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)**:**	***Androcalva bivillosa***
Nomination for (addition, deletion, change)**:**	**Addition**
Nominated conservation category and criteria:	**CR: C2(a)(i)**

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 ☐ No ☐
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:	*Androcalva bivillosa*			
Common name:	Straggling Androcalva			
Family name:	Malvaceae	Fauna ☐	Flora ☒	
Nomination for:	Listing ☒	Change of status/criteria ☐	Delisting ☐	

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	2014	Critically Endangered	B1ab(ii,iv)+B2ab(ii,iv), D
	2. WA	2016	Critically Endangered	B2ab(iii,v), C2(a)(i)
	3.			

Consistent with Schedule 1, item 2.7 (h) and 2.8 of the Common Assessment Method Memorandum of Understanding, it is confirmed that:	
• 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 ☒ No ☐
Comments:	
• surveys of the species were adequate to inform the assessment;	Yes ☒ No ☐
Comments:	Further surveys undertaken in 2014 and 2015 increased the estimate of subpopulation size from approximately 40 to 78 mature individuals. This is likely a result of further survey effort and response to disturbance rather than actual recovery.
• 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 ☒ No ☐
Comments:	Since the assessment in 2014, a number of inconsistencies have been corrected. The extent of occurrence is approximately 1159 km^2 (>100 km^2), therefore the species does not meet criterion B1 for critically endangered. A presumed decline in 2 subpopulations was discovered to be incorrect. Coordinates of a WA Herbarium collection (Subpopulation 5) were found to correspond to an existing subpopulation. Subpopulation 4 was found to have had an incorrect location description and was renumbered to be part of an existing subpopulation. Therefore criteria (ii and iv) no longer apply, however plant loss is predicted through habitat loss and hence criteria (iii and v) apply for CR: B2ab(iii,v). The number of mature individuals has increased to 78, therefore criterion D no longer

	applies for critically endangered. With projected decline in plant numbers, the species now meets criterion C2(a)(i) for critically endangered. This assessment was endorsed by WA TSSC in 2016

Nominated national conservation status: category and criteria

Presumed extinct (EX) ☐ Critically endangered (CR) ☒ Endangered (EN) ☐ Vulnerable (VU) ☐

None (least concern) ☐ Data Deficient ☐ Conservation Dependent ☐

What are the IUCN Red List criteria that support the recommended conservation status category?	**C2(a)(i)**

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)	• The taxon is thought to be a relatively short-lived disturbance opportunist, appearing following fire or soil disturbance and senescing sometime following maturity. Therefore the meaningful extent of any decline in plant numbers is difficult to quantify – hence criterion A has not been applied. • **Not able to apply criteria**
B.	Geographic range (EOO and AOO, number of locations and evidence of decline)	• (B1) Using Minimum Convex Polygon (MCP) the EOO is approximately 1159km^2 which was calculated by drawing a polygon around the subpopulations. • (B2) Area of Occupancy is estimated as 28 km^2 using the 2km x 2km grid method. Area occupied habitat is 0.042 km^2 or 4.2 hectares. • (a) The species is severely fragmented as the subpopulations occur within the extensively cleared northern Wheatbelt. The largest subpopulation has less than 50% of mature individuals • (b) Continuing decline observed and projected: • (iii) Continuing decline in the area of habitat at the road reserve subpopulations with vegetated area narrowing from road widening. • (v) Approximately 12 plants are to be removed in further major road works proposed for the North West Coastal Highway in 2016. Further loss of mature individuals likely. • **Meets criteria for Endangered B1ab(iii,v) + B2ab(iii,v)**
C.	Small population size and decline (population size, distribution and evidence of decline)	• (C) Known from 78 mature individuals in total. • The species is a disturbance opportunist and plant numbers fluctuate with an overall increase from 41 in 2014, to 78 in 2015, however, proposed roadworks will remove 12 plants and their habitat preventing recovery at that site. If management does not succeed in protection of the habitat it is likely that plant numbers will decline further due to ongoing road widening and maintenance. • Largest subpopulation contains 38 mature individuals, which is the most any subpopulation has had recorded.

		• **Meets criteria for Critically Endangered C2(a)(i)**
D.	Very small or restricted population (population size)	• (D) There are 78 mature individuals in total. • **Meets Endangered D**
E.	Quantitative analysis (statistical probability of extinction)	• No information to assess.

Summary of assessment information					
EOO	1159 km^2 (using Minimum Convex Polygon)	AOO	28 km^2 (2 km x 2 km grid).	Generation length	-

No. locations	6	Severely fragmented	Yes ☒ No ☐ Unknown ☐
No. subpopulations	8	No. mature individuals	78

Percentage global population within Australia	100
Percentage population decline over 10 years or 3 generations	Unknown

Threats *(detail how the species is being impacted)*

Threat *(describe the threat and how it impacts on the species. Specify if the threat is past, current or potential)*	Extent *(give details of impact on whole species or specific subpopulations)*	Impact *(what is the level of threat to the conservation of the species)*
Road and track maintenance • Threats include grading, chemical spraying, construction of drainage channels and slashing of vegetation (which promotes weeds). Past, current and future	Whole population (Subpopulations 1,2,3,6,7)	Catastrophic
Clearing • The widening of the North West Coastal Highway threatens Subpopulations 1 and 2 with approximately 12 plants to be removed. Past, current, future	Whole population (Subpopulations 1,2)	Catastrophic
Poor recruitment • The species appears to require disturbance to recruit. However, if disturbance is too frequent, occurs at the wrong time of the year or too much topsoil is removed, populations are not likely to persist in the long term. Current, future	Whole population	High
Weeds • Weeds suppress early plant growth by competing for soil	Whole population	Severe

moisture, nutrients and light. They also increase the fire hazard. Grading, stock movement, slashing and spraying greatly promote weeds. Past, current and future		
Habitat fragmentation • The area where the species occurs has been subject to extensive clearing for agriculture. The Shire of Northampton has less than 5% of pre-European natural vegetation remaining and most populations of *Androcalva bivillosa* are subject to the effects of fragmentation. Past, future	Whole population	Severe
Altered disturbance regimes • *Androcalva bivillosa* appears to recruit from seed following soil disturbance and fire. A lack of, or inappropriate nature of, fire or soil disturbance may in the long term threaten the viability of populations. Past, current, future	Whole population	Severe
Small subpopulation size • Small population size is likely to result in low genetic diversity and could limit the long term viability of the species. Future	Whole population	Severe
Accidental damage • Subpopulation 8 is potentially at threat from recreational vehicles. Subpopulation 9 is in an airport carpark and is potentially threatened by accidental damage from visitors. Past, current, future	Whole population (Subpopulations 8 and 9)	High
Rabbits • Although direct grazing of plants has not been observed, soil disturbance during warren construction and increased nutrient levels and introduction of weeds from droppings may impact on populations Current, future	Whole population (Subpopulation 8)	High
Drought • This is a threat to the species if it occurs over a number of years. Future	Whole population	Severe

Management and Recovery	
Is there a Recovery Plan (RP) or Conservation Management Plan operational for the species?	Yes ☐ No ☒
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). • Department of Parks and Wildlife (2016 DRAFT) *Androcalva bivillosa* Interim Recovery Plan 2016–2021.	

