

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 angustifolium</i> subsp. Hutt River (S.Patrick 2982)
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:			
<i>Scientific committee Meeting date:</i>			
<i>Scientific committee comments:</i>			
<i>Recommendation:</i>			
<i>Ministerial approval:</i>		<i>Date of Gazettal/ Legislative effect:</i>	

Nomination/Proposal summary (to be completed by nominator)

Current conservation status				
Scientific name:	<i>Hypocalymma angustifolium</i> subsp. Hutt River (S.Patrick 2982)			
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	2010	Vulnerable	D2
		5/4/2017	Endangered	B1ab(iii,v)+2ab(iii,v)
	2.			
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:	Since the previous assessment in 2010, several visits were made to Subpopulation 2, however no plant counts were undertaken. Although no counts have been undertaken at the subpopulations since from 2003 to 2007, their status is not expected to have changed significantly.			
<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:	<i>Hypocalymma longifolium</i> is listed under the EPBC Act. This species was listed in WA, but in 2009 a taxonomic review determined that part of this species belonged to a new taxon <i>H. angustifolium</i> subsp. Hutt River (S. Patrick 2982). This nomination proposes the assessment and listing of <i>H. angustifolium</i> subsp. Hutt River while still retaining the separate listing of <i>Hypocalymma longifolium</i> as Vulnerable D1 as there are less than 1000 mature individuals, and the population appears stable.			

<p><i>H. angustifolium</i> subsp. Hutt River</p> <p>It is not possible to determine whether the total population size of <i>H. angustifolium</i> subsp. Hutt River has increased or declined since the assessment in 2010, as no accurate plant counts have been undertaken. However the habitat within which the subspecies occurs is highly threatened by road and firebreak maintenance, weeds, pigs, water erosion, hydrological changes and fire. This may directly and indirectly contribute to a decline in the area, extent and/or quality of habitat in the subpopulation. Road maintenance, upgrading and subsequent erosion of the reserve at Subpopulation 2 have resulted in damage to individuals. Long term root exposure in the subspecies will likely cause an overall decline in individual numbers. Without ongoing management a projected decline is expected. Meets criteria for Endangered B1ab(iii,v)+B2ab(iii,v).</p>		
<p>Nominated national conservation status: category and criteria</p>		
<p>Presumed extinct (EX) <input type="checkbox"/> Critically endangered (CR) <input type="checkbox"/> Endangered (EN) <input checked="" type="checkbox"/> Vulnerable (VU) <input type="checkbox"/></p>		
<p>None (least concern) <input type="checkbox"/> Data Deficient <input type="checkbox"/> Conservation Dependent <input type="checkbox"/></p>		
<p>What are the IUCN Red List criteria that support the recommended conservation status category?</p>		<p>EN: B1ab(iii,v)+2ab(iii,v)</p>
<p>Eligibility against the IUCN Red List criteria (A, B, C, D and E)</p>		
<p><i>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.</i></p>		
A.	Population size reduction (evidence of decline)	<ul style="list-style-type: none"> Insufficient information is available to reliably show rate of decline. Unable to assess
B.	Geographic range (EOO and AOO, number of locations and evidence of decline)	<ul style="list-style-type: none"> (B1) EOO <5,000km². Using Minimum Convex Polygon (MCP) the EOO is estimated as 500km², which was calculated by drawing a polygon around the outer most subpopulations. (B2) AOO <500km². The estimated AOO is 20km² using the 2km x 2km grid method. (a) Severely fragmented and known from two geographically isolated locations which have no common overriding threat, one in the Yerina Springs/Hutt River area and the other 200km to the southeast in the Arrino area. Subpopulations 2 to 5 within one location are linked by continuous vegetation remnants. (b) Continuing decline observed and projected: (iii) The habitat within which the subspecies occurs is highly threatened by road and firebreak maintenance, weeds, pigs, water erosion, hydrological changes and fire. The large extent of clearing in the Northampton Shire has resulted in increased surface runoff and groundwater recharge. The subspecies occurs in permanently damp springs and swamps along a river, which makes it particularly susceptible to future changes to hydrology and water quality. It is suspected that these impacts may directly and indirectly contribute to a decline in the area, extent and/or quality of habitat in the subpopulations. (v) Road maintenance and upgrade at Subpopulation 2 have resulted in damaged to individuals in the past, with 14 plants destroyed in

