Presumed extinct (EX) <input type="checkbox"/> Critically endangered (CR) <input type="checkbox"/> Endangered (EN) <input checked="" type="checkbox"/> Vulnerable (VU) <input type="checkbox"/>		
None (least concern) <input type="checkbox"/> Data Deficient <input type="checkbox"/> Conservation Dependent <input type="checkbox"/>		
What are the IUCN Red List criteria that support the recommended conservation status category?	EN: B1ab(iii,v)+2ab(iii,v)	
Eligibility against the IUCN Red List criteria (A, B, C, D and E)		
Provide justification for the nominated conservation status; is the species eligible or ineligible for listing against the five criteria. For delisting , provide details for why the species no longer meets the requirements of the current conservation status.		
A.	Population size reduction (evidence of decline)	<ul style="list-style-type: none"> Survey data are insufficient to determine any population trends. Unable to assess
B.	Geographic range (EOO and AOO, number of locations and evidence of decline)	<ul style="list-style-type: none"> (B1) EOO <100 km². Using Minimum Convex Polygon (MCP) the EOO is estimated as 4 km², which was calculated by drawing a polygon around the plants (0.2 km²) and rectifying to be no less than the estimated AOO. * Note EOO and AOO figures do not include the new Subpopulation 2 as it has yet to be confirmed as the specimen location is vague and field validation has not been made. (B2) AOO <10 km². The estimated AOO is 4 km² using the 2 km x 2 km grid method. The mapped area of the single subpopulation is 0.2 km² or 20 hectares. (a) Known from one general locality near Cascade. However, regarded as being two locations as the main threatening process (road maintenance) is restricted to those plants occurring within the road reserve, and excludes the plants in the adjacent nature reserve. (b) Continuing decline observed and projected: (iii) (v) The habitat within which the species occurs is highly threatened by road maintenance activities. Approximately 50 individuals were cleared as a result of road grading in 2014 at one site and potentially 5 plants at a second site. Road maintenance activities may directly and indirectly contribute to a decline in the area, extent and/or quality of habitat, and subsequently the number of mature individuals, in the known subpopulation. Meets criteria for Endangered: B1ab(iii,v)+2ab(iii,v)
C.	Small population size and decline (population size, distribution and evidence of decline)	<ul style="list-style-type: none"> Known from approximately 3,500 mature individuals. There are not enough survey data to determine any population trends, despite observed decline in area of occupancy. Continuing decline has been projected in the number of mature individuals due to ongoing road maintenance. All recorded mature individuals (100%) in Subpopulation 1. Meets criteria for Vulnerable: C2(a)(ii)

D.	Very small or restricted population (population size)	<ul style="list-style-type: none"> The species is known from approximately 3,500 mature individuals. Estimated AOO is 4 km² and number of locations is two. Meets criteria for Vulnerable D2 		
E.	Quantitative analysis (statistical probability of extinction)	<ul style="list-style-type: none"> No information to assess. 		
Summary of assessment information				
EOO	0.2 km ² (MCP), recalculated to 4 km ² so as not to be less than the AOO.	AOO 4 km ² (2 km x 2 km grid method). Extrapolated area of subpopulations 0.2 km ² .	Generation length	Unknown
No. locations	2	Severely fragmented	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>
No. subpopulations	2 (status of one to be confirmed)	No. mature individuals	Approximately 3,500	
Percentage global population within Australia			100	
Percentage population decline over 10 years or 3 generations			Unknown	
Threats (detail how the species is being impacted)				
Threat (describe the threat and how it impacts on the species. Specify if the threat is past, current or potential)		Extent (give details of impact on whole species or specific subpopulations)		Impact (what is the level of threat to the conservation of the species)
Road maintenance <ul style="list-style-type: none"> Threats include grading, chemical spraying, construction of drainage channels, and slashing of road vegetation. Approximately 50 plants were removed during road maintenance in 2014. Such activities also encourage the spread of weeds and disease. Past, current, future		Individuals within road reserves		Severe
Altered fire regimes <ul style="list-style-type: none"> It is not certain how the species responds to fire but it is likely to be killed by fire and regenerate from seed. If fire frequency is increased the soil seed bank could be depleted before juvenile plants have reached maturity. Past, current and future		Whole population		Potentially severe
Weeds <ul style="list-style-type: none"> Potential for weed invasion with inappropriate roadside and fire management, which would cause competition with the plants and alter the fire characteristics of the habitat. Future		Individuals within road reserves		Moderate