Interim Recovery Plan No. #. Department of Parks and Wildlife, Western Australia.

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;
- Rehabilitation of the ex-gravel pit, including photo-point monitoring;
- Extensive survey for the species in areas of suitable habitat on private property and nature reserves;
- Collection of seed and cuttings material for storage at the Threatened Flora Seed Centre and for propagation of the species by Botanic Gardens and Parks Authority;
- Threatened flora markers have been installed at subpopulations.

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

- Ongoing monitoring and observations of subpopulation and threats, including rabbits;
- Ongoing liaison with Main Roads Western Australia to ensure that subpopulations of the species are not accidentally damaged or destroyed, and the habitat is maintained in a suitable condition for the conservation of the species;
- Undertake weed control at subpopulations;
- Develop and implement a fire management strategy, including associated weed control measures and the need for and method of the construction and maintenance of firebreak;
- Restrict access to Subpopulations 8 and 9 through the installation of barriers such as bollards or fencing;
- Collect and store further seed to guard against the extinction of natural populations. Collections should aim to sample and preserve the maximum range of genetic diversity possible;
- Undertake surveys in areas of potentially suitable habitat;
- 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;
- Promote awareness of the species with general public.

Research

- Undertake systematic monitoring of populations to determine population trends;
- As habitat disturbance (physical or fire) is thought to promote germination of soil stored seed, it is recommended that disturbance trials be undertaken;
- 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.

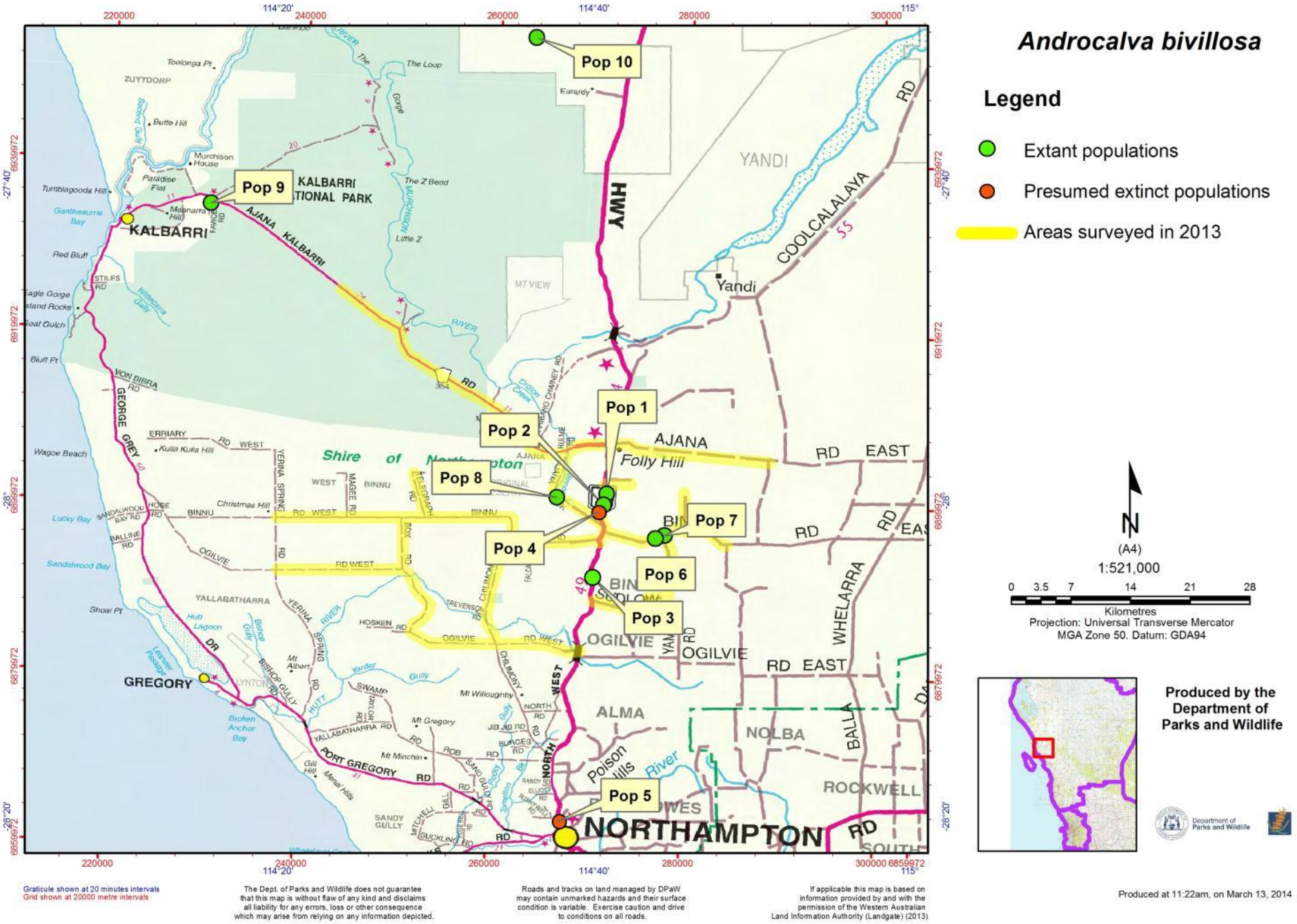
Nomination prepared by:	
Contact details:	
Date submitted:	14/9/2016