		<p>2007. An increase in water runoff at Subpopulation 2 has resulted in sections of the road reserve eroding away causing root exposure in individuals and probable future road maintenance. Long term root exposure in the subspecies will likely cause an overall decline in individual numbers.</p> <ul style="list-style-type: none"> Meets criteria for EN: 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 13,539 mature individuals. Does not meet criterion
D.	Very small or restricted population (population size)	<ul style="list-style-type: none"> (D) The subspecies is known from approximately 13,539 mature individuals in total. (D2) The number of locations ≤ 5 Meets criteria for VU:D2
E.	Quantitative analysis (statistical probability of extinction)	<ul style="list-style-type: none"> No information to assess.

Summary of assessment information

EOO	500km ² (MCP)	AOO	20km ² (2km x 2km grid). Extrapolated area of subpopulations ~0.27km ²	Generation length	Unknown
No. locations	2	Severely fragmented	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/>		
No. subpopulations	5	No. mature individuals	13,539		
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)
<p>Water erosion</p> <ul style="list-style-type: none"> Water runoff from the road has resulted in sections of the road reserve eroding away, causing root the exposure in the subspecies and many other species. 	Subpopulation 2	Severe
<p>Hydrological changes</p> <ul style="list-style-type: none"> Extensive clearing for agriculture in the area is likely to have increased surface runoff and recharge of the groundwater. The subspecies occurs in permanently damp springs and swamps along a 	Whole population	Catastrophic

<p>river, which are susceptible to waterlogging and an increase in salinity.</p> <p>Future</p>		
<p>Road and firebreak maintenance</p> <ul style="list-style-type: none"> Threats include grading, chemical spraying, construction of drainage channels, and slashing of road and firebreak vegetation. These disturbance events also encourage weed invasion. Individuals at Subpopulation 2 have been damaged during road upgrading in the past. <p>Past, current, future</p>	Subpopulations 2 and 5	Severe
<p>Weeds</p> <ul style="list-style-type: none"> Weeds, including grasses, melon (<i>Citrullus lanatus</i>), <i>Typha</i> sp. and nightshade (<i>Solanum</i> sp.) are present at Subpopulation 2. Weeds suppress early plant growth by competing for soil moisture, nutrients and light. They also increase the fire hazard. Grading, stock movement, slashing and spraying greatly promote weeds. <p>Current, future</p>	Subpopulation 2	Catastrophic
<p>Feral pigs</p> <ul style="list-style-type: none"> Pigs are having a major impact on the habitat through digging, trampling and breaking foliage while moving through the area. Increased nutrient levels from droppings may occur and result in weed invasion. <p>Current, potential</p>	Subpopulations 4 and 5, potential to all subpopulations	Severe
<p>Altered fire regimes</p> <ul style="list-style-type: none"> It is not certain how the subspecies 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. <p>Current and future</p>	Whole population	Severe
Management and Recovery		
Is there a Recovery Plan (RP) or Conservation Management Plan operational for the species?		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<p>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).</p> <ul style="list-style-type: none"> Phillimore, R. and English, V. (2001) Long-leaved Myrtle (<i>Hypocalymma longifolium</i>) Interim Recovery Plan 2001–2004. Interim Recovery Plan No. 88. Department of Conservation and Land Management, Western Australia. (Subpopulation 2 in this IRP was re-determined as <i>H. angustifolium</i> subsp. Hutt River, however the remainder of the IRP refers to <i>H. longifolium</i>). 		
List current management or research actions, if any, that are being undertaken that benefit the conservation of the species.		

- Monitoring and surveys have been carried out to determine plant numbers and impact of threats;
- Threatened flora roadside markers have been installed at Subpopulations 2 and 3;
- Seed was collected in 2005 and 2007, and stored at Parks and Wildlife Threatened Flora Seed Centre.