Management and Recovery	
Is there a Recovery Plan (RP) or Conservation Management Plan operational for the species?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
<i>List all relevant recovery or management plans (including draft, in-preparation, out-of-date, national and State/Territory recovery plans, recovery plans for other species or ecological communities, or other management plans that may benefit or be relevant to the nominated species).</i>	
<i>List current management or research actions, if any, that are being undertaken that benefit the conservation of the species.</i> <ul style="list-style-type: none"> Monitoring and surveys have been carried out to determine plant numbers and impact of threats; Threatened Flora markers have been installed within the road reserve at Subpopulation 1a; Liaison with the Shire of Esperance. 	
<i>List further recommended management or research actions, if any, that would benefit the conservation of the species. Please ensure that this section addresses all identified threats.</i> <p>Management</p> <ul style="list-style-type: none"> Monitor subpopulation for evidence of grazing impacts, or changes in plant or site health; Collect seed from the subpopulation and store at Parks and Wildlife Threatened Flora Seed Centre; Liaise with Shire of Esperance to ensure the species is not accidentally damaged or destroyed during road maintenance, and the habitat is maintained in a suitable condition for the conservation of the species; Develop and implement a fire management strategy, including the need for, and method of, the construction and maintenance of firebreaks; Undertake surveys in areas of potentially suitable habitat and confirm subpopulation; Install Threatened Flora markers within the road reserve once the subpopulation is confirmed to protect individuals from road maintenance activities; Establish new subpopulations through translocation into disease-free areas; Manage weed incursions if detected from monitoring. <p>Research</p> <ul style="list-style-type: none"> Research biology and ecology of the species, with a focus on pollination effectiveness, seed viability, conditions required for natural germination, response to threats and disturbances and reproductive biology. Improve understanding of the species' responses to fire frequency, severity and season to inform the preparation of a fire management strategy. 	
Nomination prepared by:	
Contact details:	
Date submitted:	28/3/2017
<i>If the nomination has been refereed or reviewed by experts, please provide their names and contact details:</i>	

Summary of subpopulation information (detailed information to be provided in the relevant sections of the form)						
Location or Subpopulation (include coordinates)	Land tenure	Survey information: Date of survey and No. mature individuals * = combined total	Area of Subpopulation	Site / habitat Condition	Threats (note if past, present or future)	Specific management actions
Subpopulation 1, site a: NW of Cascade.	Shire road reserve	1996: 200 2010: *770 (partial survey) 2015: 3,200	19 ha	Moderate. Approximately 50 plants removed by road maintenance activities in 2014.	Road maintenance (past, present, future) Fire (past, present, future) Small population size (past, present, future) Weeds (future) Drought (past, present, future) Climate change (future)	Monitor the site to identify current or potential threats Develop a fire management plan Manage weeds if identified as a threat at the site Collect seed and test viability, conduct regeneration trials Implement translocations Undertake further surveys Liaise with Shire of Esperance
Subpopulation 1, sites b&c: NW of Cascade.	Nature reserve	2010: *770 (partial survey) 2014: 300	1 ha	Healthy	Fire (past, present, future) Small population size (past, present, future) Weeds (future) Drought (past, present, future) Climate change (future)	Monitor the site to identify current or potential threats Develop a fire management plan Manage weeds if identified as a threat at the site Collect seed and test viability, conduct regeneration trials Implement translocations Undertake further surveys
Subpopulation 2 (not confirmed): NW of Cascade. This subpopulation	Shire road reserve	2013: 5 2014: 0	Not recorded	Was recorded as healthy condition in 2013 but was not located in 2014	Road maintenance (past, present, future) Fire (past, present, future)	Install markers if required Monitor the site to identify current or potential threats

has yet to be confirmed in the field. The locality description for the specimen collected was vague and no plants were found when surveyed in 2014.				survey and is suspected to have been graded during road maintenance.	<p>Small population size (past, present, future)</p> <p>Weeds (future)</p> <p>Drought (past, present, future)</p> <p>Climate change (future)</p>	<p>Develop a fire management plan</p> <p>Manage weeds if identified as a threat at the site</p> <p>Collect seed and test viability, conduct regeneration trials</p> <p>Implement translocations</p> <p>Undertake further surveys</p> <p>Liaise with Shire of Esperance</p>
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Department of
Parks and Wildlife