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

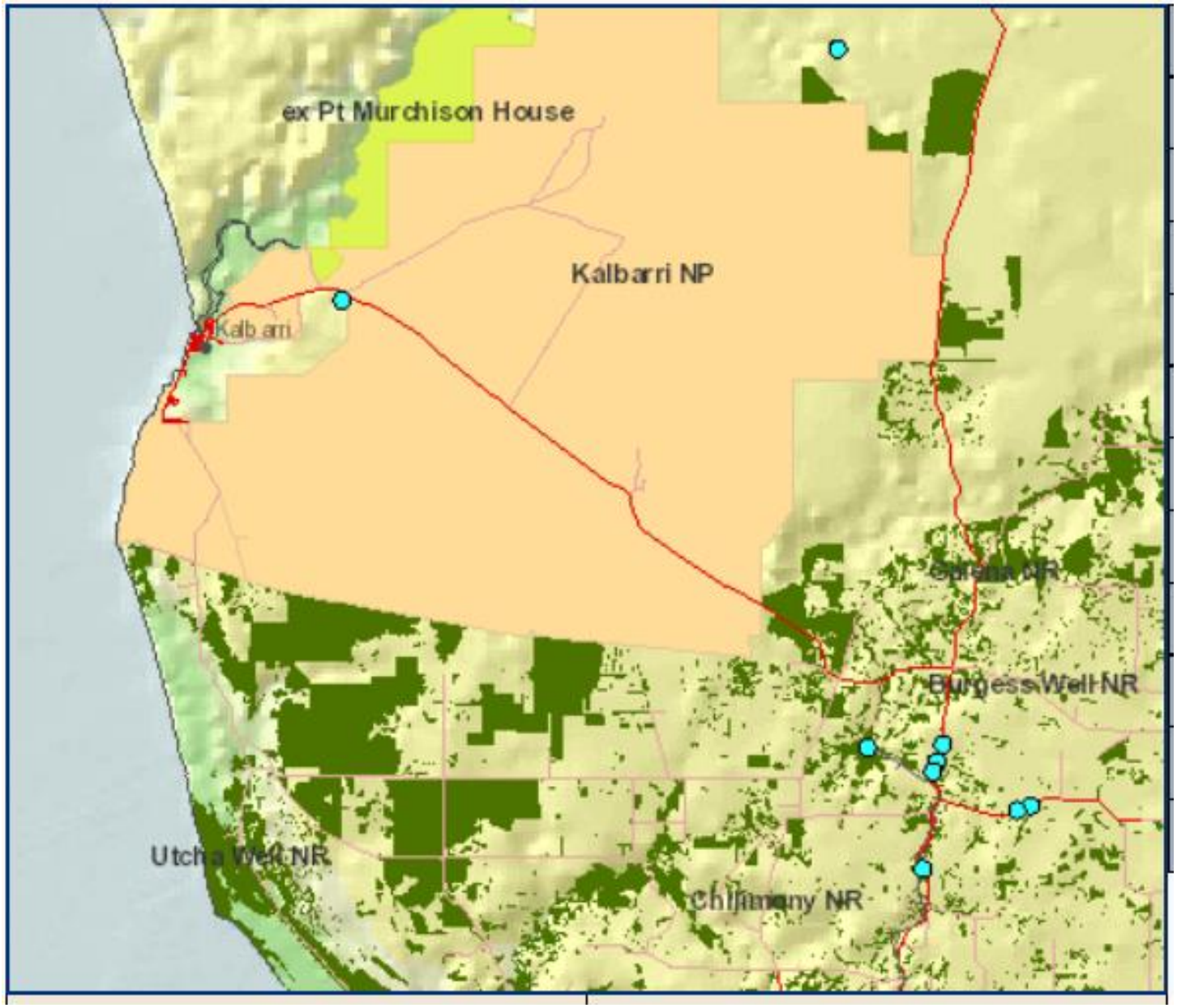
Summary of subpopulation information *(detailed information to be provided in the relevant sections of the form)*						
Location *(include coordinates)*	Land tenure	Survey information: Date of survey and No. mature individuals	AOO	Site / habitat Condition	Threats *(note if past, present or future)*	Specific management actions
Subpopulation 1: North West Coastal Highway road reserve, 5.7km north of Binnu	Main Roads road reserve	2004: 5 2011: 0 (cleared by roadworks) 2012: 2 2013: 12 (3 plants removed by roadworks) 2014: 10 2015: 10	1 ha	Disturbed. Habitat degraded by ongoing road maintenance. Vegetated area narrowing from road widening.	Road widening and maintenance (past, present, future) Clearing (past, future) Altered disturbance regimes (past, present, future) Lack of recruitment (past, present, future) Habitat fragmentation (present, future) Small population size (future) Climate change (future)	Install markers Liaise with MRWA to ensure protection of plants and habitat Develop a fire management plan Undertake regeneration trials Establish new populations through translocation
Subpopulation 2: North West Coastal Highway road reserve, 3 to 4km north of Binnu	Main Roads road reserve	2004: 6 2012: 7 2013: 10 2014: 8 2015: 8	0.8 ha	Disturbed. Habitat degraded by ongoing road maintenance. Vegetated area narrowing from road widening.	Road widening and maintenance (past, present, future) Clearing (past, future) Altered disturbance regimes (past, present, future) Lack of recruitment (past, present, future) Habitat fragmentation (present, future) Small population size (future) Climate change (future)	Install markers Liaise with MRWA to ensure protection of plants and habitat Develop a fire management plan Undertake regeneration trials Establish new populations through translocation
Subpopulation 3: North West Coastal Highway road reserve, 4.5km south	Main Roads road reserve	2004: 1 2005: 0 (1 plant cleared)		Disturbed. Habitat degraded by ongoing road maintenance. Vegetated area narrowing from road	Road widening and maintenance (past, present, future) Altered disturbance regimes (past,	Install markers Liaise with MRWA to ensure protection of plants and

of Binnu		2014: 1 2015: 0		widening.	present, future) Lack of recruitment (past, present, future) Habitat fragmentation (present, future) Small population size (future) Climate change (future)	habitat Develop a fire management plan Undertake regeneration trials Establish new populations through translocation
Subpopulation 6: Binnu East Road, 5.5km east of North West Coastal Highway	Shire road reserve	2011: 20 2013: 4 2014: 4	0.5 ha	Disturbed. Habitat degraded by ongoing road widening and maintenance, and weeds.	Road widening and maintenance (past, present, future) Weeds (past, present, future) Altered disturbance regimes (past, present, future) Lack of recruitment (present, future) Habitat fragmentation (present, future) Small population size (future) Climate change (future)	Install markers Undertake weed control Liaise with local shire to ensure protection of plants and habitat Develop a fire management plan Undertake regeneration trials Establish new populations through translocation
Subpopulation 7: Binnu East Road, 6.4 to 6.5km east of North West Coastal Highway	Shire road reserve	2011: 2 2013: 2 2014: 1	0.5 ha	Disturbed. Habitat degraded by ongoing road widening and maintenance, and weeds.	Road widening and maintenance (past, present, future) Weeds (past, present, future) Altered disturbance regimes (past, present, future) Lack of recruitment (present, future) Habitat fragmentation (present, future) Small population size (future) Climate change (future)	Install markers Undertake weed control Liaise with local shire to ensure protection of plants and habitat Develop a fire management plan Undertake regeneration trials Establish new populations through translocation
Subpopulation 8: Water Crown Reserve 16064, 6km	Shire water reserve	2013: 6 2014: 51	0.5 ha	Habitat disturbed by recreational activities,	Accidental damage (past, present, future)	Rehabilitate gravel pit Restrict access

