

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 sylvestre</i>
Nomination for (addition, deletion, change):	Addition
Nominated conservation category and criteria:	EN: B1ab(iii)+B2ab(iii)

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:	<i>Hypocalymma sylvestre</i>			
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	2012	Critically Endangered	B2ab(iii)
	2. WA	29/9/2016	Endangered	B1ab(iii)+B2ab(iii)
	3.			
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 2011.			
<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:	Assessment is consistent and criteria remains current to 2016 assessment. Does not meet CR under B1 or B2 as number of locations 5, and AOO calculated as 16km ² . Meets EN under criteria B1ab(iii)+B2ab(iii).			
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?		B1ab(iii)+B2ab(iii)			
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"> There is not enough survey data 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) Using Minimum Convex Polygon (MCP) the EOO is 17.3 km² which was calculated by drawing a polygon around the plants. (B2) Estimated AOO using the 2km x 2km grid method is 16 km². (a) Known from 5 locations, 4 are in larger areas of remnant vegetation (and hence not severely fragmented) and one scattered across cleared agricultural land. (b) Continuing decline observed and projected: (iii) Ongoing threats to habitat condition and extent from clearing, fence and firebreak construction and maintenance, fire, stock, weeds, poor recruitment, loss of habitat and a drying climate. Meets criteria for Endangered B1ab(iii)+B2ab(iii) 			
C.	Small population size and decline (population size, distribution and evidence of decline)	<ul style="list-style-type: none"> Known from 14,236 mature individuals in total. There is not enough survey data to determine any population trends, despite observed decline in habitat condition. Does not meet criterion 			
D.	Very small or restricted population (population size)	<ul style="list-style-type: none"> There are 14,326 mature individuals in total. Does not meet criterion 			
E.	Quantitative analysis (statistical probability of extinction)	<ul style="list-style-type: none"> No information to assess. 			
Summary of assessment information					
EOO	17.3 km ² (MCP)	AOO	16 km ² (2 km x 2 km grid).	Generation length	-
No. locations	5	Severely fragmented	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>		
No. subpopulations	5	No. mature individuals	14,236		
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>Clearing</p> <ul style="list-style-type: none"> Subdivision development threatens populations through removal of vegetation for fuel reduction zones, fence and firebreak installation. <p>Current and future</p>	Whole population	Catastrophic
<p>Fence and firebreak construction and maintenance</p> <ul style="list-style-type: none"> Grading, chemical spraying, construction of drainage channels and the mowing of vegetation for fence and firebreak construction and maintenance. <p>Past, current and future</p>	Part subpopulations (if subpopulations are subdivided)	Severe
<p>Stock</p> <ul style="list-style-type: none"> Stock (sheep and cattle) cause suppression of growth and erosion and compaction of the soil. Most of the private property locations are currently destocked but may change in the future. <p>Past, future</p>	Whole population	Severe
<p>Altered fire regimes</p> <ul style="list-style-type: none"> The species appears to regenerate from basal and epicormic growth suggesting a fire response. The species occurs in fire prone areas where landowners may implement inappropriate fire management regimes to decrease fuel loads, to the detriment of the species. Destocking has resulted in an increase in biomass of annual weedy species, particularly grasses which has contributed to a high fuel load and fire risk. Fire is likely to facilitate further weed invasion and should be followed up with appropriate weed control. <p>Past, current and future</p>	Whole population	Severe
<p>Grazing of habitat (kangaroos)</p> <ul style="list-style-type: none"> Surrounding habitat is being heavily grazed by kangaroos, which may impact on the <i>H. sylvestre</i> in the long-term through loss of critical habitat. <p>Past, current and future</p>	Whole population	High
<p>Weeds</p> <ul style="list-style-type: none"> <i>Arctotheca calendula</i>, <i>Ursinia anthemoides</i> and <i>Romulea rosea</i> may form a dense ground cover on cleared agricultural areas. Weeds suppress early plant growth by competing with the species and its associated vegetation for soil 	Subpopulation in cleared areas	Severe

<p>moisture, nutrients and light. They also exacerbate grazing pressure and increase the fire hazard due to the easy ignition of high fuel loads, which are produced annually by many grass weed species. Grassy weeds such as <i>Avena fatua</i> occur in close proximity to all populations and have potential for invasion as reduced grazing increases seed load and thus penetration into uninfested areas.</p> <p>Past, current and future</p>		
<p>Loss of habitat</p> <ul style="list-style-type: none"> Subpopulations that occur in cleared agricultural areas with little natural vegetation to provide a buffer for the species from the impact of stock or other threats. <p>Potential</p>	Whole population	High
<p>Drought</p> <ul style="list-style-type: none"> This is a threat to the species if it occurs over a number of years. <p>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"> Department of Parks and Wildlife (2016 DRAFT) <i>Hypocalymma sylvestre</i> Interim Recovery Plan 2016–2021. Interim Recovery Plan No. #. Department of Parks and Wildlife, Western Australia. 		
<p>List current management or research actions, if any, that are being undertaken that benefit the conservation of the species.</p> <ul style="list-style-type: none"> Liaison with private land owners to protect remnant vegetation on which the species occurs; Monitoring and surveys have been carried out to determine plant numbers and impact of threats. 		
<p>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.</p> <p>Management</p> <ul style="list-style-type: none"> Identify appropriate intensity and interval of fire to promote seed germination and/or vegetation regeneration and assist private landholders in developing appropriate fire management plans for their populations and in collaboration with neighbours; Notify new land owners in newly subdivided estates of <i>H. sylvestre</i> populations and encourage development of management plans for this species including implementing weed control to reduce suppression/competition and fire fuel load; Raise awareness of <i>H. sylvestre</i> in local community (eg. Providing local property owners with fact sheets and organising field days in conjunction with known industry or community interest groups); Minimise adverse impacts from land use at known sites, suitably managing access on private land, strategic fencing to keep out stock, ensure fencing and firebreak installation/maintenance activities do not adversely affect populations; 		

