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 adenothalia***
Nomination for (addition, deletion, change)**:**	**Addition**
Nominated conservation category and criteria:	**CR: B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv); D**

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 adenothalia*			
Common name:	None			
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	2010	Critically Endangered	B1ab(i,ii,iii,iv,v)+B2ab(i,ii,iii,iv,v)
		16/1/2018 (endorsed)	Critically Endangered	B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv); D
	2.			

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:	Opportunistic surveys of the previously known location as well as potential habitat have been undertaken since 2010. No new individuals have been found.
• 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:	Assessment is consistent and criteria remains current, however, with no regeneration from the last known location, continuing decline in the number of mature individuals is not applicable, and criterion D can also be used to support the Critically Endangered assessment.
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?	**CR: B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv); D**	
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)	• No extant individuals are known. • **Insufficient information to assess**
B.	Geographic range (EOO and AOO, number of locations and evidence of decline)	• (B1) EOO < 50km^2. Likely extent of previous occurrence based on observations of vegetation from Canna to Morawa (previous recorded collections). • (B2) AOO is 4 km^2 using the 2 km x 2 km grid. Although there are no extant individuals, the species may still exist as a soil seed bank. • (a) Was recently known from one location. • (b) Continuing decline observed and projected: • (i) (ii) The species has suffered a reduction in EOO and AOO. The last known plant at the single known subpopulation of the species died in 2009, and the species may be deemed to be extinct if regeneration does not occur. Previous known collection sites no longer exist due to vegetation clearing. • (iii) The habitat is highly threatened by road maintenance, poor recruitment and fire and a projected decline in area, extent and habitat quality is projected. • (iv) Previously known collections (locations), Morawa and Canna have not been relocated. The recently known subpopulation at Canna may be deemed to be extinct if regeneration does not occur. • (v) The species was known from one individual in 2008. This plant died in 2009 and has not been seen since. As there has been no regeneration, and no further plants/subpopulations located, continuing decline in number of mature individuals cannot now be included as a criterion. • **Meets criteria for Critically Endangered B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv)**
C.	Small population size and decline (population size, distribution and evidence of decline)	• No extant individuals are known. • **Unable to assess for continuing decline in number of mature individuals**
D.	Very small or restricted population (population size)	• (D) No extant individuals are known. • **Meets criteria for Critically Endangered D**

E.	Quantitative analysis (statistical probability of extinction)	• No information to assess.

Summary of assessment information					
EOO	<50 km^2 (previous extent based on earlier collections)	AOO	4 km^2 (may exist as soil seed bank)	Generation length	Unknown

No. locations	1 (may exist as soil seed bank)	Severely fragmented	Yes ☐ No ☒ Unknown ☐
No. subpopulations	1 (may exist as soil seed bank)	No. mature individuals	0 (one plant in cultivation at the Botanic Gardens and Parks Authority)

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

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

Threat *(describe the threat and how it impacts on the species. Specify if the threat is past, current or potential)*	Extent *(give details of impact on whole species or specific subpopulations)*	Impact *(what is the level of threat to the conservation of the species)*
Road maintenance • Threats include grading, chemical spraying, construction of drainage channels, and slashing of road vegetation. Past, current and future	Whole population	Severe
Poor recruitment • No recruitment has been observed with the last plant dying in 2009. The biology of the species is insufficiently known to be certain of the effect of disturbance, fire, drought and temperature extremes on seed germination and seedling survival. However, the species may require a disturbance to recruit, but if disturbance is too frequent, occurs at the wrong time of the year or is followed by a drought, then the species is likely to be severely impacted. Past, current, future	Whole population	Severe
Altered fire regimes • The species may require fire to stimulate germination. However frequent fire would deplete the soil seed store. Fire is likely to facilitate weed invasion and should be followed up with appropriate weed control. Past, current and future	Whole population	Severe