northwest of North West Coastal Highway		(seedlings) 2015: 38		rabbits and weeds.	Weeds (past, present, future) Altered disturbance regimes (past, present, future) Lack of recruitment (present, future) Rabbits diggings (present, future) Small population size (future) Climate change (future)	Undertake weed control Liaise with local shire to ensure protection of plants and habitat Develop a fire management plan Control rabbits Undertake regeneration trials Establish new populations through translocation
Subpopulation 9: Kalbarri Airport carpark (Lot 12570)	Airport	2013: 5 2014: 6	0.4 ha	Habitat disturbed by accidental damage and fire.	Accidental damage (past, present, future) Altered disturbance regimes (past, present, future) Lack of recruitment (present, future) Small population size (future) Climate change (future)	Restrict access Develop a fire management plan Undertake regeneration trials Establish new populations through translocation
Subpopulation 10: Eurardy Station CL 3114-906, Lot 236. 7km northwest of Homestead on North Creek track	Wildlife sanctuary	1/2014: 2 8/2014: 9 2015: 11	0.5 ha	Habitat disturbed by track/firebreak maintenance.	Track/firebreak maintenance (past, present, future) Altered disturbance regimes (past, present, future) Lack of recruitment (present, future) Small population size (future) Climate change (future)	Install markers Develop a fire management plan Undertake regeneration trials Establish new populations through translocation


Androcalva bivillosa
Legend
Extant populations
Presumed extinct populations
Areas surveyed in 2013
Pop 1
Pop 2
Pop 3
Pop 4
Pop 5
Pop 6
Pop 7
Pop 8
Pop 9
Pop 10
KALBARRI
NORTHAMPTON
GREGORY
AJANA
OGILVIE
ALMA
NOLBA
YANDI
Yandi
Folly Hill
Shire of Northampton
HWY
COOLCALALAYA RD
WHELARRA RD
(A4)
1:521,000
0 3.5 7 14 21 28
Kilometres
Projection: Universal Transverse Mercator
MGA Zone 50. Datum: GDA94
Produced by the Department of Parks and Wildlife
Graticule shown at 20 minutes intervals
Grid shown at 20000 metre intervals
The Dept. of Parks and Wildlife does not guarantee that this map is without flaw of any kind and disclaims all liability for any errors, loss or other consequence which may arise from relying on any information depicted.
Roads and tracks on land managed by DPaW may contain unmarked hazards and their surface condition is variable. Exercise caution and drive to conditions on all roads.
If applicable this map is based on information provided by and with the permission of the Western Australian Land Information Authority (Landgate) (2013)
Produced at 11:22am, on March 13, 2014

***Androcalva bivillosa* subpopulations with conservation estate and remnant vegetation**



Department of
Parks and Wildlife

Form to nominate a Western Australian species for listing as threatened, change of category or delisting 2014 (Updated 2016).

The purpose of this nomination form is to bring your nomination to the attention of the Western Australian Threatened Species Scientific Committee (TSSC) for its consideration and subsequent advice to the Minister for Environment, who makes the final decision on changes to the threatened species lists. Please read through both the guidelines and the nomination form to familiarise yourself with the information required before filling out the nomination form.

The assessment of the conservation status is according to IUCN red list category and criteria, and whilst it is a State listing process, the TSSC will consider the status of Western Australian species throughout their total natural range in Australia, and where appropriate (eg, for species that do not breed in Australia), their range and status outside Australia. Therefore, information provided in the nomination should include information on populations outside WA where applicable.

Note, this nomination 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".

Nominators should refer to:

DPaW Nomination Guidelines
IUCN (2001). IUCN Red List Categories and Criteria Version 3.1 (IUCN, Gland, Switzerland)
IUCN (2011). Guidelines for using the IUCN Red List Categories and Criteria. Version 9.0 (September 2011). www.iucnredlist.org

Nominations should be submitted (preferably in electronic format) to:

Species and Communities Branch
Department of Parks and Wildlife
Locked Bag 104
BENTLEY DC WA 6983

Telephone: (08) 9334 0455
Email: tssc@dpaw.wa.gov.au

TSSC meetings are usually held near the end of the first quarter of the calendar year. The closing date for nominations for TSSC meetings is the last Friday of January that year.

NOTICE: Incomplete forms may result in delays in assessment, or rejection of the nomination. DPaW staff can advise you on how to fill out the form and may be able to supply additional, unpublished information.

SECTION 1. NOMINATION

1.1. Nomination for:

Flora ☒ | **Fauna** ☐ | as: **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.

Androcalva bivillosa C.F. Wilkins

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

Suggested common name "Straggling androcalva"

1.4. Family Name

Malvaceae

1.5. Current Conservation Status. If none, type 'None'.

	IUCN Red List Category e.g. Vulnerable	IUCN Red List Criteria e.g. B1ab(iv); D1
International IUCN Red List	None	None
National EPBC Act 1999	None	None
State of Western Australia	Critically Endangered	B1ab(ii,iv)+B2ab(ii,iv), D

State of WA Priority	1☐	2☐	3☐	4☐	5☐

1.6. Nominated Conservation Status.

	IUCN Red List Category e.g. Vulnerable	IUCN Red List Criteria e.g. B1ab(iv);D1
State of Western Australia	Critically Endangered	B2ab(iii,v); C2(a)(i)

State of WA Priority	1☐	2☐	3☐	4☐	5☐

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** ☐ **Details:**

1.7. Reasons for the Nomination.
Briefly summarise the reasons for the nomination in dot points. Please include details relevant to the IUCN Category and each Criteria.

Androcalva bivillosa is known from 5 small road reserve subpopulations, one water reserve subpopulation, one small access track subpopulation and one small car park subpopulation. Subpopulations are severely fragmented and the area of occupancy is <2 square kilometres (3.4ha) (4.2 ha in 2016).

The extent of occurrence is 1159 km^2 (>100 km^2) (2016), therefore the species does not meet criteria B1 for critically endangered.

A presumed decline in 2 subpopulations was discovered to be incorrect coordinates of a WA herbarium collection (Subpopulation 5) which when plotted was an existing subpopulation. Subpopulation 4 was found to have had an incorrect location description and was renumbered to be part of an existing subpopulation. Therefore criteria (ii and iv) no longer applies under criterion B.

The number of mature individuals has increased from 38-40 in 2014 to 78 in 2015, therefore criteria D no longer applies, however plant loss is predicted through habitat loss due to road widening and maintenance. Now meets criteria CR: B2ab(iii,v) and also C2(a)(i) (2016).

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.

Previously known as *Commersonia bivillosa* ms C. F. Wilkins

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

No ☐ **Yes** ☒

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

No hybridisation is known.