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.

Management

- Monitor subpopulations for evidence of pig activity, or changes in plant or site health;
- Develop and implement a drainage strategy at Subpopulation 2;
- Liaise with the Shire of Northampton and private property owners to ensure the subspecies is not accidentally damaged or destroyed during road and firebreak maintenance, and the habitat is maintained in a suitable condition for the conservation of the subspecies;
- Develop and implement a fire management strategy, including the need for, and method of, the construction and maintenance of firebreaks;
- Control weeds at Subpopulation 2;
- Undertake feral pigs control at Subpopulations 4 and 5 on private property;
- Install Threatened flora markers at Subpopulation 5 along the firebreak if required to protect individuals from upgrading of firebreaks;
- Undertake surveys in areas of potentially suitable habitat and confirm subpopulation on private property;
- Protect remnant vegetation on private property through conservation covenant and/or land acquisition;
- Establish new subpopulations through translocation into disease-free areas.

Research

- Research biology and ecology of the subspecies, with a focus on pollination effectiveness, seed viability, conditions required for natural germination, response to threats and disturbances and reproductive biology.

Nomination prepared by:

Contact details:

Date submitted:

28/3/2017

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

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	Area of Subpopulation	Site / habitat Condition	Threats (note if past, present or future)	Specific management actions
Subpopulation*: north of Arrowsmith River, Arrino *Subpopulation yet to be confirmed in the field and therefore has not been allocated a number.	Private property	2005: 2-5 individuals	Not recorded	Not recorded	Not recorded	Undertake survey and monitoring Liaise with landowner
Subpopulation 2a-c: SW of Binnu.	Shire road reserve; private property; water reserve	1991: 1,000+ 1995: 10,000+ 2003: ~10,000	~24ha	Healthy. Water runoff from the road resulted in erosion.	Road maintenance (past, present, future) Weeds (past, present, future) Water erosion (past, present, future) Hydrological changes (future) Fire (future) Pigs (future) Climate change (future)	Liaise with landowners Control weeds Develop and implement a drainage management strategy Develop a fire management plan Collect seed and test viability, conduct regeneration trials Control pigs if required Implement translocations Improve security through conservation covenants
Subpopulation 3: SW of Binnu.	Shire road reserve	2007: 1	1m ²	Poor. Plant was almost dead when last surveyed in 2007.	Road maintenance (past, present, future) Hydrological changes (future)	Liaise with local shire Develop a fire management plan

					Fire (future) Climate change (future)	Collect seed and test viability, conduct regeneration trials Implement translocations
Subpopulation 4a-c: S of Binnu.	Private property	2007: 1,533	~0.42ha	Healthy	Pigs (present, future) Hydrological changes (future) Fire (future) Climate change (future)	Liaise with landowners Develop a fire management plan Collect seed and test viability, conduct regeneration trials Control pigs if required Implement translocations Improve security through conservation covenants
Subpopulation 5: S of Binnu.	Private property	2007: 2,000	2.6ha	Healthy	Firebreak maintenance (past, present, future) Hydrological changes (future) Fire (future) Climate change (future)	Install threatened flora markers Liaise with landowners Develop a fire management plan Collect seed and test viability, conduct regeneration trials Implement translocations Improve security through conservation covenants



Department of
Environment and Conservation

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Form to nominate a Western Australian species for listing as threatened, change of category or delisting 2010 (updated 2017).

NOTICE: Incomplete forms may result in delays in assessment, or rejection of the nomination. To fill out this form you must refer to the Guidelines and contact the relevant Officer in the DEC Species and Communities Branch. DEC staff can advise you on how to fill out the form and may be able to supply additional, unpublished information.

Answer all relevant sections, filling in the white boxes and indicating when there is no information available. **Note**, this application form applies to both flora and fauna species, and hence some questions or options may not be applicable to the nominated species – for these questions, type “N/A”.

To mark boxes with a **cross**, double click the box and select not checked or checked.