Small population size • A single catastrophic event has the potential to remove the last known area of habitat. Past, current, future	Whole population	Catastrophic
Drought • This is a threat to the species and may have been the cause of recent deaths. • Climate change modelling for the south west predicts a decline in rainfall, and some seasonal shift to summer rainfall events, which is likely to increase the potential impact of drought on the species. Past, 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 Environment and Conservation (2013) *Androcalva adenothalia* (formerly *Commersonia adenothalia*) Interim Recovery Plan 2013−2018. Interim Recovery Plan No. 336. Department of Environment and Conservation, 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 presence of plants and impact of threats;
- Unsuccessful attempts at seed collection for storage at Parks and Wildlife Threatened Flora Seed Centre;
- Collection of vegetative material by Botanic Gardens and Parks Authority.

List further recommended management or research actions, if any, that would benefit the conservation of the species. Please ensure that this section addresses all identified threats.

Management

- Monitor subpopulation for evidence of germinants, grazing impacts, or changes in site health;
- Install threatened flora markers on road reserve;
- Attempt to stimulate recruitment through germination trials;
- Propagation of vegetative material for collection of viable seed for future translocation;
- Develop and implement a fire management strategy, including the need for, and method of, the construction and maintenance of firebreak;
- Undertake surveys in areas of potentially suitable habitat.

Research

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

Nomination prepared by:	
Contact details:	
Date submitted:	19/12/2016
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 or Subpopulation *(include coordinates)*	Land tenure	Survey information: Date of survey and No. mature individuals	Area of subpopulation	Site / habitat Condition	Threats *(note if past, present or future)*	Specific management actions
Subpopulation 1: Canna	Shire road reserve	2005: 2 2008: 1 (1 seedling) 2009: 0	<1 ha (may exist as soil seed bank)	May be extinct. Degraded road reserve.	Road maintenance (past, present, future) Poor recruitment (past, present, future) Fire (past, present, future) Small population size (past, present, future) Drought (past, future) Climate change (future)	Install threatened flora markers Conduct recruitment trials Develop a fire management plan Undertake further surveys Implement translocations if possible

Department of Environment and Conservation

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

To fill out this form you must refer to the Guidelines. Incomplete forms may result in delays in assessment, or rejection of the nomination.

Answer all relevant sections, filling in the white boxes and indicating when there is no information available. To mark boxes with a **cross** ☒: on the **View** menu, point to **Toolbars**, and then click **Forms**. Click **Protect Form**, then check the box. Unlock the form by clicking and you will then be able to type text in the white table cells.

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".

SECTION 1. NOMINATION			
1.1. Nomination information			
Flora √	**Fauna** ☐	**Nomination for: Addition** √ **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 this is not possible, use unpublished names or numbers of voucher specimens.**			
Androcalva adenothalia			
1.3. Common Name **If the species has a generally accepted common name, please show it here. This name will be used on all official documentation.**			
n.a.			
1.4. Current Conservation Status. If none, type 'None'.			
International IUCN Red List Category and Criteria applicable to the highest rank category only e.g. Vulnerable (B1ab(iv);D(1))	None		
National EPBC Act 1999 Category	None		
State of WA Wildlife Conservation Notice Schedule	Critically Endangered		
State of WA IUCN Category	B1ab(i,ii,iii,iv,v)+B2ab(i,ii,iii,iv,v)		
State of WA Priority	None		
Is the species listed as 'Threatened' in any other Australian State or Territory? If Yes, list these States and/or Territories and the status for each.			
No √ **Yes** ☐			

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

No √ Yes ☐

1.5. Nominated Conservation Status. Type one category for each of the fields. If none, write 'None'.

International IUCN Red List Category and Criteria applicable to the highest rank category only e.g. Vulnerable (B1ab(iv);D(1))	
National EPBC Act 1999	Critically Endangered B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv); D
State of WA Wildlife Conservation Notice Schedule	Schedule 1
State of WA IUCN Category	Critically Endangered B1ab(i,ii,iii,iv)+B2ab(i,ii,iii,iv); D
State of WA Priority	None

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.