Form to nominate a Western Australian species for listing as threatened, change of category or delisting 2015 (updated 2017).

SECTION 1. NOMINATION					
1.1. Nomination for:					
Flora <input checked="" type="checkbox"/>	Fauna <input type="checkbox"/>	as: Threatened / DRF <input checked="" type="checkbox"/> Change of category <input type="checkbox"/> Delisting <input type="checkbox"/>			
1.2. Scientific Name This name will be used to identify the species on all official documentation. Use the approved name used by the Western Australian Museum or Herbarium, if possible.					
<i>Hypocalymma</i> sp. Cascade (R. Bruhn 20896)					
1.3. Common Name If the species has a generally accepted common name, please show it here.					
1.4. Family Name					
Myrtaceae					
1.5. Current Conservation Status. If none, type 'None'.					
	IUCN Red List Category e.g. Vulnerable			IUCN Red List Criteria e.g. B1ab(iv); D1	
International IUCN Red List					
National EPBC Act 1999					
State of Western Australia	Vulnerable			D2	
State of WA Priority	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
1.6. Nominated Conservation Status.					
	IUCN Red List Category e.g. Vulnerable			IUCN Red List Criteria e.g. B1ab(iv); D1	
EPBC Act	Endangered			B1ab(iii,v)+2ab(iii,v)	
State of Western Australia	Endangered			B1ab(iii,v)+2ab(iii,v)	
State of WA Priority	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Is the species listed as 'Threatened' in any other Australian State or Territory? If Yes, list these States and/or Territories and the status for each.					
No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> Details:					
1.7. Reasons for the Nomination. Briefly summarise the reasons for the nomination in dot points. Please include details relevant to the IUCN Category and each Criteria.					
<i>Hypocalymma</i> sp. Cascade is known from a single subpopulation in one general locality near Cascade. However, it is regarded as being two locations as the main threatening process (road maintenance) is restricted to those plants occurring within the road reserve, and excludes the plants in the adjacent nature reserve.					

A third potential location exists approximately 7km to the north on a shire road reserve. A specimen was originally collected by a Wildflower Society volunteer in 2013, however the locality description was vague and no plants were found when surveyed in 2014.

There has been an observed decline in the area of occupancy and number of mature individuals as a result of road maintenance activities. The area of occupancy is less than 10km² (at 0.2km²) and extent of occurrence less than 100km² (at 0.2km²) meeting IUCN Red List Criteria B1ab(iii,v)+2ab(iii,v).

Approximately 90% of plants within the single known subpopulation occur on insecure tenure located on a road reserve.

SECTION 2. SPECIES

2.1. Taxonomy.

Describe the taxonomic history, using references, and describe the key distinguishing features that can be used to separate this taxon from closely related taxa. Include details of the type specimen, changes in taxonomy, scientific names and common names used for the species.

First collected in 1996 by R. Bruhn. This species is currently known as *Hypocalymma* sp. Cascade but is in the process of being formally described (B. Rye, pers. com. 2014). It is considered to be a distinct species, and can be easily distinguished by its flowers, which are the largest in the genus (B. Rye, pers. comm. 2014).

Is this species conventionally accepted? If no, explain why. For example, is there any controversy about the taxonomy? For undescribed species, detail the location of voucher specimens (these should be numbered and held in a recognised institution and be available for reference purposes).

No ☒ Yes ☐

Hypocalymma sp. Cascade is considered a distinct taxon and is currently in the process of being formally described. It is clearly distinguished from other *Hypocalymma* (B. Rye, personal communication, 2014).