2.2. Description

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

Shrub decumbent or prostrate, 0.1–0.5 x 0.4–2.5 m, suckering not observed. Young stems with dense, sessile, white, pale brown or white, stellate hairs with 6–10 erect arms up to 1.1 mm long, over smaller stellate hairs, and with or without occasional, intermixed, white, clavate glandular trichomes up to 0.1 mm long. Stipules narrowly ovate or ovate, 1.7–5.5 x 0.45–1.3 mm; apex acute or acuminate, entire. Mature leaves petioles 2.1–6 mm long; blade flat or crisped, margins moderately recurved, base unequal, obtuse; ovate, elliptic or oblong, 5.5–23 x 3–16.1 mm (juvenile leaves ~33 x 15 mm); discolorous dark green, glossy over paler green; abaxial surface tomentose, blade and ribs with sessile, white, stellate hairs with 6 –12 erect arms up to 0.5 mm long, over smaller, stellate hairs, ribs with or without scattered, brown, stellate hairs, glandular trichomes absent; adaxial surface with scattered, to medium-density, sessile, white, stellate hairs with 1–6 erect arms up to 0.7 mm long, glandular trichomes absent. Inflorescence 12.2–16mm long, 3–9 flowered. Bud base dark pink, apex white or pink; calyx lobes valvate; apex rounded. Peduncle 1–3.7mm long. Pedicel non-articulated, 3.5–6.8mm long. Peduncle and pedicel with dense, sessile, white, stellate hairs with ~6 erect arms up to 0.35 mm long, and intermixed medium-density, red-tipped, clavate, glandular trichomes up to 0.4 mm long. Bract narrowly ovate, to linear-lanceolate, 2.8–4.5 x 0.3–0.8 mm. Calyx white with tinge of pink or red at base; total calyx length 3–4.6 mm long; tube 0.8–1.4mm long; lobes ovate, 2.1–3.3 x 1.1–2.1, 70 - 73% of total, apex acute; abaxial surface with dense, white, stellate hairs with ~6 erect arms up to 0.7 mm long, and intermixed, medium-density, red-tipped, clavate, glandular trichomes up to 0.7 mm long; adaxial surface base glabrous, central lobe with scattered, white, simple, appressed hairs up to 0.2 mm long, glandular trichomes absent towards margin with medium-density, simple hairs up to 0.1 mm long. Petals white throughout or with base tinged with yellow or pink; 2.5–3 x 2.1–2.4 mm; glabrous; base when lateral lobes flattened obovate to obcordate, margin flat; apical ligule subsessile, obovate to broadly obovate, 1.7–1.9 x 1–1.1 mm. Staminal tube 0.45–0.8mm long. Staminodes 3 between each stamen; central staminode ovate-lanceolate, white, 1.4–2.2 x 0.55–0.6 mm; 2 lateral staminodes linear, white, papillose, adnate to central staminode, 0.8–1.3 x 0.1–0.15mm. Filaments 0.15–0.8 x 0.1–0.2 mm. Anthers dark red, with paler red connective, 0.4–0.5 x 0.7–0.8 mm. Ovary 5-loculate, ovoid, 0.7–1.1 x 0.7 –1.1 mm; outer surface with pre-setae outgrowths. Ovules 5–9 per locule. Styles 0.6–0.8mm long. Fruit ellipsoid; wings absent; thin woody wall 0.2 mm wide; 9–11 x 9–12 mm; outer surface with white, stellate hairs beneath dense setae throughout, 3.5–4.3 mm long; setae shaft staight, with medium-density, mainly simple but with occasional sessile or short-stalked, stellate hairs with 2–4 arms up to 0.3 mm long, glandular trichomes absent; apical hair with ~ 6 white arms; central-axis hairs up to 0.2 mm long. Seed obovate, exotesta black or dark brown, prominently aculeate or verrucate 1.8–2.2 x 1.2–1.5. Aril a white, translucent cap, ~1.2 x 1.5 mm.

2.3. Distribution

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

Androcalva bivillosa is restricted in distribution from Ajana north of Binnu to Kalbarri and Eurardy Station in the Northampton area in Western Australia.

2.4. Habitat

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

Non-biological habitat

Flats and slopes. Reddish-brown or yellow sand with lateritic gravel. Road verge lateritic gravel and orange brown clayey sand. Recent soil disturbance.

Biological habitat

Kwongan shrubland with *Acacia* sp., *Allocasuarina* sp., *Callitris arenarius, Melaleuca cordata*, *Grevillea candelabroides, Grevillea eriostachya* and *Jacksonia* sp.

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

N.a.

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

No.

2.5. Reproduction

Provide an overview of the breeding system.

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

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

Flowering is from July to October. Fruit is present during late October to December. This species appears to recruit from seed so it is expected that at least some of the seed is viable. Recruitment has been observed following soil disturbance. Pollination mechanism is unknown. Suckering has not been observed.

2.6. Population dynamics

Provide details on ages of sexual maturity, extent of breeding success, life expectancy and natural mortality. Describe population structure (presence of juveniles/seedlings, mature and senescing individuals). Estimate generation length.

Androcalva bivillosa is considered to be disturbance opportunistic and has been observed to recruit following soil disturbance. As a result plants are usually of similar age. It is not known if this species recruits in the absence of disturbance. It is not likely that plants live for many years.

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 Australia and in other countries.

3.1. Distribution
Describe the global distribution.

Androcalva bivillosa is known from the Binnu and Kalbarri/Eurardy Station areas in the Midwest of Western Australia.

Near Binnu it exists as 6 small subpopulations occurring in the maintenance zone on road verges and one small population is in an old gravel pit. Near Kalbarri it is known from one small subpopulation at an airport car park. At Eurardy Station it is known from one location (11 plants in 2015) on and access track. The total number of known plants is 78 mature individuals.

One of the road verge subpopulations, the gravel pit subpopulation and the car park subpopulation were located during recent survey to more accurately determine the conservation status of this species. This equates to 15 new plants being located within the last few years.

The number of known plants has fluctuated somewhat over the past decade due to some sites being disturbed by road works and this being followed by recruitment. At other times plants have been cleared by roadworks and this has not been followed by recruitment. Two previously known populations are now extinct due to roadside clearing.

The main threats to this species are poor recruitment, roadside clearing and inappropriate disturbance due to road maintenance. The species appears to require a disturbance to recruit however frequent or severe disturbance results in the loss of the subpopulation. All plants are within locations susceptible to accidental damage and clearing.

This species does not occur outside Australia.

Provide an overview of the global population size, trends, threats and security of the species outside of Australia.

Androcalva bivillosa is not known to occur 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?

Androcalva bivillosa is restricted to the Binnu and Kalbarri/Eurardy Station areas of the Midwest of Western Australia. The population in this area constitutes the entire global population.