There is only one known wild subpopulation which consisted of one individual of this species during 2008 surveys. This plant died in 2009 and no other individuals have been found during more recent surveys (AOO <4 km^2 using 2 km x 2 km grid). The likelihood of germination of soil stored seed is not currently known and no new seedlings were seen at the site during an inspection in late spring 2009. It is however possible that new seedlings may be detected at this site during future inspections, if there is a soil seed bank present together with appropriate conditions for seed germination and survival.

There are two recorded collections (WA Herbarium), the first was R.D. Royce (#7516) in 1962 at a location recorded as "Morawa", the second in 2005, C. Wilkins, P. Offszanka & J. Wilkins (#2030) at the recent known subpopulation site at Canna. This is approximately 30 km from Morawa and the extent of its occurrence is likely to be <50 km^2.

The only known subpopulation (a) with a single individual was located on a disturbed road verge. The area surrounding Canna has been largely cleared for agriculture and remnant vegetation on private properties is often degraded due to a history of livestock grazing.

The only known subpopulation of *Androcalva adenothalia* consisted of a single plant that has appeared to decline due to drought conditions. Previously another mature plant and a possible seedling have been seen in recent years at the site however these have since perished possibly due to drought.

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.

The species was first given the phrase name *Commersonia* sp. Canna (C.F. Wilkins 2030) and was accepted as a distinct species on FloraBase as *Commersonia adenothalia* C.F. Wilkins ms (means abundance of glands).

Results of phylogenetic analyses of molecular sequences of the Lasiopetaleae Tribe undertaken by Whitlock *et al*. (2011) recovered one clade that constituted a new genus divided from *Commersonia*, *Androcalva*, which is grouped by characters of central staminodes and extrorse anther dehiscence. The species was formally described as *Androcalva adenothalia* in 2011 by Wilkins and Whitlock.

Androcalva adenothalia differs from *Commersonia* sp. Bindoon (C.F. Wilkins 2155, F. & J. Hort) (currently known as *A. fragifolia*) in having the outer surface of the calyx being dark pink rather than white; the stem and flower stalks have an abundance of stalked, red-tipped glands present that are longer than the hairs; and the leaf lower surface has medium density rather than tomentose stellate hairs.

Differs from *Rulingia cuneata* (currently known as *Androcalva cuneata*) in not having a velvety upper leaf surface and in having glands on the outer calyx and stem that are longer than the hairs rather than glands absent.

(C Wilkins, pers. comm.)

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 has been recorded for this species.

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).

Androcalva adenothalia (Wilkins and Whitlock 2011)