SECTION 1. NOMINATION					
1.1. Nomination for:					
Flora <input checked="" type="checkbox"/>	Fauna <input type="checkbox"/>	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 this is not possible, use unpublished names or numbers of voucher specimens.					
<i>Hypocalymma angustifolium</i> subsp. Hutt River (S. Patrick 2982).					
1.3. Common Name					
If the species has a generally accepted common name, please show it here. This name will be used on all official documentation.					
There is no common name for this subspecies.					
1.4. Current Conservation Status. If none, type ‘None’.					
	IUCN Red List Category e.g. Vulnerable		IUCN Red List Criteria e.g. B1ab(iv);D(1)		
International IUCN Red List	None		None		
National EPBC Act 1999	None		None		
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"/>	None

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 ☒ Yes ☐

Does the species have specific protection (e.g. listed on an annex or appendix) under any other legislation, inter-governmental or international arrangements e.g. CITES? If Yes, please provide details.

No ☒ Yes ☐

1.5. Nominated Conservation Status.

	IUCN Red List Category e.g. Vulnerable	IUCN Red List Criteria e.g. B1ab(iv);D(1)
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"/>	

1.6. Reasons for the Nomination.

Briefly summarise the reasons for the nomination in dot points. Please include details relevant to the IUCN Categories and Criteria where appropriate.

This taxon was previously recognised as *Hypocalymma longifolium* (DRF – En:B1+2ce). In September 2009 all specimens of *Hypocalymma longifolium*, except those from one subpopulation, were assigned to the phrase name *Hypocalymma angustifolium* subsp. Hutt River (S. Patrick 2982).

Specimens from the four subpopulations of *Hypocalymma longifolium* located at Yerina Springs were re-identified as *Hypocalymma angustifolium* subsp. Hutt River (S. Patrick 2982). After re-identification of a specimen of *Hypocalymma angustifolium* one extra subpopulation was also assigned to *Hypocalymma angustifolium* subsp. Hutt River (S. Patrick 2982). The nomination seeks to add this newly described taxon to the DRF schedule as Endangered due to:

- The extent of occurrence being 500km²
- There are only 5 known subpopulations.
- The habitat within which the subspecies occurs is highly threatened by road and firebreak maintenance, weeds, pigs, water erosion, hydrological changes and fire. The large extent of clearing in the Northampton Shire has resulted in increased surface runoff and groundwater recharge. The subspecies occurs in permanently damp springs and swamps along a river, which makes it particularly susceptible to future changes to hydrology. It is suspected that these impacts may directly and indirectly contribute to a decline in the area, extent and/or quality of habitat in the subpopulations.
- Road maintenance and upgrade at Subpopulation 2 have resulted in damaged to individuals in the past. An increase in water runoff at Subpopulation 2 has resulted in sections of the road reserve eroding away causing root exposure in individuals. Long term root exposure in the subspecies will likely cause an overall decline in individual numbers.

Hypocalymma longifolium was retained as Vulnerable under criterion D1 as there are less than 1000 mature individuals and the population appears stable.

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.
<p>After taxonomic revision by Rye and Keighery, the TSSC in 2006 agreed to recognise <i>Hypocalymma angustifolium</i> subsp. <i>longifolium</i> at the species level and list under <i>Hypocalymma longifolium</i>. Further work by Keighery proposes several new taxa of <i>Hypocalymma</i>. As a result, 3 new phrase names under <i>H. angustifolium</i> have been recognised by the WA Herbarium in September 2009.</p> <ul style="list-style-type: none"> • <i>H. angustifolium</i> subsp. Swan Coastal Plain (G.J. Keighery 16777) • <i>H. angustifolium</i> subsp. Dandaragan Plateau (S. Patrick 702A) • <i>H. angustifolium</i> subsp. Hutt River (S. Patrick 2982) <p><i>Hypocalymma longifolium</i> still remains current with only one known subpopulation. The other four subpopulations at Yerina Springs have now been assigned to <i>Hypocalymma angustifolium</i> subsp. Hutt River. During the review of other specimens, one other <i>Hypocalymma angustifolium</i> specimen/occurrence from Arrino has also been assigned to <i>H. angustifolium</i> subsp. Hutt River.</p>
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 <input type="checkbox"/> Yes <input checked="" type="checkbox"/>
Describe any known hybridisation with other species in the wild, indicating where this occurs and how frequently.
No known hybridisation occurs with other species in the wild.
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).
<p><i>Hypocalymma angustifolium</i> subsp. Hutt River (S. Patrick 2982) has not been formally published and described yet, but Keighery has noted that it is a very large shrub, with leaves slender, linear, triquetrous, usually incurved or straight, leaves normally more than 40mm long (DEC 2010).</p>