The global threat of climate change may impact this species.

SECTION 4. CONSERVATION STATUS AND MANAGEMENT

Conservation status and management information is required for the national extent of the species, however, greater detail is expected for the WA occurrences. If the taxon is considered to be endemic to Western Australia, please provide supporting evidence.

4.1. Population
What is the total national/State population size in terms of number of mature individuals? Has the number of individuals been counted, or is this an estimate? Provide details of the method of determining the number of individuals. Are there other useful measures of population size and what are they? Or if these are unavailable, provide an estimate of abundance (e.g. scarce, locally abundant etc).

Note: The term 'population' is used in a specific sense in the Red List Criteria that is different to its common

biological usage. Population is here defined as the total number of mature individuals of the taxon. In the case of taxa obligately dependent on other taxa for all or part of their life cycles, biologically appropriate values for the host taxon should be used. (IUCN 2001)

The total population of *Androcalva bivillosa* is 78 individuals. The number of individuals at each location has been counted. There are only a small number of plants so counting each individual was considered the most appropriate method of determining population size.

Androcalva bivillosa is considered to be endemic to Western Australia.

How many subpopulations or locations do you consider the species occurs in and why?

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

Androcalva bivillosa is known from 8 subpopulations as there are 8 groups of plants between which the distance apart is too far for the transfer of pollen to occur. The shortest distance between any group of plants is approximately 1 km.

This species is known from 5 locations. It is possible that a single road maintenance event could clear three subpopulations within a single location.

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

There are currently no known propagated occurrences of *Androcalva bivillosa*.

There is a small amount of seed collected during 2013 which is in storage at the Department of Parks and Wildlife Threatened Flora Seed Centre.

There are currently no proposed re-introduction sites.

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. More specific detail is expected for WA occurrences for taxa that are not endemic to WA.

Date of survey	TPFL Pop #	Location Description (include coordinates of the site)	Land status	Number of mature individuals at location	Area of occupancy at location	Condition of site
2012 2013 2015	1	N W Coastal Highway 5.7km N of Binnu	MRWA Road Reserve	2 12 10	1ha	disturbed
2012 2013 2015	2	N W Coastal Highway 3.3km N of Binnu	MRWA Road Reserve	7 10 8	0.8ha	disturbed
2004 2013 2014 2015	3	N W Coastal Highway 4.5km S of Binnu	MRWA Road Reserve	1 0 1 0		disturbed
2012	4 (Extinct)	Private	Private	Wrong coordinates, part of Subpopulation 2		

		property, W of N W Coastal Hwy, 3.3km N if Binnu	Property	(2016)		
2003	5 (Extinct)	N W Coastal Highway 1.7km N of Northampton	MRWA Road Reserve	Same as Subpopulation 2 (2016)		
2011 2013 2014	6	Binnu E Rd, 4.5 km E of N W Coastal Hwy	Road Reserve, Shire of Northampton	20 4 4	0.5ha	disturbed
2011 2013 2014	7	Binnu E Rd, 5.5km E of NW Coastal Hwy	Road Reserve, Shire of Northampton	2 2 1	0.5ha	disturbed
2013 2015	8	Gravel Pit off Ajana Back RD	Crown Reserve, Shire of Northampton	6 38	0.2ha 0.5ha (2015	disturbed
2013 2014	9	Kalbarri Airport, car park	Crown Reserve, Shire of Northampton	5 6	0.4ha	disturbed
2014 2015	10	Eurardy Station	Lease hold pastoral	9 11	<0.1ha 0.5ha (2015)	disturbed

What is the total area of occupancy (in km^2) for the species; explain how it was calculated and datasets used. If an accurate estimate is unavailable, provide a range of values or a minimum or maximum area estimate. Where separate breeding habitat is applicable, if possible, also provide area of breeding habitat.

Area of occupancy is 0.042 square kilometres. This was calculated by determining the area within which the plants occur (length x width) for each sub-population and adding these together.

What is the extent of occurrence (in km^2) 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.

The extent of occurrence is 1159 square kilometres. This was calculated by drawing a polygon around the location of each occurrence and determining the area within this polygon.

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.

Due to the small number of individuals and small area of occupancy it is considered that all occurrences are important for the long-term survival and recovery of the species.

Is the distribution of the species severely fragmented? Why?

The distribution of the species is severely fragmented. Sub-populations occur in the northern Wheatbelt of Western Australia which is extensively cleared and in the Shire of Northampton which has less than 5% of the pre-European extent of vegetation remaining. 5 sub-populations are within a narrow strip of road reserve vegetation, one is on a pastoral access track, one is within a gravel pit within a crown reserve surrounded by cleared farmland and the other is within an island of vegetation within a car park.

Is the taxon subject to extreme fluctuations? If so, provide evidence.

The taxon is subject to fluctuations in number of plants within populations because it appears to be relatively short lived and recruits following a disturbance. Long term records are not available for most subpopulations:

Sub-population 1: In 2004 there were 5 plants, subpopulation was totally cleared in 2011, 2 new plants were recorded in 2012, in 2013 around 15 plants were present then 3 were removed during shoulder grading leaving 12 plants in October 2013. In 2014 and 2015, 10 plants were recorded.

Sub-population 2: In 2004 6 plants were recorded, 2012 7 plants were recorded, in 2013 10 plants were recorded. In 2014 and 2015, 8 plants were recorded.

Sub-population 3: In 2004 1 plant was recorded and was subsequently cleared. In 2014, one plant was recorded but died. In 2015 there were no plants at this site.

Sub-population 8: in 2013 there were 6 plants known. Following grading of the old gravel pit, in 2014 51 seedlings appeared. In 2015 the number of mature individuals declined to 38.

Collection Record: the species was recorded to be occasional on the Old Ajana Road in 1990 and there are now no plants of this species on the Old Ajana Road.

Has there been any known decline in the species within WA or nationally, or is this likely in the future? – provide details in relation to the elements detailed below, including how the decline has been measured or inferred. Is there a presumption of continuing decline? If so, provide details of the decline and how it relates to the specific Red List Categories and Criteria version 3.1.

Note: A continuing decline is a recent, current or projected future decline (which may be smooth, irregular or sporadic) which is liable to continue unless remedial measures are taken. Fluctuations will not normally count as continuing declines, but an observed decline should not be considered as a fluctuation unless there is evidence for this. (IUCN 2001) Refer to Red List Guidelines 9.0

There is limited information on population change over time for this species. There are currently more plants known than previously recorded however it is expected that this is due to survey effort. It is assumed that the number of plants has probably actually declined. Proposed roadworks will remove 12 plants and their habitat preventing recovery at that site. If management does not succeed in protection of the habitat it is likely that plant numbers will decline further due to ongoing road widening and maintenance.