Shrub prostrate, 2–5 x 10–25 cm, suckering not observed. *Young stems* with medium to dense, sessile, white, stellate hairs with 3–8 erect arms up to 0.3mm long, intermixed with red-tipped, clavate, glandular trichomes up to 0.3mm long, without basal layer of small stellate hairs. *Stipules* narrowly ovate, 2.1–4.1 x 0.4–1.4 mm, apex acute or acuminate, entire. *Mature leaves* petioles 1.1–11.9mm long; blade flat to scarcely undulate, with margin scarcely recurved or flat, base unequal, strongly to slightly cordate, margin irregularly crenulate, apex obtuse; blade ovate, 2.3–23.5 x 1.8–18mm (*juvenile leaves* not seen); discolorous, dark glossy green over paler fawn–green; abaxial surface blade and ribs with dense, sessile, white, stellate hairs with ~6 erect arms up to 0.4mm long, over smaller, stellate hairs and intermixed scattered, red-tipped, clavate, glandular trichomes up to 0.35mm long; adaxial surface glabrous or with scattered, sessile, white, stellate hairs with 1 or 2(–4) erect arms up to 0.2mm long and occasional, white, clavate, glandular trichomes up to 0.1mm long. *Inflorescence* 6–7mm long, 4–9(–11)-flowered. *Bud* dark pink throughout; calyx lobes valvate; apex rounded. *Peduncle* 0.6–5.2mm long. *Pedicel* non-articulated, 1.8–4.1mm long. Peduncle and pedicel with dense, sessile, white, stellate hairs with ~6 erect arms up to 0.25mm long, and intermixed medium-density, redtipped, clavate, glandular trichomes up to 0.3mm long. *Bract* narrowly ovate, 1.1–4.1 x 0.15–0.6 mm. *Calyx* outer surface dark pink, inner surface white throughout, becoming pink; total length 2.1–2.3mm long; tube 0.5–0.6mm long; lobes ovate, 1.6–1.7 0.6–1.1 mm, ~74% of total calyx length, apex acute; abaxial surface with dense, white, stellate hairs with ~6 erect arms up to 0.2mm long, intermixed with long-stalked, clavate, glandular trichomes up to 0.3mm long; adaxial surface, base glabrous, central lobe with either scattered, white, simple, appressed hairs up to 0.2mm long, or occasional, white, clavate, glandular trichomes up to 0.1mm long, towards margin with medium-density, simple hairs up to 0.1mm long. *Petals* white throughout with streak of red up the main vein; 1.5 x 1.1–1.2 mm; glabrous; base ovate when lateral lobes flattened; margin flat; apical ligule sessile, subcircular to broadly obovate, 0.7–0.8 x 0.5–0.6 mm. *Staminal tube* 0.2–0.25mm long. *Staminodes* 1 or 3 between each stamen; central staminode ovate, white, 1.4–1.5 x 0.5 mm; lateral staminodes, if present, linear, white, papillose, adnate to filament, ~0.6 x 0.15 mm. *Filaments* 0.5–0.7 x 0.25 mm. *Anthers* dark red with white connective, 0.25–0.3 x 0.4–0.5 mm. *Ovary* 5-loculate, ovoid, 0.6–0.7 x 0.6–0.7 mm, outer surface smooth, glabrous. *Ovules* 4–6 per locule. *Styles* 0.5–0.6mm long. *Fruit* and *seed* not seen.

Flowering period:

August to October.

2.3. Distribution

Describe the distribution of the species <u>in Australia</u> and, if possible, provide a map.

Androcalva adenothalia was known from one individual in Canna, WA. This individual died in 2009.

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

Orange – brown sand, gravel, laterite. Disturbed road verge.