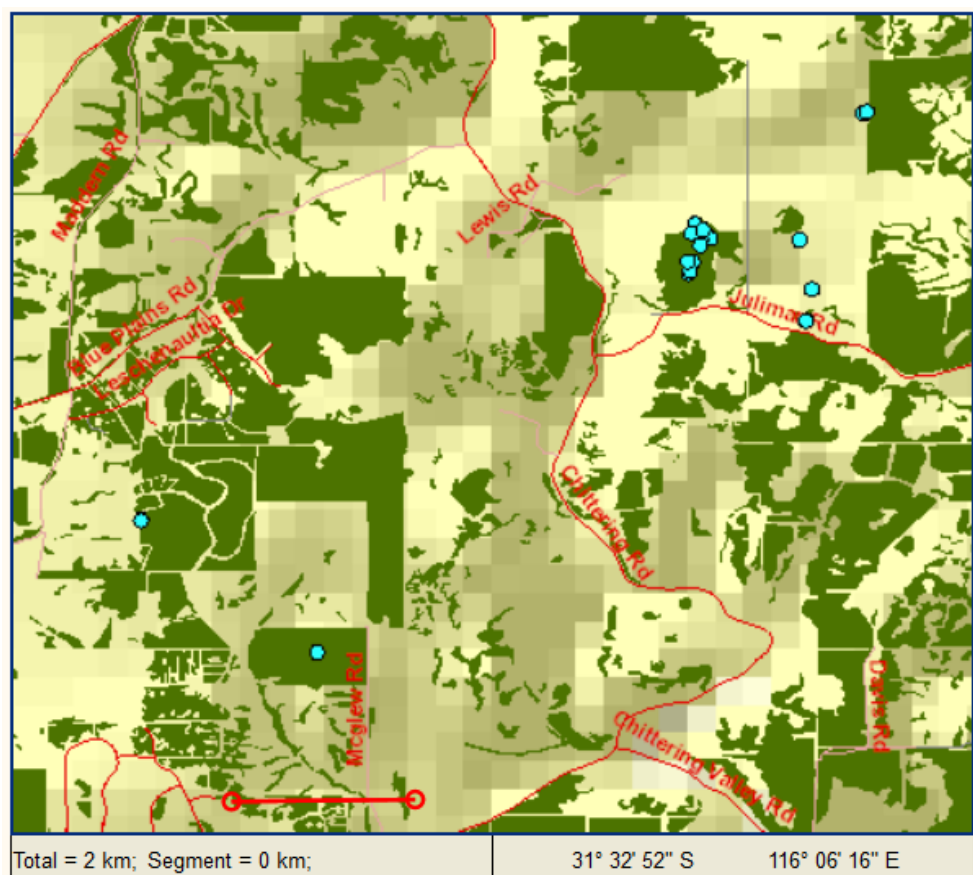
- Investigate formal conservation arrangements, management agreements and covenants on private land, and investigate inclusion in reserve tenure if possible;
- Ensure existing restrictive covenants on *H. sylvestre* populations are upheld;
- Survey potential habitat in Chittering Springs Estate, private properties with remnant Wandoo woodland between Locations 1 and 3 and survey new populations which are unsurveyed;
- Identify if a drying climate, summer drought events or other causes are responsible for die-off observed in populations on slopes with N & E aspect;
- Collect and store seeds to guard against the extinction of natural populations. Collections should aim to sample and preserve the maximum range of genetic diversity possible;
- Develop a translocation proposal and select a disease free translocation site;
- Map habitat critical to the survival of the species to facilitate its protection and appropriate management.

Research

- 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.

Nomination prepared by:	
Contact details:	
Date submitted:	12/9/2016
<i>If the nomination has been refereed or reviewed by experts, please provide their names and contact details:</i>	

Occurrences of *Hypocalymma sylvestre* with remnant vegetation and conservation estate



Summary of subpopulation information (detailed information to be provided in the relevant sections of the form)						
Location (include coordinates)	Land tenure	Survey information: Date of survey and No. mature individuals	Area of subpopulations	Site / habitat Condition	Threats (note if past, present or future)	Specific management actions
Private property Lots 8 and 9 Julimar Rd; Lot 5 Chittering Road, Chittering	Private property	1998: locally common 2006: 524 2011: 3,827	7.85 ha	Good, historically grazed by stock.	Clearing (present, future) Fence and firebreak construction and maintenance (past, present, future) Stock (past, future) Fire (past, present, future) Grazing (past, present, future) Road maintenance (past, present) Weeds (past, present, future) Climate change (future)	Improve security of tenure Ensure fenceline and firebreaks installed around subpopulations Develop a fire management plan Collect seed and test viability, conduct regeneration trials Install fencing to prevent grazing, trampling Revegetate with native species Undertake weed control
Private property Lot 1 Julimar Rd; Lot 113 Valley View Road, Chittering	Private property	2011:2844	14.4ha	Completely degraded (mostly cleared paddock with few shrubs).	Clearing (present, future) Fence and firebreak construction and maintenance (past, present, future) Stock (past, future) Fire (past, present, future) Grazing (past, present, future) Road maintenance (past, present) Weeds (past, present, future) Climate change (future)	Ensure fenceline and firebreaks installed around subpopulations Develop a fire management plan Collect seed and test viability, conduct regeneration trials Install fencing to prevent grazing, trampling Revegetate with native species Undertake weed control

Private property, Lots 1 and M2116 Julimar Road, Hillstream Estate, Chittering	Private property	2011: 8,674	15.4 ha	Healthy, large remnant area of bushland	Clearing (present, future) Fence and firebreak construction and maintenance (past, present, future) Stock (past, future) Fire (past, present, future) Grazing (past, present, future) Weeds (past, present, future) Climate change (future)	Improve security of tenure Ensure fenceline and firebreaks installed around subpopulations Develop a fire management plan Collect seed and test viability, conduct regeneration trials Install fencing to prevent grazing, trampling Revegetate with native species Undertake weed control
Private property, Lots 550 and 551, Chittering Springs Estate	Private property	2011: 198	0.1575 ha	Healthy but adjacent subdivision	Clearing (present, future) Fence and firebreak construction and maintenance (past, present, future) Stock (past, future) Fire (past, present, future) Grazing (past, present, future) Weeds (past, present, future) Climate change (future)	Improve security of tenure Ensure fenceline and firebreaks installed around subpopulations Develop a fire management plan Collect seed and test viability, conduct regeneration trials Install fencing to prevent grazing, trampling Revegetate with native species Undertake weed control
Private property Lot 9003 McGlew Road, Lower Chittering	Private property	2007: -	-	Healthy, large remnant area of bushland	Clearing (present, future) Stock (past, future) Fire (past, present, future) Grazing (past, present, future)	Improve security of tenure Ensure fenceline and firebreaks installed around subpopulations Develop a fire management

					Climate change (future)	plan Collect seed and test viability, conduct regeneration trials Install fencing to prevent grazing, trampling
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Department of
Environment and Conservation

Our environment, our future



Form to nominate a Western Australian species for listing as threatened, change of category or delisting 2012 (Updated 2016).