2.3. Distribution

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

Hypocalymma angustifolium subsp. Hutt River (S. Patrick 1982) mostly occurs around the Yerina Springs - Hutt River area, approximately 450km NNW of Perth, Western Australia. Another subpopulation occurs approximately 200km south-east of this in the Arrino area approximately 280km north of Perth, Western Australia.

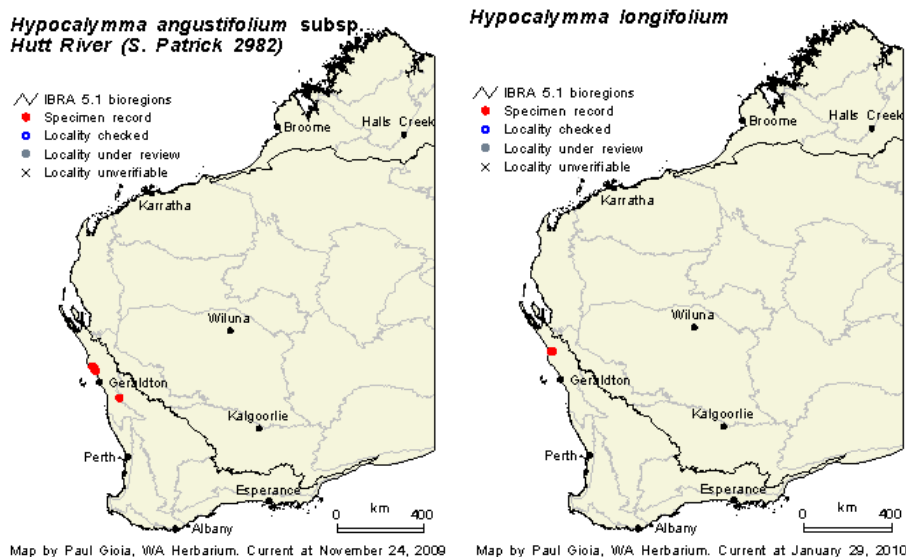


Figure 1. Locations of subpopulations of *Hypocalymma angustifolium* subsp. Hutt River (left) and *H. longifolium* (right) in Western Australia.

2.4. Habitat

Describe the non-biological habitat (e.g. aspect, topography, substrate, climate) and biological habitat (e.g. forest 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.

Non-biological habitat

Hypocalymma angustifolium subsp. Hutt River (S. Patrick 1982) grows in permanently damp springs and swamps, in low heath and sedges (DEC 2010).

Biological habitat

Hypocalymma angustifolium subsp. Hutt River (S. Patrick 1982) grows in low heath with *Grevillea leucopteris*, *Melaleuca* sp., *Hibbertia* sp., *Acacia* sp., and *Banksia* sp. (DEC 2010).

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?

Hypocalymma angustifolium subsp. Hutt River (S. Patrick 1982) is associated with the listed species *Diuris drummondii* (VU) as they both occur at the location of Subpopulation 2. Subpopulations 2 and 3 also occur within the buffer of the “Kalbarri ironstone community”, a Priority Ecological Community (priority 1) (however it is unlikely to be associated with it).