Due to the vulnerable location for each subpopulation their long term survival is unlikely without conservation management.

Has there been a decline in the size of the population (number of mature individuals)?

The total number of known plants has increased from 12 in 2004 to 38-40 in 2013 and 78 in 2015 as more extensive survey has been carried out.

- **can the rate of population size reduction be determined over the last 10 years or 3 generations (whichever is the longer)? If so, state whether the determination is based on quantitative data (observed), estimated (provide data and calculations), inferred or suspected.**

There is limited information on population history.

- **can the rate of population size reduction be estimated for the next 10 years or 3 generations and in any 10 year or 3 generation period (up to a maximum of 100 years into the future)? If so, state how the reduction is estimated (provide data and calculations), inferred or suspected.**

There is limited information on population history.

Has there been a decline in the number of locations, extent of occurrence or area of occupancy?

A continuing decline has occurred in the area of habitat at the road reserve subpopulations with vegetated areas narrowing from road widening. Approximately 12 plants are to be removed in further major road works proposed for the North West Coastal Highway in 2016. Further loss of mature

individuals is likely.

Has there been a decline in the area or quality of habitat?

Subpopulations 1 and 2 occur on a Main Roads Reserve. The vegetated area is more narrow than it was in 2004. All other locations are disturbed and there is limited information on the history of these areas.

4.2. Survey effort

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

The applicant (Alanna Chant) has inspected known locations within Main Roads reserve and surveyed the number of plants during three spring flowering periods between 2004 and 2013. Road reserve vegetation between these North West Coastal Highway locations has also been checked for additional plants during these surveys. This has included at least three full days survey work.

MRWA has also commissioned a survey of this area by GHD in 2013, which did not locate any new plants. A report on this survey is not yet available.

Two other DPaW officers (Kiera Foster and Catherine Page) have surveyed the recorded sites during spring flowering during this period.

Kiera Foster has also undertaken an extensive flora and vegetation survey within Kalbarri National Park for a new roading and infrastructure project just north of the Kalbarri Airport. This included an extensive survey for gravel resource nearby the Airport and including 13 old disturbed resource pits along and access track to the north of the Airport (Foster, 2013).

A recovery team member (Robin Simkin) who lives in Kalbarri and has an agricultural property in the vicinity of known locations has spent many days during four consecutive years undertaking spring survey for various threatened flora in the area including this species. Survey areas have included disturbed roadsides and gravel pits. Two new subpopulations (6 plants) were found as a result of this survey work.

During spring 2013 Alanna Chant, Robin Simkin and Janet Newell met to identify potential survey areas for this species then spent a day in the field searching each of the areas identified. Survey areas included disturbed road side, gravel pits and areas of recent machine activity within the vicinity of recorded locations. Two new locations (10 plants) were found as a result of this process. Maps highlighting search areas for this plant are attached to this nomination.

Alanna Chant, Robin Simkin and Vanessa Westcott (Bush Heritage Ecologist) spent a day specifically searching nearby the recorded collection site and a large MRWA gravel pit on Eurardy Station during January 2014. This involved traversing the areas on foot. Only two individuals were found at the recorded collection site. Survey timing was far from idea however plants were identifiable.

MRWA commissioned a survey of an extensive gravel pit on Eurardy Station on 30th July 2009 and *Androcalva bivillosa* was not found during this survey (GHD, 2009).

The Wildflower Society of Western Australia completed a Flora Survey and Field Herbarium Project over two weekends during spring 2003 (late August and early October) This survey was carried out using the standard survey techniques described in the "Bushland Plant Survey for the Community" (Keighery, 1994). 25 large 20m x 20m quadrats were used to sample the vegetation over the various vegetation communities on the property. Additional collections were made by wandering through areas which were slightly different from quadrat sites. Some further collections were made of summer flowering species by the station owners and three volunteers returned in August 2004 to collect further material.

Previous recovery team members (Don and Barbara Bellairs) recorded this species on the Ajana Back road in 1990. Don and Barbara have spent over 20 years collecting plant specimens and surveying in Kalbarri National Park and Eurardy Station and have not found this species at any other location.

Provide details on the distinctiveness and detectability of the species, or the distinctiveness of its habitat, that would assist survey success.

Androcalva bivillosa is distinctive. It's flowers appear most similar to A. crispa and A. pulchella, however, A. bivillosa differs from a. crispa in having the petals and calyx that are white throughout or with a yellow or pink-tinged base, rather than white with a conspicuously dark red base, and A. bivillosa has flat margins on the lateral lobes of the petal base rather than a hooded margin. Both these species differ from a. pulchella in having clyx lobes witht ehapex acute, rahter than rounded.

It is an attractive, low growing ground cover plant that would make a popular garden plant if available, in my opinion.

Images attached.

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.

It is considered that *Androcalva bivillosa* has been reasonably well surveyed.

The Alanna Chant has inspected known locations within Main Roads reserve and surveyed and surveyed other nearby areas between 2004 and 2013.

MRWA has also commissioned the consultant GHD to survey areas of the North West Coastal Highway 2013 and a large gravel pit area on Eurardy Station in 2008.

DPaW staff Kiera Foster and Catherine Page have surveyed the recorded sites during spring flowering between 2008 and 2012.

Kiera Foster has undertaken an extensive flora and vegetation survey in 2012 within Kalbarri National Park adjoining the Kalbarri Airport and including 13 disturbed roading material sites.

Local volunteer and Recovery Team member Robin Simkin, has spent many days during four consecutive years undertaking spring survey for various threatened flora in the area including this species.

During spring 2013 Alanna Chant, Robin Simkin and Janet Newell carried out specific survey of previously unsurveyed areas identified as potential habitat.

Alanna Chant, Robin Simkin and Vanessa Westcott (Bush Heritage Ecologist) surveyed the recorded collection site and a large disturbed gravel pit in summer 2014.

The Wildflower Society of Western Australia completed a Flora Survey and Field Herbarium Project over two weekends during spring 2003, with follow up survey in summer 2003 and spring 2004.

Previous recovery team members (Don and Barbara Bellairs) recorded this species on the Ajana Back road in 1990. Don and Barbara have spent over 20 years collecting plant specimens and surveying in Kalbarri National Park and Eurardy Station and have not found this species at any other location.

Alanna Chant has worked as a flora conservation officer based in Geraldton for over 10 years and has not found this species at any other location.

It is possible that there may be some populations on adjoining private properties and in private gravel pits however access to survey these areas has not been provided to date. It is considered that there is unlikely to be extensive secure populations which have not been found. All known populations are in disturbed sites so it is expected that any other locations which have not yet been found may be susceptible to clearing, grazing or accidental damage.

4.3. Threats

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

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?).