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 ☒ Fauna ☐ Threatened / DRF ☒ Change of category ☐ Delisting ☐

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.

Hypocalymma sylvestre Strid & Keighery

1.3. Common Name

If the species has a generally accepted common name, please show it here.

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	
National EPBC Act 1999	None	
State of Western Australia	Critically Endangered	B2ab(iii)
State of WA Priority	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>	

1.5. Nominated Conservation Status.

	IUCN Red List Category e.g. Vulnerable	IUCN Red List Criteria e.g. B1ab(iv);D(1)
State of Western Australia	Critically Endangered	B1ab(iii)+B2ab(iii)
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.

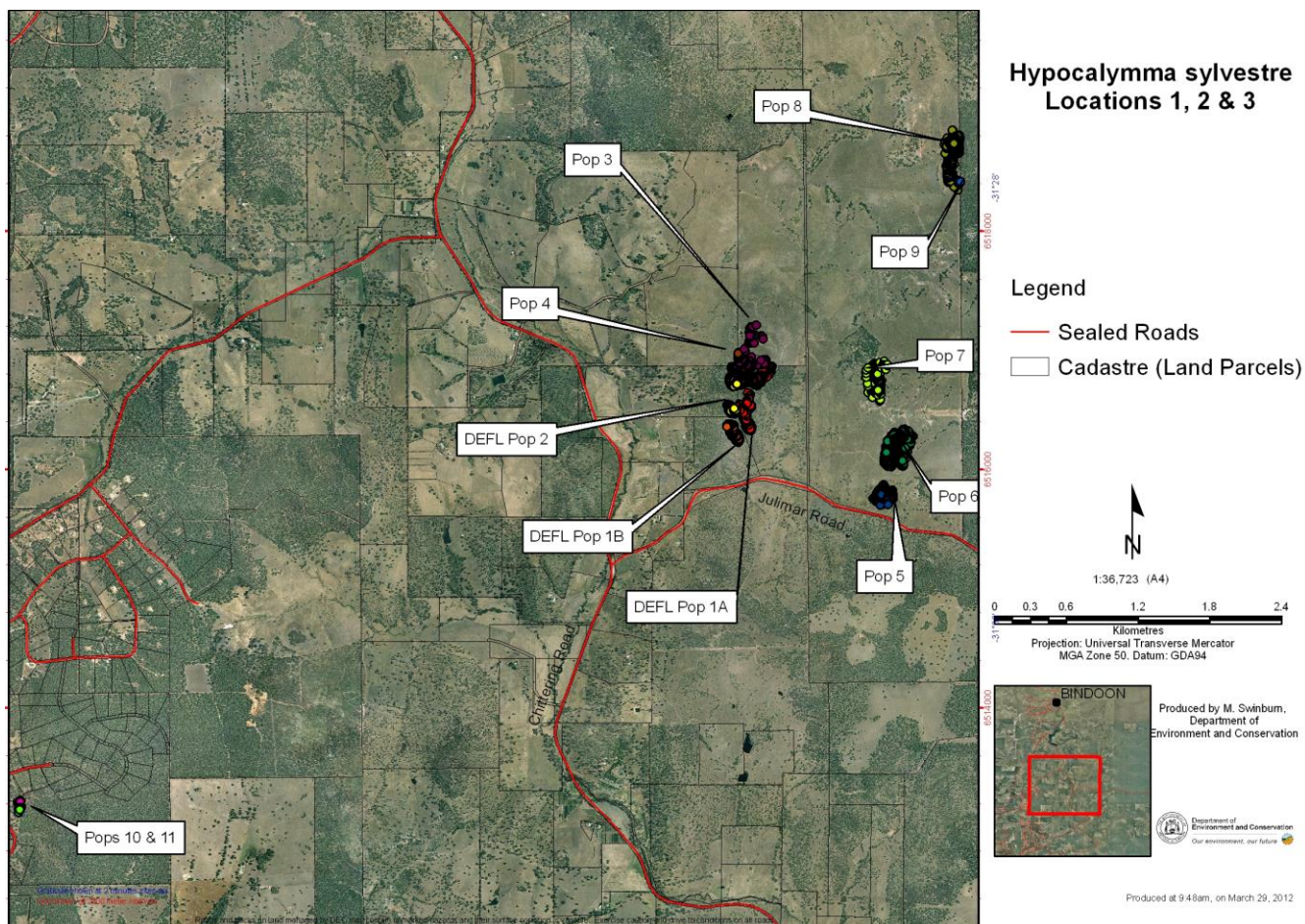
No ☒ Yes ☐

<p>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.</p>
<ul style="list-style-type: none"> • All known populations on private land and threatened with continuing decline in quality of habitat due to wildfire, weed competition, land management activities, habitat incursion and a drying climate.
<ul style="list-style-type: none"> • Extent of occurrence < 100 km² (calculated extent of occurrence = 3.6 km²) and area of occupancy <10 km² (calculated area of occupancy =0.267 km²).
<ul style="list-style-type: none"> • There are 3 locations which are severely fragmented with a total of approximately 14,000 mature individuals.
<ul style="list-style-type: none"> • The Julimar, Bindoon, Chittering area has been extensively surveyed by DEC staff & volunteers and other organisations with no new locations found.
<p>SECTION 2. SPECIES</p>
<p>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>
<p><i>Hypocalymma sylvestre</i> was first collected in 1998 by Mike Hislop and described in 2002 by Strid & Keighery in Nordic J.Bot. 22:558 (2002) where it is referred to as <i>H. sylvestris</i> sp. nov. <i>Hypocalymma</i> sp. Chittering (T. Palmer 1) is a taxonomic synonym (Florabase 2011).</p> <p>The holotype specimen is held in Western Australian Herbarium: Perth 05202825. Locality: Remnant bushland on private property (Lot 9 Julimar Road, Chittering) ca 23kms from intersection with Chittering Road (this should read 2.3kms), 10 October 1998, T. Palmer 29.</p> <p>Possession of reniform seeds distinguishes this genus from sections of the closely related genus, <i>Baeckea</i>. It is further distinguished from the genus <i>Rinzia</i> (the closest relative of <i>Hypocalymma</i>) in having numerous, exserted stamens with basifixed anthers and terete flattened filaments. <i>H. sylvestre</i> is a distinct species most closely related to <i>H. tetrapterum</i>, differing in the elliptic, V-shaped imbricate leaves with a pungent apex (Strid & Keighery 2002).</p>
<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).</p>
<p>No <input type="checkbox"/> Yes <input checked="" type="checkbox"/></p>
<p>Describe any known hybridisation with other species in the wild, indicating where this occurs and how frequently.</p>
<p>Unknown</p>
<p>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>