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?
According to specimen information, flowering occurs in August and September for <i>Hypocalymma angustifolium</i> subsp. Hutt River (S. Patrick 2982) (DEC 2010).
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).
Unknown.
Questions 2.7 and 2.8 apply to fauna 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.
This subspecies is endemic to Western Australia.
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					
4.1. Population What is the total population size in terms of number of mature individuals? Has there been any known reduction in the size of the population, or is this likely in the future? – provide details. 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><i>Hypocalymma angustifolium</i> subsp. Hutt River (S. Patrick 2982) is known from five subpopulations with approximately 13,539 mature individuals (DEC 2010). Road maintenance and upgrade at Subpopulation 2 have resulted in damaged to individuals in the past. An increase in water runoff at Subpopulation 2 has resulted in sections of the road reserve eroding away causing root exposure in individuals. Long term root exposure in the subspecies will likely cause an overall decline in individual numbers. Subpopulation 3 has one plant which was last recorded in 2007, however this plant was observed to be in decline, being nearly dead with only a few new shoots on it. It is assumed that there has been a reduction in the subpopulation size at this site as only one plant is currently recorded at the site. Subpopulations 1, 4 and 5 do not have enough monitoring information to assess a change in subpopulation size (DEC 2010).</p>					
Provide locations of: captive/propagated occurrences or <i>ex situ</i> collections; recent re-introductions to the wild; and sites for proposed re-introductions. Have these sites been identified in recovery plans?					
<p>Seed has been collected by Parks and Wildlife Threatened Flora Seed Centre in 2005 and 2007.</p>					
How many locations do you consider the species occurs in and why? Where a species is affected by more than one threatening event, location should be defined by considering the most serious plausible threat.					
<p><i>Hypocalymma angustifolium</i> subsp. Hutt River (S. Patrick 2982) occurs in five subpopulations at two disjunct locations.</p>					
For <u>flora</u>, and where applicable, for <u>fauna</u>, detail the location, land tenure, estimated number of individuals, area of occupancy, and condition of site for each known date, location or occurrence.					
Date of survey	Location	Land status	Number of individuals at location	Area of occupancy at location	Condition of site
11/08/2005	1) Arrino	Private property	2-5 individuals	Not recorded.	Requires survey and monitoring.
10/09/2003	2A) SW of Binnu	Shire road verge	10,000 (2A, 2B and 2C)	Not recorded.	Healthy
10/09/2003	2B) SW of Binnu	Private property	See 2A.	Not recorded.	Healthy
10/09/2003	2C) SW of Binnu	Unvested Crown reserve (water)	See 2A	Not recorded.	Healthy
14/12/2007	3) SW of Binnu	Shire road verge	1 (almost dead)	1m ²	Poor
2/08/2007	4A) S of Binnu	Private property	1,500	3600m ²	Healthy

2/08/2007	4B) S of Binnu	Private property	22	600m ²	Healthy
2/08/2007	4C) S of Binnu	Private property	11	Not recorded.	Healthy
13/08/2007	5) S of Binnu	Private property	2,000	26000m ²	Healthy

Has the number of individuals been counted, or is this an estimate? Provide details of the method of determining the number of individuals.

The number of individuals has been counted by estimation at Subpopulations 2A, 2B, 2C, 4A and 5. Actual counts were made for Subpopulations 3, 4B and 4C. No monitoring of Subpopulation 1 has occurred as it was only recently identified as *Hypocalymma angustifolium* subsp. Hutt River.

Has there been any known reduction in the number of locations, or is this likely in the future? – provide details.

There may be a future reduction in the number of subpopulations as the single plant located at Subpopulation 3 was recorded as nearly dead in 2007, and hence the maintenance of this subpopulation will be dependent on the regeneration of the subspecies at this site. There is potential for a future reduction in the number of locations as the habitat between Rare Flora Markers at Subpopulation 2A was cleared in 2001 to create road verge drains. Although no actual plants were destroyed or damaged, subsequent erosion has resulted in root exposure of individuals which will likely lead to an overall decline in numbers. In 2007 the same population was damaged by machinery resulting in 14 plants dead and 23 damaged (DEC 2010).

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. Include estimates of past, current and possible future extent of occurrence. If available, include data that indicates the percentage decline over 10 years or 3 generations (whichever is longer) that has occurred or is predicted to occur.