The species was first collected near Cascade by R. Bruhn in 1996 (CAS 20896, PERTH).

A second collection collected by E. Adams in 2010 (EA 636) is also housed at the WA Herbarium.

A third collection was made by volunteer Jason Holmes in 2014 and is housed at the WA Herbarium. This collection has not been confirmed in the field.

Describe any known hybridisation with other species in the wild, indicating where this occurs and how frequently.

None known.

2.2. Description

Describe the physical appearance, habit, behaviour/dispersion and life history. Include anatomy or habit (e.g. size and/or weight, sex and age variation, social structure) and dispersion (e.g. solitary, clumped or flocks etc), and life history (eg short lived, long lived, geophytic, etc).

Shrub 0.4–1 m high, with multiple slender erect stems from a woody base; young stems ± terete, glabrous. Leaves sessile, broadly ovate to cordate or ovate, 8–11 × 4–7 mm, acute or obtuse, with moderately incurved margins, entire, concolorous. Peduncles 1–1.5 mm long, 1-flowered. Bracteoles usually deciduous, 4–5.5 mm long. Pedicels 0.7–1 mm long. Flowers 20–30 mm diam. Sepals 3–4 mm long, entire. Petals 11–15 mm long. Stamens 65–110, shortly united at base. Longest filaments 3–4 mm long. Ovary 3(4)-locular; ovules 7–11 per loculus. Style 3.7–4.3 mm long; base deeply inset. Fruits c. 1/2 inferior, 3–4 mm long. Seeds 1.8–2.1 mm long.

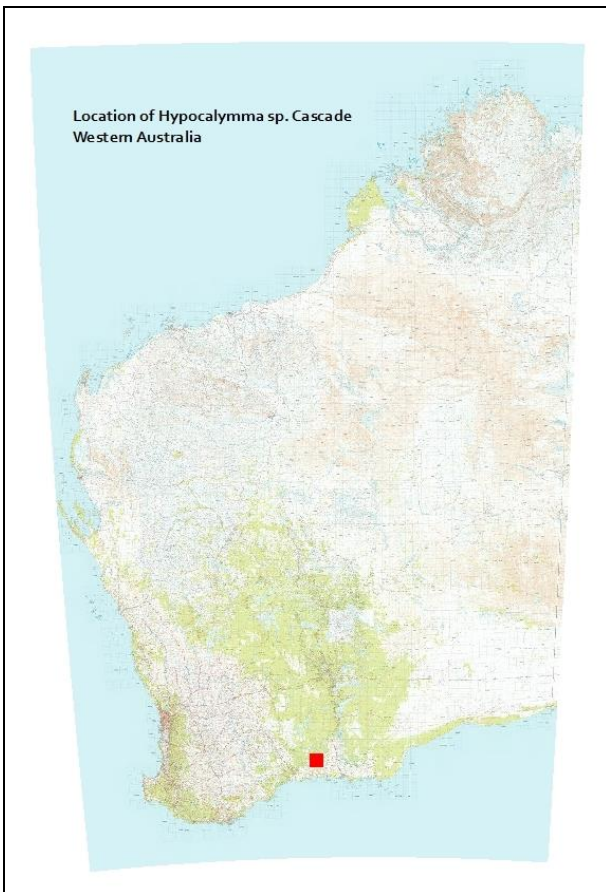


Left: Flowers of *Hypocalymma* sp. Cascade; Right: A plant growing in the road maintenance zone.

2.3. Distribution

Describe the distribution of the species in Australia and, if possible, provide a map.

Known from near Cascade, Western Australia. The majority of the subpopulation is found on road reserve with plants also located within the adjacent Nature Reserve (see Map 1).



Map 1 Location of *Hypocalymma* sp. Cascade (R. Bruhn 20896).

2.4. Habitat

Describe the non-biological habitat (e.g. aspect, topography, substrate, climate) and biological habitat (e.g. vegetation type, associated species, sympatric species). If the species occurs in various habitats (e.g. for different activities such as breeding, feeding, roosting, dispersing, basking etc) then describe each habitat. Note if the habitat has a special defining characteristic. If possible estimate the area of habitat, or the relative abundance of the habitat, and note if a critical habitat requirement (eg breeding habitat) is restricted in its availability to the species.