Androcalva bivillosa is expected to have been impact by a long history of land clearing and agriculture in the Northampton Shire, in the northern wheatbelt.

There are currently 8 small populations with a total of 78 mature individuals. Subpopulations are fragmented and the largest known population is currently 38 plants. Fragmentation and small subpopulation size is likely to indicate there is low genetic diversity within populations which could limit long term viability.

All subpopulations exist in disturbed locations which are susceptible to road maintenance and accidental damage.

Rabbits are a minor threat at present. Although direct grazing of plants has not been observed, soil disturbance during warren construction and increased nutrient levels and introduction of weeds from droppings may impact on populations.

Androcalva bivillosa is considered a disturbance opportunist and poor recruitment is a threat to population viability.

More information is needed in relation to this species required disturbance regime for recruitment, longevity and seed viability. Trials into these requirements in combination with seed collection and translocation projects will be necessary to address the current threats.

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

Location	Past threats	Current threats	Potential threats	Management requirements (see section 4.4)
N W Coastal Hwy 5.7 km N of Binnu	Road works, poor recruitment, habitat loss	Roadworks, poor recruitment, fragmentation, edge effects	Climate Change, small population size	Liaise MRWA, monitor population, gain DRF listing
N W Coastal Hwy 3 to 4 km N of Binnu	Road works, poor recruitment, habitat loss	Roadworks, poor recruitment, fragmentation, edge effects	Climate Change, small population size	Liaise with MRWA, monitor population, gain DRF listing
N W Coastal Hwy 4.5 km S of Binnu	Road works, poor recruitment, habitat loss	Roadworks, poor recruitment, fragmentation, edge effects	Climate Change, small population size	Liaise with MRWA, monitor population, gain DRF listing
Binnu E Rd 5.5 km E of NW Coastal Hwy	Road works, poor recruitment, habitat loss	Roadworks, poor recruitment, fragmentation, edge effects	Climate Change, small population size	Liaise with Northampton Shire, monitor population gain DRF listing
Binnu E Rd 6.4 to 6.5 km E of NW Coastal Hwy	Road works, poor recruitment, habitat loss	Roadworks, poor recruitment, fragmentation, edge effects	Climate Change, small population size	Liaise with Northampton Shire, monitor population gain DRF listing
Gravel Pit off	Accidental	Accidental	Climate Change,	Liaise with land

Ajana Back Rd	machine damage, gravel extraction, poor recruitment	damage, poor recruitment, rabbit diggings	small population size	manager, rehabilitate gravel pit, monitor impact of rabbits
Kalbarri Airport Car Park	Accidental damage, poor recruitment	Accidental damage, poor recruitment	Climate Change, small population size	Liaise with Northampton Shire. undertake recruitment trials.
Eurardy Station	Track/firebreak maintenance	Track/firebreak maintenance, poor recruitment	Climate Change, small population size	Install markers, undertake recruitment trials

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.

Androcalva bivillosa recruits following disturbance and has not yet been found in undisturbed vegetation. All plants occur in locations that are frequently disturbed. The most appropriate disturbance regime that this plant requires for it's continuing survival may not be provided in the long term and if too frequent or inappropriate disturbance occurs it is likely that the plants will not continue to persist.

There is no current model addressing the disturbance regime issue. In the future it will be necessary to gather information on various aspects relating to the species longevity and recruitment and develop a model addressing this aspect of the species survival.

4.4. Management

Identify key management documentation for the species e.g. recovery plans, conservation plans, threat abatement plans etc.

Androcalva bivillosa is not currently included in any key management documentation.

Does this species benefit from the management of another species or community? Explain.

This species does not benefit from the management of another species or community and there are no Threatened Flora or Threatened Ecological Communities occurring in the vicinity of Androcalva bivillosa.

How well is the species represented in conservation reserves or covenanted land? Which of these are actively managed for this species? Provide details.

Androcalva bivillosa does not occur on any formal conservation reserve or covenanted land. A small population of two plants occurs on Eurardy Station which is lease hold owned by Bush Heritage Australia, a private conservation organisation. All locations are within road maintenance zones, gravel pit and a car park area.

Are there any management or research recommendations that will assist in the conservation of the species? Provide details.

Management requirements include:

- Ongoing monitoring and observations of subpopulation and threats, including rabbits;
- Determine the longevity of the species and how long plants continue to flower and produce seed'
- Undertake trials to gain information on seed germination requirements, including required disturbance regime for recruitment and how long seed remains viable in the soil;
- Establish new populations in more secure locations, such as within gravel pit rehabilitation areas, where the disturbance regime can be managed and there are fewer conflicting land uses;
- Ongoing liaison with Main Roads Western Australia to ensure that subpopulations of the species are not accidentally damaged or destroyed, and the habitat is maintained in a suitable condition for the conservation of the species;

- Undertake weed control at subpopulations;
- Develop and implement a fire management strategy, including associated weed control measures and the need for and method of the construction and maintenance of firebreak;
- Restrict access to Subpopulations 8 and 9 through the installation of barriers such as bollards or fencing;
- Collect and store further seed to guard against the extinction of natural populations. Collections should aim to sample and preserve the maximum range of genetic diversity possible;
- Undertake surveys in areas of potentially suitable habitat;
- 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;
- Promote awareness of the species with general public.

4.5. Other

Is there any additional information that is relevant to consideration of the conservation status of this species?

Main Roads WA are proposing to widen a section of the North West Coastal Highway where Subpopulation 1 and 2 of this species occurs. This is likely to result in the loss of 12 plants from these subpopulations bringing the total population to 66 mature individuals.

SECTION 5. NOMINATOR

Nominator(s) name(s)	
Organisation(s)	
Address(s)	
Telephone number(s)	
Email(s)	
Date	27 January 2014

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

Carol Wilkins, Research Scientist, Department of Parks and Wildlife

Robin Simkin DPaW Volunteer

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.

Foster (2013) Kalbarri National Park Roading and Infrastructure Project: Flora and Vegetation Assessment Part 1 Department of Environment and Conservation

GHD (2009) Flora and Fauna Survey Strategic Material Area Northe West coastal Highway SLK 145.6 October 2009

GHD (2013) NW Coastal Highway survey data, report currently unavailable.

WA Herbarium Forabase 2014

Wilkins, C A and Whitlock B A (2012) A new Australian genus Androcalva separated from Commersonia (Malvaceae s.l. or Byttneriaceae) Australian Systematic Botany, 25 297-299

Wildflower Society of WA (2003-2005) A Survey and Field Herbarium Project Eurardy Station

Attachment 1. Photos of *Androcalva bivillosa*

Photo credit: Alanna Chant August 2013

Photo credit: Alanna Chant August 2013

Photo credit: Juliet Wege

Attachment 2. Map showing extent of Species and areas surveyed during 2013.