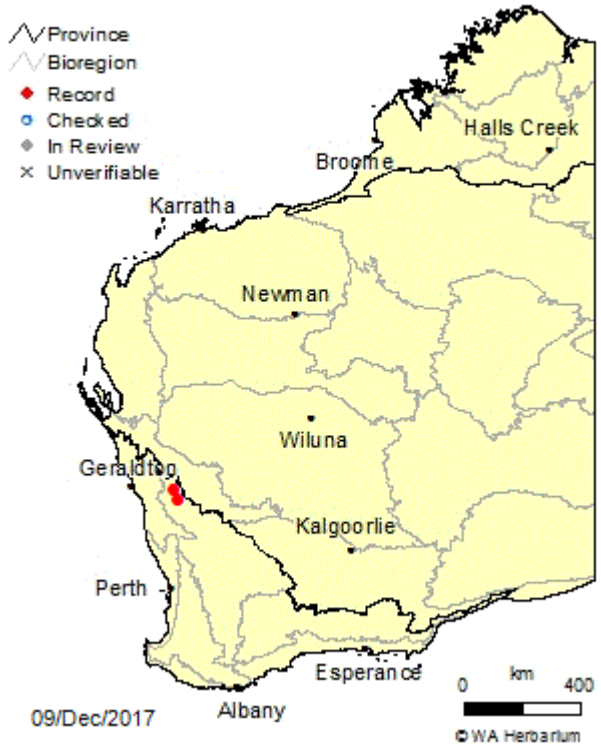
Biological habitat

Acacia and *Allocasuarina* scrub with occasional mallees.
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?
No
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?**
The species has been observed flowering in August, September and October. No information is available on fruit setting or seed production and viability. An unsuccessful attempt to collect seed was made by Andrew Crawford in January 2008 (A. Crawford, pers. com.). Vegetative material was collected from the species in January 2008 and several plants have been raised in cultivation at the Kings Park Botanic Garden, which are clones. Currently (2016) only one potted plant from the single clone remains alive at BGPA (Eric Bunn, pers. comm.). Suckering has not been observed, the species is likely to reproduce via seed and be disturbance responsive (Carol Wilkins, pers. comm.).
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).**
Two mature individuals and a seedling have been observed at the known subpopulation site in recent history however these have not survived. One mature individual was cleared during road maintenance and the second mature individual and possible seedling are thought to have died from drought. The last surviving individual showed signs of drought stress (Paul Offszanka, pers. comm.).
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 a 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 (see map below from Western Australian Herbarium 1998–).

Androcalva adenothalia



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

n.a.

Explain the relationship between the Australian population and the global population. What percentage of the global population occurs in Australia? Is the Australian population distinct, geographically separate or does part, or all, of the population move in/out of Australia's jurisdiction? Do global threats affect the Australian population?

n.a.

SECTION 4. CONSERVATION STATUS AND MANAGEMENT

4.1. Population

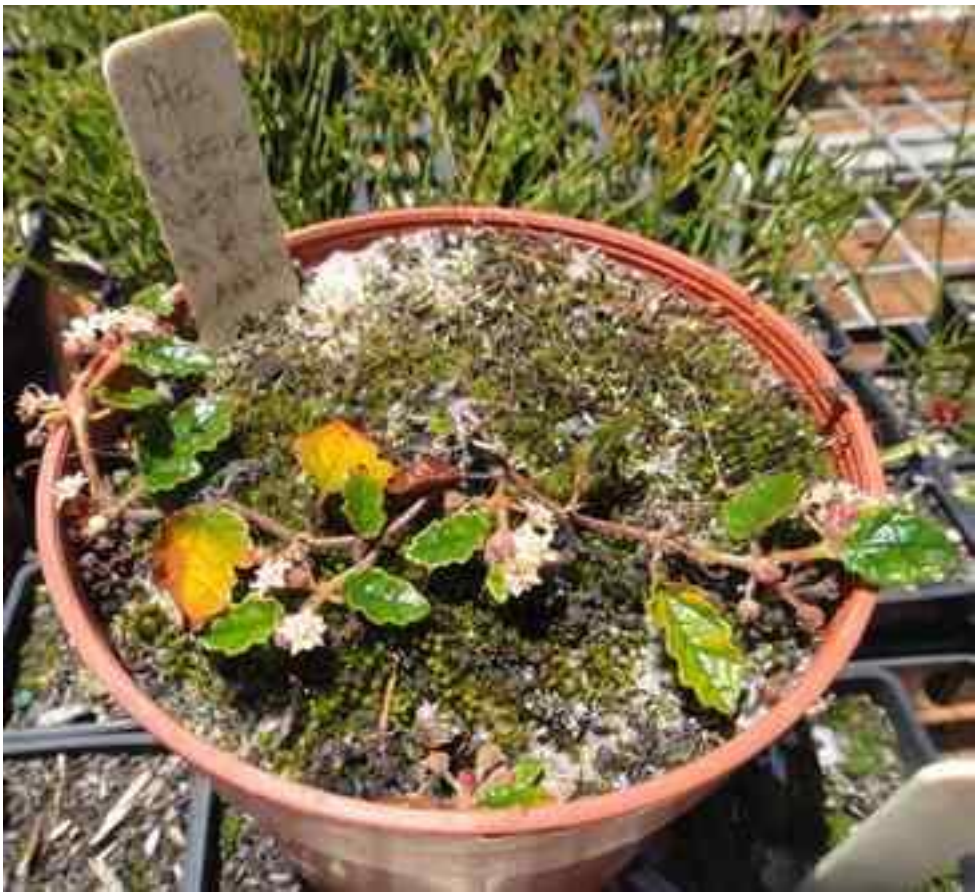
What is the total population size in terms of number of mature individuals? Has there been any known reduction in the size of the population, or is this likely in the future? – provide details. Are there other useful measures of population size and what are they? Or if these are unavailable, provide an estimate of abundance (e.g. scarce, locally abundant etc).