Non-biological habitat

Hypocalymma sp. Cascade is found on Oldfield 1 Subsystem soil characterised by grey shallow sandy duplex soils, duplex sandy gravels and sandy loams. The population is located between 250 and 260 m elevation on a gentle slope.

The area where *Hypocalymma* sp. Cascade occurs experiences a semi-arid (desert) climate of hot, dry summers and cold winters. Average rainfall is around 500 mm per annum.

Biological habitat

Hypocalymma sp. Cascade is found growing amongst Open Shrub Mallee of *Eucalyptus urna*, *Eucalyptus Eremophila*, *Eucalyptus leptocalyx*, *Eucalyptus phaenophylla*, *Eucalyptus pleurocarpa* and *Eucalyptus angustissima*, over Low Heath C / Low Scrub B of *Melaleuca fissurata*, *Melaleuca uncinata*, *Melaleuca bromelioides*, *Melaleuca glaberrima*, *Melaleuca podiocarpa*, *Melaleuca subfalcata*, *Tetrapora verrucosa*, *Acacia fragilis*, *Acacia binata*, *Beaufortia schaueri*, *Beyeria lechenaultii*, *Hakea newbeyana*, *Hakea scoparia*, *Daviesia lancifolia*, *Grevillea oligantha*, *Hibbertia gracilipes*, *Hibbertia exasperata*.

Does the (fauna) species use refuge habitat e.g. in times of fire, drought or flood? Describe this habitat.

N/A

Is the species part of, or does it rely on, a listed threatened ecological community? Is it associated with any other listed threatened species?

No

2.5. Reproduction

Provide an overview of the breeding system.

For fauna: Provide an overview of the breeding system and breeding success, including: when does it breed; what conditions are needed for breeding; are there any breeding behaviours that may make it vulnerable to a threatening process?

For flora: When does the species flower and set fruit? Is the seed produced viable? What conditions are needed for this? What is the pollinating mechanism? If the species is capable of vegetative reproduction, a description of how this occurs, the conditions needed and when. Does the species require a disturbance regime (e.g. fire, ground disturbance) in order to reproduce?

Hypocalymma sp. Cascade has been recorded flowering in August/September, and plants have also been observed with some flowers in January.

Seed viability and longevity is not known. Further research is required into the biology and ecological requirements of the species.

It is not known what the impact of fire is on the species. From current database information, no fire events have impacted on the population in over 40 years.

Surveys of the subpopulation have observed some plants growing in the road maintenance zone and also on the edge of water drains. There are also plants occurring along a narrow cleared track where a telecommunication line is buried, indicating that the species will colonise areas that have been disturbed. However, disturbance does not appear essential for the species to reproduce given the large numbers of plants in undisturbed areas.