<p>Spreading to erect, much-branched shrub reaching 80cm in height. Stout virgate branches, glabrous throughout. Twigs quadrangular, narrowly winged, ash-grey, becoming straight, slender +/- terete, with conspicuous leaf scars below, densely leafy above. Leaves imbricate, ovate-elliptic, c. 5x4mm, flat to slightly V-shaped, glandular-punctate, margins with a line of hairs, apex acute-pungent. Flowers subsessile, solitary or paired in leaf axils, the whorls usually distinctly separate. Bracts leaf-like, bracteoles suborbicular, c. 2mm, scarious. Calyx lobes short, c. 2x2mm, rounded, green entire. Petals, broadly ovate, c.4x4mm, denticulate, white or pale cream. Stamens c. 60, equalling petals; filaments connate only at very base, white or pale cream. Ovary depressed-pyramidal, without a central depression around the style, 3-ribbed, 3-celled with 2-3 ovules per cell. Style exceeding petals. Seeds +/- reinform, c. 1.6x1.0mm, with large rows of minute pits, medium brown (Strid & Keighery 2002).</p>

2.3. Distribution

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

Hypocalymma sylvestre is endemic to Western Australia and the South West Botanical Province (Florabase 2011). Known from a few (n=5) collections on the Dandaragan Plateau in the Chittering Valley 70km NE of Perth and ~10 km south of Bindoon. A very localised species found in 12 sub-populations (reassessed as 4 subpopulations in 2016) entirely on private lands (Figure below).



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

Known from steep ironstone-quartz and lateritic slopes and ridges in brown to yellow loamy sand. Occurs on all aspects of slopes in areas deeply to moderately dissected by gullies.

Annual mean rainfall is 663 mm with the lowest mean temperature of 18.2°C falling in July and the maximum mean temperature of 33.1°C falling in February. (BOM 2011).

Biological habitat

Open Powderbark Wandoo (*Eucalyptus accedens*) woodland with occasional *Corymbia calophylla*. Open shrubland understorey typically comprised of *Xanthorrhoea acanthostachya*, *Kunzea*, *Hibbertia lasiopus*, *H. hypericoides*, *Hakea lissocarpa*, *Gastrolobium spinosum*.

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

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

This species does not occur within any Threatened Ecological Community boundaries. <i>Gastrolobium crispatum</i> (Priority 1) occurs within the remnant woodland population (DEFL Pop 1A).
2.5. Reproduction Provide an overview of the breeding system. For <u>fauna</u>: 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 <u>flora</u>: 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?
<i>Hypocalymma sylvestre</i> flowers August to November with peak flowering August-September, setting fruit in October-November. European honey bees were observed visiting flowers however time was not devoted to observing native pollinators (Pers. obs M. Swinburn). The flower configuration is very basic, and Mike. Hislop suggests that in regard to pollination it is likely to be a generalist (M. Hislop pers. comm. 29/11/2011).
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).
Population dynamics unknown. Minimal information was collected on population structure (age) however very difficult to distinguish seedlings from basal regeneration in field.
Questions 2.7 and 2.8 apply to <u>fauna</u> nominations only
2.7. Feeding Summarise food items or sources and timing/availability.
Briefly describe feeding behaviours, including those that may make the species vulnerable to threatening processes.
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.
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.
The species is endemic to Western Australia.
Provide an overview of the global population size, trends, threats and security of the species outside of Australia.
Not present outside Australia.
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).