The extent of occurrence is approximately 500km². The extent of occurrence is calculated by drawing a polygon around the outer most populations (with no internal angle exceeding 180 degrees) and calculating the area using the GIS programme ARCmap.

Is the distribution of the species severely fragmented? Why?

The distribution of this species is considered to be fragmented as Subpopulation 1 occurs approximately 200km south-east of the other subpopulations, and much of the intervening vegetation has been cleared. The other subpopulations are all relatively closely grouped together within 10km (DEC 2010).

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.

All subpopulations are considered necessary.

4.2. Survey effort

Describe the methods to conduct surveys. For example, (e.g. season, time of day, weather conditions); length, intensity and pattern of search effort (including where species not encountered); any limitations and expert requirements.

Surveys for *Hypocalymma angustifolium* subsp. Hutt River (S. Patrick 2982) have been carried out during spring time, when flowering occurs. Surveys have been concentrated along the Hutt River as this is where the potential habitat for this subspecies occurs, and these surveys were conducted in a systematic way (DEC 2010).

Provide details on the distinctiveness and detectability of the species, or the distinctiveness of its habitat, that would assist survey success.
All known subpopulations for this subspecies occur in swampy permanently damp areas (DEC 2010).
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.
<p>This subspecies has been reasonably well surveyed with the majority of the potential habitat for this species along the Hutt River having been surveyed. Details of the surveys to date include:</p> <ul style="list-style-type: none"> • A large area along the Hutt River was surveyed for this subspecies in spring 2007, as this is where the potential habitat for this subspecies occurs. All of the western side of the river in this area was surveyed from the rivers edge to approximately 60 metres in from the edge. The survey completed on one private property location and adjacent parts of a Water Reserve was surveyed by two Parks and Wildlife district staff with the assistance of eight Greencorp team members. The remaining area was surveyed by two Parks and Wildlife district staff members. During these surveys Subpopulations 4A, 4B, 4C and 5 were discovered. • Areas along the Hutt River on private property were surveyed for this subspecies in 2004 by a Parks and Wildlife district staff member. No plants were found. • The new subpopulation at Arrino which occurs further south than the other subpopulations has only been recorded from one WA herbarium record in 2005 (originally determined as <i>Hypocalymma angustifolium</i>) and further monitoring of this subpopulation is needed to ascertain the subpopulation's size. The potential habitat between this subpopulation and the Yerina Springs subpopulations is unknown. No known targeted surveys in this area have been undertaken however the entity has been listed as DRF since 1992, with no other records of this subspecies being located since that time.

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?).

Road works are a threat to the road verge subpopulations. The plants located at Subpopulation 2 have been observed to be damaged by machinery whilst the road was graded in the past. There are roadside markers in place at Subpopulation 2 and 3 to alert people working in the area as to the presence of the Flora. The plants at Subpopulation 5 are located close to a firebreak and so are also potentially threatened by firebreak maintenance activities (DEC 2010).

Weeds including grasses, melons (*Citrullus lanatus*), *Typha* sp. and nightshade (*Solanum* sp.) have been observed to be present at, and are thus a potential threat for Subpopulations 2A, 2B and 2C. Weeds suppress early plant growth by competing for soil moisture, nutrients and light (Phillimore and English 2001; DEC 2010).

Hydrological change and salinity is a potential threat for all subpopulations. The areas surrounding the subpopulations have been extensively cleared for agricultural use and so are likely to have increased the surface water runoff and recharge of the groundwater. Further clearing of the surrounding catchments has the potential to alter the hydrology of the area and threaten the subpopulation. Water erosion has been observed at Subpopulation 2A as water runoff from the road has resulted in sections of the road reserve eroding away, causing roots to become exposed in many species including *Hypocalymma angustifolium* subsp. Hutt River (S. Patrick 2982) (Phillimore and English 2001; DEC 2010).

Pigs are known to be present at the locations of Subpopulations 4A, 4B, 4C and 5. It is not thought that the pigs are actually grazing on *Hypocalymma angustifolium* subsp. Hutt River (S. Patrick 2982) however the damage caused by pigs to the surrounding habitat can be significant including digging, trampling and breaking foliage while moving through the area. The owner of the private property where Subpopulation 4 is located is already undertaking some feral pig control (DEC 2010).