2.6. Population dynamics Provide details on ages of sexual maturity, extent of breeding success, life expectancy and natural mortality. Describe population structure (presence of juveniles/seedlings, mature and senescing individuals). Estimate generation length.
Currently the majority of the subpopulation is represented by mature individuals.
Questions 2.7 and 2.8 apply to <u>fauna</u> nominations only
2.7. Feeding Summarise food items or sources and timing/availability.
N/A
Briefly describe feeding behaviours, including those that may make the species vulnerable to threatening processes.
N/A
2.8. Movements Describe any relevant daily or seasonal pattern of movement for the species, including relevant arrival/departure dates if migratory. Provide details of home range/territories.
N/A
SECTION 3. INTERNATIONAL CONTEXT
For species that are distributed both in <u>Australia</u> and in <u>other countries</u>.
3.1. Distribution Describe the global distribution.
N/A
Provide an overview of the global population size, trends, threats and security of the species outside of Australia.
N/A
Explain the relationship between the Australian population and the global population. What percentage of the global population occurs in Australia? Is the Australian population distinct, geographically separate or does part, or all, of the population move in/out of Australia's jurisdiction? Do global threats affect the Australian population?
N/A
SECTION 4. CONSERVATION STATUS AND MANAGEMENT
<p>Conservation status and management information is required for the national extent of the species, however, greater detail is expected for the WA occurrences. If the taxon is considered to be endemic to Western Australia, please provide supporting evidence.</p> <p>4.1. Population What is the total national/State population size in terms of number of mature individuals? Has the number of individuals been counted, or is this an estimate? Provide details of the method of determining the number of individuals. Are there other useful measures of population size and what are they? Or if these are unavailable, provide an estimate of abundance (e.g. scarce, locally abundant etc).</p> <p>Note: The term 'population' is used in a specific sense in the Red List Criteria that is different to its common biological usage. Population is here defined as the total number of mature individuals of the taxon. In the case of taxa obligately dependent on other taxa for all or part of their life cycles, biologically appropriate values for the host taxon should be used. (IUCN 2001)</p> <p>Based on extrapolation the current population size is estimated at 3,500 plants. The population boundary was mapped with a handheld GPS. Fifteen 10m x 10m plots were established throughout the population and the number of plants within the plots counted. An average was taken and extrapolated over the population area mapped.</p> <p>How many subpopulations or locations do you consider the species occurs in and why?</p> <p>Note: 'Subpopulations' are defined as geographically or otherwise distinct groups in the population between</p>

which there is little demographic or genetic exchange (typically one successful migrant individual or gamete per year or less). 'Locations' are defined as a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present. The size of the location depends on the area covered by the threatening event and may include part of one or many subpopulations. Where a taxon is affected by more than one threatening event, location should be defined by considering the most serious plausible threat. (IUCN 2001) Refer to Red List Guidelines 9.0

The species is known from one general locality consisting of a single subpopulation near Cascade. However, it is regarded as being two locations as the main threatening process (road maintenance) is restricted to those plants occurring within the road reserve, and excludes the plants in the adjacent nature reserve.

A third potential location exists approximately 7km to the north on a shire road reserve but has not yet been confirmed in the field. A specimen was originally collected by a Wildflower Society volunteer in 2013, however the locality description was vague and no plants were found when surveyed in 2014.

Hypocalymma sp. Cascade occurs on Oldfield 1 Subsystem soils on mallee scrub (Open Shrub Mallee over Low Heath / Low Scrub B). These areas have been mapped to indicate potential habitat.

No other subpopulations have been located.

Provide locations of: captive/propagated occurrences or ex situ collections; recent re-introductions or introductions to the wild; and sites for proposed re-introductions or introductions. Have these sites been identified in recovery plans?

N/A

For flora, and where applicable, for fauna, detail the location, land tenure, estimated number of individuals, area of occupancy, and condition of site for each known date, location or occurrence. More specific detail is expected for WA occurrences for taxa that are not endemic to WA.

Date of survey	Location Description (include coordinates of the site)	Land status	Number of mature individuals at location	Area of occupancy at location	Condition of site
8/1996	Canna	Road reserve	200 (estimate)	UNK	UNK
8/2010	Canna	Road reserve	750 (brief survey)	0.05	Good
12/2014	Canna	Road reserve	3200	0.19	Good
12/2014	Canna	Nature Reserve	300	0.01	Good

What is the total area of occupancy (in km²) for the species; explain how it was calculated and datasets used. If an accurate estimate is unavailable, provide a range of values or a minimum or maximum area estimate. Where separate breeding habitat is applicable, if possible, also provide area of breeding habitat.

The total area of occupancy for the species is 0.2 km². The population boundary was mapped using a handheld GPS giving this area of occupancy.

What is the extent of occurrence (in km²) for the species; explain how it was calculated and datasets used. If an accurate estimate is unavailable, provide a range of values or a minimum or maximum area estimate.

This species is only known from a single subpopulation. The extent of occurrence is therefore the same area as the area of occupancy at 0.2km².

Identify important occurrences necessary for the long-term survival and recovery of the species? This may include: key breeding populations, those near the edge of the range of the species or those needed to maintain genetic diversity.

Given that the species is known from a single subpopulation, the population is key to maintaining the long-term survival and genetic diversity of the species.