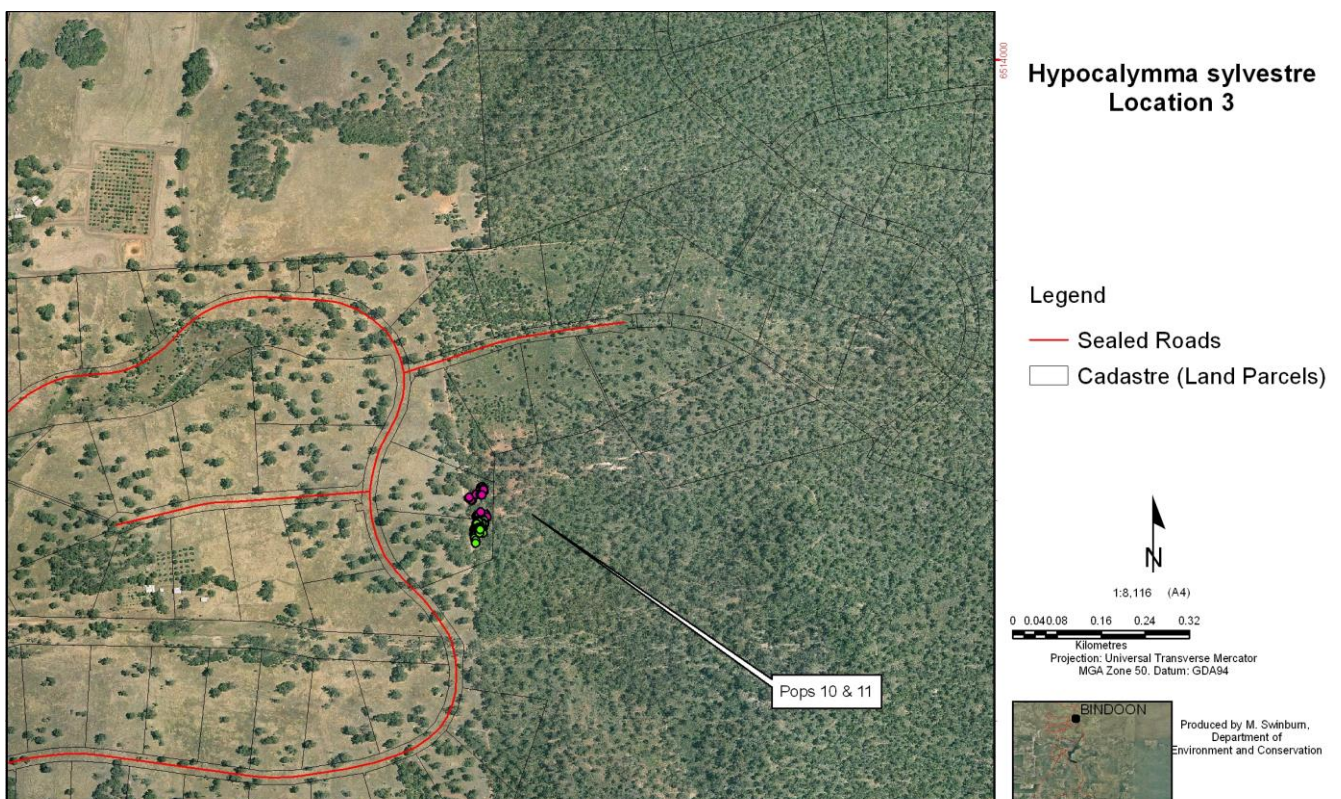
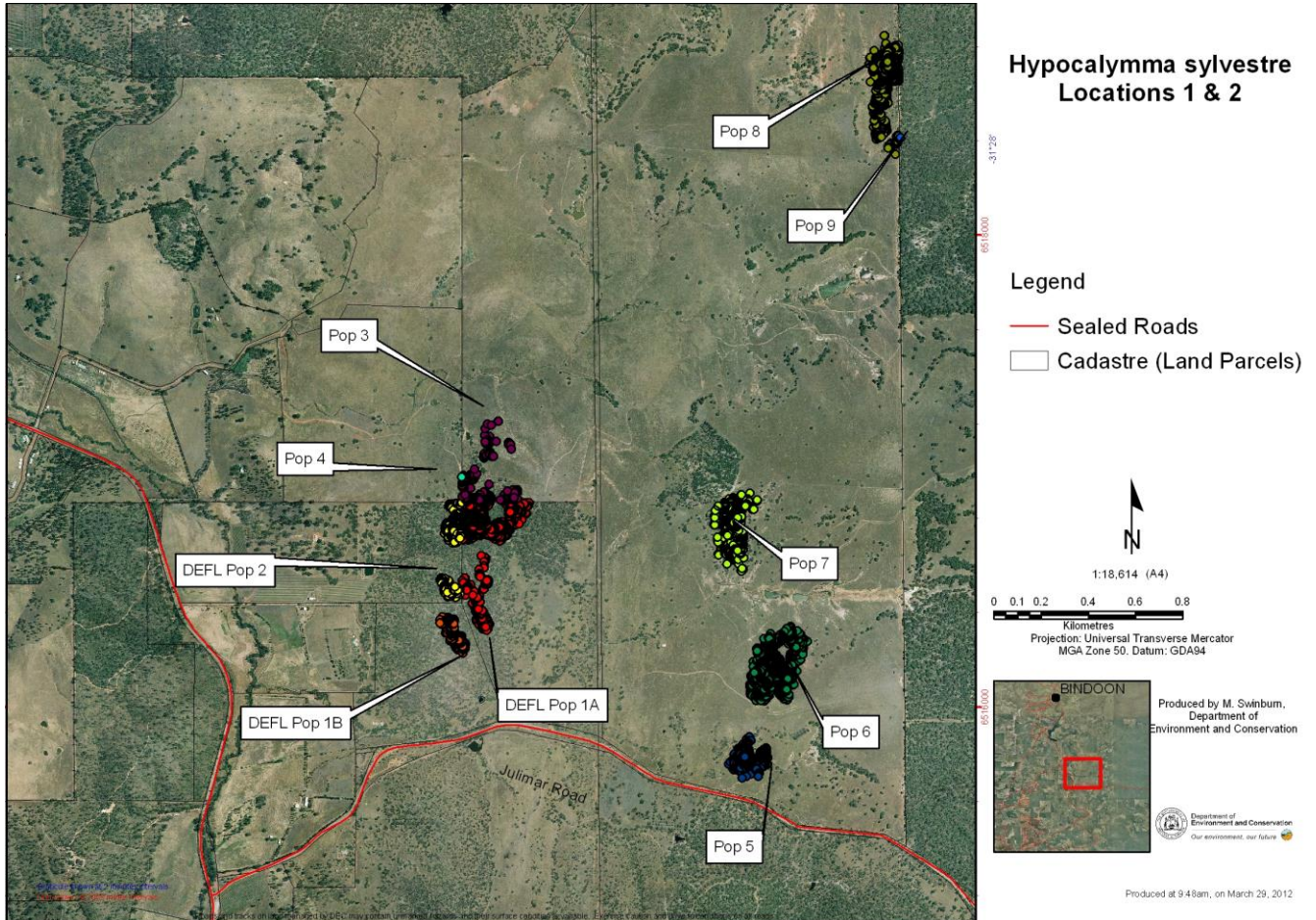
The approximate total population size exceeds 14,000 mature individuals. Previous population estimates were underestimated so there is not enough survey data to determine any trends in the populations. There has been historical reduction in population size on account of the large amount of clearing that has occurred in the Chittering Valley. Incremental loss of mature individuals is likely due to increasing development pressures (subdivisions) and wildfire on lands on which this species occurs (see section 4.3).

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

No seed has been collected for *ex situ* preservation (A. Crawford pers.comm 19/12/2011). No specimens have been propagated *ex situ* by Kings Park (A. Shade pers.comm 2/12/2011). No recovery plans currently cover this species.

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.