Limited habitat is also a threat to this subspecies as the habitat for this plant appears to be restricted to areas of the Hutt River. All of the areas along the Hutt River containing suitable habitat are on private property. These areas have very limited access and are surrounded by large scale cleared land (DEC 2010).

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

Location	Past threats	Current threats	Potential threats	Management requirements (see section 4.4)
2A		Road works and water erosion.	Grazing, weeds, and hydrological change	
2B,2C			Grazing, weeds and hydrological change	
3		Road works	Hydrological change.	
4A, 4B and 4C			Pigs and hydrological change.	

5			Firebreak maintenance, roadworks, pigs and hydrological change.	
<p>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.</p> <p>Unknown.</p>				
<p>4.4. Management Identify key management documentation for the species e.g. recovery plans, conservation plans, threat abatement plans etc.</p> <p>There are no management documents for this subspecies. There is an Interim Recovery Plan for <i>Hypocalymma longifolium</i> which was written when Subpopulation 2 was still considered this taxon, the other subpopulations first identified as <i>Hypocalymma longifolium</i> and now assigned to <i>Hypocalymma angustifolium</i> subsp. Hutt River (S. Patrick 2982) had not been discovered at the time of preparing this Plan.</p> <ul style="list-style-type: none"> Long-Leaved Myrtle (<i>Hypocalymma longifolium</i>) Interim Recovery Plan No. 88: 2001-2004 (Phillimore, R and English, V 2001). 				
<p>Does this species benefit from the management of another species or community? Explain.</p> <p>Subpopulation 2 of <i>Hypocalymma angustifolium</i> subsp. Hutt River (S. Patrick 2982) occurs in the same location as a subpopulation of <i>Diuris drummondii</i> (VU) and so would benefit from the management of this subspecies.</p>				
<p>How well is the species represented in conservation reserves or covenanted land? Which of these are actively managed for this species? Provide details.</p> <p>There are no subpopulations of <i>Hypocalymma angustifolium</i> subsp. Hutt River (S. Patrick 2982) located on conservation reserves or covenanted land.</p>				
<p>Are there any management or research recommendations that will assist in the conservation of the species? Provide details.</p> <p>The recovery actions listed in the IRP for <i>Hypocalymma longifolium</i> that pertain to Subpopulation 2 of <i>Hypocalymma angustifolium</i> subsp. Hutt River (S. Patrick 2982) and which would now also apply to the other subpopulations include:</p> <ul style="list-style-type: none"> Undertake weed control at Subpopulation 2; Undertake feral animal control, this would be relevant to Subpopulations 4 and 5 which are threatened by feral pigs. The owner of the private property where Subpopulation 4 is located is already undertaking some feral pig control; Collect seed and cutting material; Seek measures to achieve conservation management of subpopulations located on private property. Possible measures include developing a management plan in consultation with the land managers, covenanting and acquiring the land; Develop and implement a drainage strategy for Subpopulation 2; Monitor the subpopulations regularly to ascertain their health and status of threatening processes that are present; Liaise with relevant land managers; Obtain biological and ecological information. 				

4.5. Other	
Is there any additional information that is relevant to consideration of the conservation status of this species?	
No.	
SECTION 5. NOMINATOR	
Nominator(s) name(s)	
Organisation(s)	
Address(s)	
Telephone number(s)	
Email(s)	
Date	Updated by Species and Communities Branch 20/3/2017
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.	
<p>DEC (2010) FloraBase website, WA Herbarium http://florabase.dec.wa.gov.au</p> <p>Department of Environment and Conservation (DEC) (2010), Records held in Department of Environment and Conservation's Declared Flora Database and rare flora files. WA Department of Environment and Conservation.</p> <p>Long-Leaved Myrtle (<i>Hypocalymma longifolium</i>) Interim Recovery Plan No. 88: 2001-2004 (Phillimore, R & English, V 2001).</p>	