Is the distribution of the species severely fragmented? Why?
No. <i>Hypocalymma</i> sp. Cascade is known from a single subpopulation.
Is the taxon subject to extreme fluctuations? If so, provide evidence.
Not that is known. Surveys of the subpopulation have not shown any major fluctuations in plant numbers in the main population area. The only exception is a decline in plant numbers as a result of road maintenance activities in 2014 which destroyed ca. 50 plants in the road reserve.
Has there been any known decline in the species within WA or nationally, or is this likely in the future? – provide details in relation to the elements detailed below, including how the decline has been measured or inferred. Is there a presumption of continuing decline? If so, provide details of the decline and how it relates to the specific Red List Categories and Criteria version 3.1.
Note: A continuing decline is a recent, current or projected future decline (which may be smooth, irregular or sporadic) which is liable to continue unless remedial measures are taken. Fluctuations will not normally count as continuing declines, but an observed decline should not be considered as a fluctuation unless there is evidence for this. (IUCN 2001) Refer to Red List Guidelines 9.0
There has been a minor decline as a result of road maintenance works (see below).
Has there been a decline in the size of the population (number of mature individuals)?
There has been a decline in the number of mature individuals and as a result of road maintenance activities which has removed plants from the road reserve. In 2014 road maintenance works removed ca. 50 plants. At the time the species was listed had a priority status therefore there were no legal requirements for a permit to take.
- can the rate of population size reduction be determined over the last 10 years or 3 generations (whichever is the longer)? If so, state whether the determination is based on quantitative data (observed), estimated (provide data and calculations), inferred or suspected.
No
- can the rate of population size reduction be estimated for the next 10 years or 3 generations and in any 10 year or 3 generation period (up to a maximum of 100 years into the future)? If so, state how the reduction is estimated (provide data and calculations), inferred or suspected.
No
Has there been a decline in the number of locations, extent of occurrence or area of occupancy?
There has been a minor decline in the area of occupancy as a result of road maintenance activities where some plants which occur on the road reserve have been cleared.
Has there been a decline in the area or quality of habitat?
There has been no decline in the majority of its habitat.
4.2. Survey effort
Describe the methods to conduct surveys. For example, season, time of day, weather conditions; length, intensity and pattern of search effort (including where species not encountered); any limitations and expert requirements.
The majority of surveys were carried out during the peak flowering time, however the plant is easily identifiable and surveys at other times of the year could be undertaken. Surveys involved walking transects through areas of potential habitat as well as vehicle based searches. Some search areas were limited by access issues particularly areas of potential habitat in unallocated crown land (UCL) in the west where there are limited access tracks.
Provide details on the distinctiveness and detectability of the species, or the distinctiveness of its habitat, that would assist survey success.
The species can be easily distinguished by its flowers, which are the largest in the genus (B. Rye, pers.

comm. 2014).

Has the species been reasonably well surveyed? Provide an overview of surveys to date (include surveys of known occurrences and surveys for additional occurrences) and the likelihood of its current known distribution and/or population size being its actual distribution and/or population size. Include comments on potential habitat and surveys that were conducted, but where the species was not present/found.

1996 - Collected by R. Bruhn in August 1996, with 200 plants estimated in the area.

2010 – Surveyed in August 2010 by E. Adams, C. Turley and J. Ford with a rough population boundary mapped and collections made for the Western Australian Herbarium.

2013 - Opportunistic survey by Jason Holmes, a Wildflower Society volunteer, on a road reserve 7km north of the existing subpopulation. A specimen was collected however, the location description was vague and unable to be relocated.

2014 – A detailed survey was carried out in December 2014 by E. Massenbauer (nee Adams), S. Butler and M. Hoggart with the population boundary accurately mapped and plants numbers estimated based on extrapolation from fifteen 10 x 10m plots.

Surveys of potential habitat.

Hypocalymma sp. Cascade occurs on Oldfield 1 Subsystem soils on mallee scrub (Open Shrub Mallee over Low Heath / Low Scrub B). These areas were mapped to indicate potential habitat areas.

There were 3 main areas identified from this process containing potential habitat, these included Nature Reserves and an area of UCL to the west which has limited access tracks.