3 locations. Location 1 encompasses the populations occurring in remnant woodland on private properties off Julimar Road and Chittering road (DEFL Pops 1A, 1B & 2) and two continuous populations on adjacent cleared land (Pops 3 & 4) (referred in 2016 as TPFL 1d and 1e) where frequent high intensity fires are likely. Location 2 encompasses the regenerated populations occurring on cleared agricultural land in Hillstream Chittering Estate (Pops 5, 6, 7, & 8) (referred in 2016 as TPFL 4a-h, 5a,b) and one adjacent population in remnant woodland (Pop 9) (referred in 2016 as TPFL 5c) where land management activities, wildfire and habitat incursion are threats (Figure of Locations 1 & 2 below). Location 3 is the isolated population in Chittering Springs Estate (Pops 10 & 11) (referred in 2016 as TPFL 3a and b) occurring on two newly subdivided lots where land management activities are impacting the population (Figure of Location 3, below).



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.

(TPFL = Threatened Priority Flora database)

Date of survey	Location	Land status	Number of individuals at location (includes seedlings/ juveniles)	Area of occupancy at location	Condition of site
11/10/2011	TPFL Pop 1B: Lot 8 Julimar Road Chittering. 1.3kms E of Chittering Road (NE corner of property)	Private Property	448 (40 on 30/08/2006)	9000 m ²	Excellent
06/10/2011 & 08/12/2011	TPFL Pop 1A: Lot 9 Julimar Rd, Chittering. 1.6km E of Chittering Rd in remnant bushland (NW corner of property)	Private Property	~4000 + 439	34,000 m ² + 21,500 m ²	Excellent
28/06/2010 & 15/11/2011	TPFL Pop 2. Lot 5 (3208) Chittering Rd, Chittering. NE & SE corners of property	Private Property	1173 (150 on 18/08/2006) + 294	11,000 m ² + 6,000 m ²	Excellent
08/09/2011	Pop 3 / HS4 (TPFL 1d): Lot 1 Julimar Rd Chittering. 1.3km E Chittering Rd/Julimar Rd intersection. 950m N Julimar Rd (southern property boundary), 1.7km W of eastern property boundary. Adjacent to northern boundary of Lot 9. Continuous with DEFL Pop1A and DEFL Pop2.	Private Property	336	30,000 m ²	Degraded
08/09/2011	Pop 4 (TPFL 1e). Lot 113 Valley View Rd, Chittering. Eastern property boundary adjacent to HS4 on Lot 1 (Pop 3)	Private Property	1	1m ²	Completely degraded
15/09/2011	Pop 5 / HS1 (TPFL 4a,b): Lot 1 Julimar Rd Chittering. 2.5km E of Chittering Rd/Julimar Rd intersection. 100m N Julimar Rd (southern property boundary) and 600m W of eastern property boundary	Private Property	1229	17,000 m ²	Degraded
13/09/2011	Pop 6 / HS2 (TPFL 4c,d): Lot 1 Julimar Rd Chittering. 2.5km E of Chittering Rd/Julimar Rd intersection. 400m N Julimar Rd (southern property boundary) and 500m W of eastern property boundary	Private Property	~3500	54,000 m ²	Degraded
25/08/2011	Pop 7 / HS3 (TPFL 4e-h): Lot 1 Julimar Road, Chittering. 2.5km E Chittering Rd/Julimar Rd intersection. 1km N of Julimar Rd, 700m W of eastern property boundary	Private Property	1657	43,000 m ²	Degraded
06/09/2011	Pop 8 / HS5 (TPFL 5a,b): Lot 1 Julimar Rd, Chittering. 3.2km E Chittering Rd/Julimar Rd intersection. 3km N Julimar Rd (southern property boundary) spanning ~500m along eastern property boundary.	Private Property	2389	40,000m ²	Degraded
06/09/2011	Pop 9 (TPFL 5c). Lot M2116 (Lot 61 P49387 on Shire records) Julimar Rd, Chittering. 3.2km E Chittering Rd. 3km N Julimar road along western property boundary. Continuous with HS5 on Lot 1 (Pop 8).	Private Property	At least 10	unknown	Excellent
08/12/2011	Pop 10 (TPFL 3a). Lot 550 (156 Wisteria Way) Chittering Springs Estate. Continuous with Pop 11 on Lot 551.	Private Property	115 (20 plants in Nov 2005)	950 m ²	Very good
08/12/2011	Pop 11 (TPFL 3b). Lot 551 (132 Wisteria Way) Chittering Springs Estate. Continuous with Pop 10 on Lot 550.	Private Property	83	625 m ²	Very good

November 2005	Non-surveyd pop Chittering Springs Estate Lot 9501 Reserve	Private Property	?	?	unknown
Has the number of individuals been counted, or is this an estimate? Provide details of the method of determining the number of individuals.					
<p>Populations 3, 5, 6, 7, 8, 10, 11 & DEFL pops 1A, 1B & 2 were surveyed using a dGPS with each individual plant being recorded with an accuracy of +/- 1m. Due to time constraints and/or loss of satellites, not all individuals were able to be located and recorded in DEFL pop 1A and Pop 6. The majority of individuals were recorded so the estimation of total number should be considered accurate. Populations 4 & 9 were estimates as permission to access the properties had not been granted.</p>					
Has there been any known reduction in the number of locations, or is this likely in the future? – provide details.					
<p>There has not been any known reduction and nor is there likely to be a reduction in the number of locations</p>					
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.					
<p>The extent of occurrence for <i>H. sylvestre</i> was calculated as 3.6 km². The spatial information collected by dGPS during monitoring of <i>H. sylvestre</i> populations was analysed using GIS software. The EOO was derived by using the area calculation tool where the shortest continuous boundary was drawn to encompass all known occurrences. The spatial data (shapefiles) used are stored by Perth Hills District (Nat Cons) at T:\429-Perth Hills District\Shared Data\Threatened Flora Program\Threatened Flora Monitoring\Priority 1 Species\Hypocalymma sylvestre\.</p>					
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.					
<p>Continuing decline in the quality of habitat would indicate a predicted decline in the number of plants.</p>					
Is the distribution of the species severely fragmented? Why?					
<p>Fragmentation of the three locations and the 12 subpopulations (reassessed as 4 subpopulations in 2016) within is great due to the species growing on lateritic ridges and upper and mid slopes in a patchwork of remnant vegetation amongst cleared agricultural land. There is no continuous habitat between the three locations.</p>					
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.					
<p>All occurrences are considered necessary for the long term survival of this species, however the subpopulations occurring in remnant woodland (Location 1) are the most natural and extensive.</p>					