Last surviving individual in the wild died in 2009. Another previously recorded mature individual and a seedling have been observed at the site in recent history, which have also not survived (Paul Offszanka, pers. comm.). No other individuals are known to have been at this site and it is not known if this was previously a larger subpopulation.

The 1962 record of this species gives no indication of the abundance of this plant at this collection site.

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?

There is one individual still alive in cultivation at the Botanic Gardens and Parks Authority (BGPA), which is a clone of the most recent wild plant. More recent propagation attempts by BGPA indicate the species is reproducible from tissue cultured and cryostored material (shoot tips), with one potted plant from a single clone currently alive in the research collection. No fruit or seed has yet to be produced (Eric Bunn, pers. com.). Progress toward a translocation/re-introduction plan has not begun. Trials to induce recruitment nearby the recent subpopulation will be considered prior to a translocation or re-introduction. The road reserve on which the current known subpopulation occurs adjoins native vegetation on a Crown Reserve to the north-west, UCL to the south-east and a nature reserve to the north-west. So areas of similar habitat within these reserves would be the most appropriate locations for re-introduction, should this be considered appropriate. A recovery plan was prepared for this species in 2013.



Single clone of *Androcalva adenothalia* alive in BGPA nursery (photo from Eric Bunn, 2016).

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.

One previous location known.

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 location or occurrence.

Location	Land status	Date of most recent survey	Number of individuals at location	Area of occupancy at location	Condition of site

Canna	Road reserve, managed by the Shire of Morawa	Oct 2009	0	<0.5m²	Disturbed Road Verge

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

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

The species was collected at what may have been a second location recorded as "Morawa" in 1962 (although given the general nature of the location description, this could be the same site). If a second collection site did exist it is possible the species no longer occurs at this location due to vegetation clearing during the period since collection. Several areas of remnant vegetation around Morawa have been surveyed without success.

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

The hypothetical distance between the two recorded collections is approximately 30km, however as the location recorded as Morawa is not specific the collection could have been made anywhere in the Morawa Shire and could even be from Canna, it is very difficult to accurately determine the extent of occurrence. So based on observation of vegetation from Canna to Morawa, it is considered to be likely that the Morawa collection is not from the vicinity of the Morawa townsite and likely extent of its previous occurrence is much less than 50km².

Is the distribution of the species severely fragmented? Why?

The habitat of the species is fragmented due to agricultural clearing.

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.

The single known wild occurrence of the species is identified as important due to it being the only known location where a soil seed back may remain.

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.

Androcalva adenothalia was first collected by R.D. Royce (# 7516) in 1962 from a location recorded as Morawa. The methods and extent of Royce's survey are unknown.

Carol Wilkins (Botanical Consultant, WA Herbarium) visited the Morawa –Canna area in order to re-locate the species in August 2005 and after meeting with Paul Offszanka was taken to the single known location of the species, where the second collection was made. This survey consisted of a fairly brief search on foot of the area surrounding the previous known subpopulation.

Paul Offszanka is a wildflower enthusiast and photographer who has lived at Canna for 50 years. Mr Offszanka conducts wildflower walks in the area and explores the bushland at Canna as well as other areas from Canna to Morawa and further north up to Pindar during the spring flowering season over the past 20 years. During his numerous exploratory walks Mr Offszanka does not recall observing *Androcalva adenothalia* at any other locations. Mr Offszanka's survey methods have not been very formal and have generally consisted of fairly random searches on foot of areas within which flowers of interest are located. After Mr Offszanka became aware of the apparent rarity of *A. adenothalia* he searched in several previously burnt areas on foot for plants resembling this species, including an area south of Offszanka Road and another further north toward Pindar near Grima Rd.

Gemma Phelan (Conservation Officer (Flora), DEC Geraldton) surveyed the known subpopulation of the species in October 2007 and surveyed further on foot north of the subpopulation.