2008 – Surveys of Unallocated Crown Land (UCL) to the west were carried out by E. Adams and M. Hoggart. Surveys involved a combination of vehicle based searches and walking transects and any tracks/cleared lines. No plants were located. There is extremely limited access through this area of UCL making surveys difficult. However, given that the species has been known to occur on edges of disturbed tracks/roads, it would seem likely that it would have been detected.

2010 – Surveys of a Nature Reserve, by E. Adams. This involved vegetation transects through suitable habitat, however no plants were located.

2013 – Further surveys were carried out by J. Waters within the UCL, including tracks and cleared lines to the north. No *Hypocalymma* sp. Cascade plants located.

2014 – Surveys of a Nature Reserve by E. Massenbauer, S. Butler and M. Hoggart in December 2014. Whilst these areas were mapped as potential habitat, ground truthing revealed that the vegetation was slightly different to that where the only known population occurs, with a higher density of shrub mallee. Several transects were traversed through the vegetation but no plants located.

4.3. Threats

Identify past, current and future threats indicating whether they are actual or potential. For each threat describe:

- how and where they impact this species**
- what the effect of the threat(s) has been so far (indicate whether it is known or suspected)**
- present supporting information/research**
- does it only affect certain populations?**
- what is its expected effect in the future (is there supporting research/information; is the threat only suspected; does it only affect certain populations?).**

If possible, provide information threats for each current occurrence/location:

Location	Past threats	Current threats	Potential threats	Management requirements (see section 4.4)
Canna	Road maintenance	Road	Road	

		maintenance	maintenance	
Canna		Inappropriate fire	Inappropriate fire	
Canna	Single catastrophic event	Single catastrophic event	Single catastrophic event	
Identify and explain why additional biological characteristics particular to the species are threatening to its survival (e.g. low genetic diversity). Identify and explain any models addressing the survival of the species.				
4.4. Management Identify key management documentation for the species e.g. recovery plans, conservation plans, threat abatement plans etc.				
N/A				
Does this species benefit from the management of another species or community? Explain.				
No.				
How well is the species represented in conservation reserves or covenanted land? Which of these are actively managed for this species? Provide details.				
There is limited security of tenure with more than 95% of the only known population occurring on a road reserve.				
Are there any management or research recommendations that will assist in the conservation of the species? Provide details.				
<ul style="list-style-type: none"> • Monitor subpopulation for evidence of grazing impacts, or changes in plant or site health; • Collect seed from the subpopulation and store at Parks and Wildlife Threatened Flora Seed Centre; • Liaise with Shire of Esperance to ensure the species is not accidentally damaged or destroyed during road maintenance, and the habitat is maintained in a suitable condition for the conservation of the species; • Develop and implement a fire management strategy, including the need for, and method of, the construction and maintenance of firebreaks; • Undertake surveys in areas of potentially suitable habitat and confirm the Rollond Road subpopulation; • Install Threatened Flora markers within the road reserve once the subpopulation is confirmed to protect individuals from road maintenance activities; • Establish new subpopulations through translocation into disease-free areas; • Manage weed incursions if detected from monitoring; • Modes of regeneration (e.g. seeder or re-sprouter) and post-fire response; • Population and seed bank dynamics. 				
4.5. Other Is there any additional information that is relevant to consideration of the conservation status of this species?				
SECTION 5. NOMINATOR				
Nominator(s) name(s)				
Organisation(s)				
Address(s)				
Telephone number(s)				
Email(s)				
Date		19/1/2015. Updated by Species and Communities Branch 7/3/2017.		

If the nomination has been refereed or reviewed by experts, provide their names and contact details.

SECTION 6. REFERENCES

What references or sources did you use to prepare your nomination? Include written material, electronic sources and verbal information. Include full references, address of web pages and the names and contact details of authorities with whom you had verbal communications.

- Florabase: <http://florabase.dec.wa.gov.au>
- Craig, G.F & Coates, D.J. (2001) *Declared Rare and Poorly Known Flora in the Esperance District*, Wildlife Management Program No 21, Department of Conservation and Land Management, Australia.