<p>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.</p>
<p>Survey effort has included targeted species surveys and opportunistic surveys by WA Herbarium Volunteer Research Associates and DEC volunteers Fred, Jean & Bert Hort (See Attachment 1). Jenny Borger, project officer from WWF's South West Australia Ecoregion Demonstration Area (SWAEDA) project has conducted surveys of 22 private properties in Bindoon and Toodyay areas (See Attachment 2). Andrew Waters, Principal Ecologist from Woodgis, has extensively surveyed DEC estate and private property in the Bindoon area for Bauxite Resources Ltd (Attachment 3). DEC staff (Vanessa Clark & Marnie Swinburn) have conducted targeted surveys on conservation estate, private properties and shire land (See Attachment 1). No new populations have been identified from targeted surveys. The only new populations have been identified from consultant environmental reports coming from two subdivision development proposals (Pops 3, 5, 6, 7, 10 & 11), opportunistic sightings of continuous populations between adjacent properties (Pops 4 & 9) and population extensions from known populations (DEFL Pops 1A & 2). The main limitations in surveying this species are gaining access/permission to private property and finding the very specific habitat in which the species occurs.</p>
<p>Provide details on the distinctiveness and detectability of the species, or the distinctiveness of its habitat, that would assist survey success.</p>
<p>The species has a fairly distinctive morphology and combined with the relatively open nature of its habitat, very easy to detect outside of its flowering period.</p>
<p>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>
<p>See Attachment 1</p>
<p>4.3. Threats Identify past, current and future threats indicating whether they are actual or potential. For each threat describe:</p> <ul style="list-style-type: none"> a). how and where they impact this species b). what the effect of the threat(s) has been so far (indicate whether it is known or suspected) c). present supporting information/research d). does it only affect certain populations? e). what is its expected effect in the future (is there supporting research/information; is the threat only suspected; does it only affect certain populations?).

Inappropriate fire regime: This species occurs in a fire prone area where increases in human population and thus an increased potential of fire-causing activities can affect all locations. Destocking has increased biomass of annual weedy species especially grasses which contributes to high fuel load and an increased fire risk for the species. The effects of frequent, high intensity wildfires are unknown, requiring further research to determine the potential impacts of wildfire on the known populations. Personal observations suggests the species can regenerate from basal and epicormic growth. A high intensity wildfire carried through the remnant woodland populations (DEFL Pops 1A, 1B & 2) in February 2004. The fire history is unknown for Locations 2 & 3.

Land management activities: Activities such as fence, track and firebreak construction and maintenance (clearing/slashing/herbicide) have impacted upon and will continue to impact Pops 10 & 11 in Location 3. Plants along the fenceline and firebreak have been suppressed (mechanically?) and consist only of the stunted stems of basal shoots. Approximately 30 plants are currently affected (approx 15% of the combined populations). It is also suspected that an emergency access way and drainage alongside both properties have taken plants during its construction that involved a large degree of earthworks. This access track and drainage has also isolated these small populations from the extensive adjacent woodland reserve and potential habitat.

The majority of populations in Location 2 (Pops 3, 5, 6, 7 & 8) have a 50m radius buffer with restrictive covenant and fencing applied for the building envelope. Shire fire management plans are suspected to override these covenants and of concern is a 100m hazard separation zone outlined in the development proposal which is a fuel reduced area and requires removal of fuel loads including shrubs. This has the potential to severely and continually affect approximately 2500 plants in Pop 8 and 300 plants in Pop 3. It is proposed that firebreaks should be installed around the perimeter of each population rather than along each property boundary, however this is only 'preferable' according to development plan. How this will be implemented on the ground by each landholder is unknown. Under shire policy no boundary fences are permitted in vegetation protection areas as per development plan without consent of the Chittering shire council. It is not known if boundary fencing will be requested or approved. If fencing and/or firebreaks are installed, Pops 3, 5, 6, 7 & 8 will be divided between at least 11 new properties with a significant but unknown number of plants being affected.

Fencing and firebreak construction and maintenance activities are suspected to have once affected the majority of Location 1 (DEFL Pops 1A, 1B & 2) but do not currently affect them as fence lines and firebreaks have been installed (the exception being Pop 3) and most are no longer used or maintained. If the properties that these populations occur on undergo subdivision in the future then the same threats will likely apply.

Habitat incursion: soil disturbance (trampling by stock), grazing by introduced stock, increased human population resulting in local population pressures (trampling, vegetation damage) are potential threats for Locations 2 & 3 (Pops 3, 5, 6, 7, 8, 10 & 11) that have been or are under subdivision.

It is suspected that grazing and trampling by introduced stock in Location 2 (Pops 3, 5, 6, 7 & 8) suppressed the growth of this species prior to the land being sold and largely destocked. A neighbour was running a small head of cattle on the property and some neglected sheep were still present at time of survey. The new subdivision allows grazing animals as per local planning policy, therefore there is a potential for introduced stock to damage/suppress growth if fenced covenants are ignored.

Current owners of remnant woodland populations in Location 1 (DEFL Pops 1A, 1B & 2) are amenable to keeping stock out of *H. sylvestre* populations or have no intention of running stock on their properties, but future owners may re-implement grazing in these areas. Perth Hills District assisted in providing fencing material for DEFL Population 2 to keep sheep out of environmentally sensitive area in which *H. sylvestre* occurs. The rocky slopes of remnant population are very sensitive and prone to erosion and compaction. Grazing and trampling by stock further impact these sensitive areas. As above, populations in Locations 2 & 3 (Pop 3, 5, 6, 7, & 8) should be fenced as per development plan and should therefore exclude stock or are unstocked. Grazing in Pops 10 & 11 is a potential threat unless fencing is erected between grazing land the *H. sylvestre* habitat. Current owners of Pop 10 not likely to allow grazing to damage plants however future owners may not be so inclined.

Weed Competition: weeds are present in varying concentrations in most populations. Pasture species such as *Arctotheca calendula*, *Ursinia anthemoides* & *Romulea rosea* etc. are in highest concentrations in the cleared agricultural populations of Locations 1 & 2 (Pops 3, 4, 5, 6, 7 & 8) and form a dense ground cover. Grassy weeds such as wild oats occur in close proximity to all populations and have potential for incursion as reduced grazing increases seed load and thus penetration into unfested areas. Weeds suppress early plant growth by competing for soil moisture, nutrients and light and severe infestation can result in habitat decline and displacement of native species. It is unknown if these or other species are likely to compete with *H. sylvestre* seedlings and reduce regeneration by seed. Location 2 populations were once suppressed by grazing but since the property was destocked the pasture weeds and *H. sylvestre* were able to flourish. *H. sylvestre* may have been able to take advantage of the low competition initially but whether the current competition now that these weeds have taken hold will suppress continued regeneration is unknown.

Drying Climate: In Pop 10, plants on NNE slope are showing die-off and subsequent basal and epicormic regeneration. Die-off and regeneration not as marked in Pop 11 which has a SSE aspect. Many plants in DEFL Pop 1B with E-NE aspect and DEFL Pop 1A with a N aspect also showing regeneration after die-off, but the die-off is not so pronounced on W aspect. As no fire has occurred in Location 1 since Feb 2004, it is possible that previous years of low rainfall and added exposure on N-E aspects could be affecting the species. This raises a potential threat with the outlook for SW Western Australia to experience an ongoing drying climate and requires further research.

If possible, provide information threats for each current occurrence/location:				
Location	Past threats	Current threats	Potential threats	Management requirements (see section 4.4)
Pops 5, 6, 7 & 8 (Location 2) (TPFL Pop 4a-h, 5a, 5b in 2016) Pop 3 (Location 1) (TPFL Pop 1d in 2016)	Grazing	Land management activities Wildfire Grazing Habitat incursion Weed Competition	Drying Climate	4.4.1 4.4.2 4.4.4 4.4.6
DEFL Pops 1A, 1B, 2 (Location 1)	Wildfire (2004) Grazing	Wildfire Weed Competition	Drying Climate Land management activities Habitat incursion	4.4.1 4.4.4 4.4.5 4.4.8
Pop 4 (not surveyed) (TPFL Pop 1e in 2016)	Grazing	Land management activities Wildfire Weed Competition	Drying Climate Grazing	4.4.1 4.4.2 4.4.4 4.4.7
Pop 9 (not surveyed) (TPFL Pop 5c in 2016)		Land management activities Wildfire Grazing	Drying Climate	4.4.1 4.4.2 4.4.4 4.4.5 4.4.7
Pop 10 & 11, Lot 9501 reserve Chittering Springs Estate (Location 3) (TPFL Pop 3a, 3b in 2016)	Habitat incursion	Land management activities Wildfire Weed Competition	Grazing Habitat incursion Drying Climate Weed Competition	4.4.1 4.4.2 4.4.4 4.4.5 4.4.7 4.4.8
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.				
Unknown				
4.4. Management Identify key management documentation for the species e.g. recovery plans, conservation plans, threat abatement plans etc.				
Draft interim recovery plan: <i>Hypocalymma sylvestre</i> Interim Recovery Plan 2016–2021. Interim Recovery Plan No. #. Department of Parks and Wildlife, Western Australia.				
Does this species benefit from the management of another species or community? Explain.				
This species does not benefit from the management of any other species or community.				
How well is the species represented in conservation reserves or covenanted land? Which of these are actively managed for this species? Provide details.				
Not known from any conservation reserve or covenanted lands. All occurrences are on freehold tenure.				
Are there any management or research recommendations that will assist in the conservation of the species? Provide details.				

1. Identify appropriate intensity and interval of fire to promote seed germination and/or vegetation regeneration and assist private landholders in developing appropriate fire management plans for their populations and in collaboration with neighbours
2. Notify new land owners in newly subdivided estates of *H. sylvestre* populations and encourage development of management plans for this species including implementing weed control to reduce suppression/competition and fire fuel load
3. Raise awareness of *H. sylvestre* in local community (eg. providing local property owners with fact sheets and organising field days in conjunction with known industry or community interest groups).
4. Minimise adverse impacts from land use at known sites, suitably managing access on private land, strategic fencing to keep out stock, ensure fencing and firebreak installation/maintenance activities do not adversely affect populations
5. Investigate formal conservation arrangements, management agreements and covenants on private land, and investigate inclusion in reserve tenure if possible.
6. Ensure existing restrictive covenants on *H. sylvestre* populations are upheld
7. Survey potential habitat in Chittering Springs Estate (including Lot 6501 reserve and 613 Swallow Lane), private properties with remnant Wandoo woodland between Locations 1 and 3 and survey new populations which are unsurveyed (Pops 4 & 9).
8. Identify if a drying climate, summer drought events or other causes are responsible for die-off observed in populations on slopes with N & E aspect.
9. Collect and store seeds to guard against the extinction of natural populations. Collections should aim to sample and preserve the maximum range of genetic diversity possible.
10. Develop a translocation proposal and select a disease free translocation site.
11. Map habitat critical to the survival of the species to facilitate its protection and appropriate management.

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

15 December 2011

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

Melanie Smith, Senior Botanist, Species & Communities Branch, DEC

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.

- Strid, A. and Keighery, G. J. (2002), A taxonomic review of the genus *Hypocalymma* (Myrtaceae). *Nordic Journal of Botany*, 22: 535–572.
- Declared Rare and Priority Flora Survey for Chittering Springs Estate Prepared by Nicole Siemon and Associates PL, January 2006 (DEC file SWN2004F0387V01)
- Western Australian Herbarium, Department of Environment and Conservation. Text used with permission (<http://florabase.dec.wa.gov.au>). Accessed on Tuesday, 29 November 2011.
- Bureau of Meteorology (2011) Observations were drawn from Gingin Aero {station 009178} approx. 22km away. www.bom.gov.au [Accessed 01 December 2011, 10.20am]
- Michael Hislop, Flora Conservation and Herbarium Program. Personal communication 29 November 2011 Ph: 9219 9126 Michael.Hislop@dec.wa.gov.au
- Andrew Crawford, Principal Technical Officer, Threatened Flora Seed Centre. Personal communication 19 December 2011 Ph. 9219 9063 andrew.crawford@dec.wa.gov.au
- Amanda Shade, Assistant Curator, Nursery, Botanic Gardens and Parks Authority. Personal communication 2 December 2011. Amanda.Shade@bgpa.wa.gov.au