Rob Davies (WA Herbarium) surveyed the Canna area for 2−3 days during September 2007. Mr Davies observed the known individual in flower at this time and collected various other plant specimens in the Canna area during this field trip, however did not find *Androcalva adenothalia* at any new locations.

Jenny Borger (Botanical Consultant) also observed the species in flower during September 2007 and spent 2−3 days at this time carrying out survey for priority flora in the Canna area, mostly on foot. Jenny has conducted extensive flora surveys in bushland from Canna to Three Springs over about 10 years and has not observed *Androcalva adenothalia* at any new locations.

Alanna Chant (Conservation Officer (Flora), Midwest) carried out surveys in the Canna and Morawa areas during spring 2008 and 2009 (25 August 2009, 8 – 9 September 2009, 27 – 28 October 2009) searching specifically for *Androcalva adenothalia*, as well as several other Priority Flora, by searching on foot and targeting areas of disturbance and areas of appropriate habitat. Areas surveyed include road verges, rail reserve, gravel pits, rubbish dump, fence lines, fire scar areas, Morawa Airport and areas of disturbed vegetation surrounding townsite, picnic spots at granite outcrops and car park bays between Canna and Morawa. A total of 6 full days were spent in these areas over spring 2008 and 2009.

An opportunistic visit to the known subpopulation by DPaW staff in 2014 failed to locate the species.

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

The species is considered as moderately distinct. Its prostrate habit and dark green shiny leaves make it distinct from other members of the Malvaceae family that occur locally. It is not highly distinct to the general community due to its small white flowers, however wildflower enthusiasts and amateur botanists would recognise it as not being common, so it is likely that if it occurred much more frequently it would have been collected and recorded more than twice. Also, being a disturbance responsive species it would likely be present in open and recently cleared locations such as road reserves, which would increase its likelihood of being collected.

Commersonia adenothalia ms Photos: J. Borger

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.

Androcalva adenothalia has been reasonably well surveyed by various people, several of whom are reasonably familiar with the flora of the local area.

Androcalva adenothalia was first collected by R.D. Royce (# 7516) in 1962 from a location recorded as Morawa. The extent of Royce's surveys in Morawa are not known, however he was the WA Herbarium Curator (1964 – 1970) and known to be a botanist who collected many small drought tolerant plants suitable for small gardens, so is likely to have noticed this plant as being uncommon.

Carol Wilkins (Botanical Consultant, WA Herbarium) visited the Morawa –Canna area in order to re-locate the species in August 2005, and after meeting with Paul Offszanka was taken to the single known location of the species, where the second collection was made.

Paul Offszanka is a wildflower enthusiast and photographer who lives at Canna and conducts wildflower walks in the area as well as providing wildflower information to tourists. Paul knows the flora of the local area well due to his interest in exploring the bushland around the Canna townsite as well as other areas from Canna to Morawa and has not seen the species at any location other than the single recent subpopulation.

Gemma Phelan (Conservation Officer (Flora), DEC Geraldton) surveyed the recent subpopulation in October 2007 and surveyed further along north of the subpopulation.

Jenny Borger (Botanical Consultant) and Rob Davies (WA Herbarium) surveyed the Canna area during September 2007. They both observed the plant in flower at the known site, and made other collections of Priority Flora in the Canna area during this trip, however did not find *Androcalva adenothalia* at any other location.

Eric Bunn (Botanic Gardens and Parks Authority) collected material from the plant in January 2008 for the purpose of propagating new individuals at the Kings Park Botanic Gardens. Eric searched for the plant in the immediate vicinity of the known location.

Alanna Chant (Conservation Officer (Flora), Midwest) carried out surveys on foot in the Canna and Morawa areas during spring 2008 and 2009 (25 August 2009, 8 – 9 September 2009, 27 – 28 October 2009) searching specifically for *Androcalva adenothalia*, as well as several other Priority Flora, and targeting areas of disturbance. Areas surveyed included road verges, rail reserve, gravel pits, rubbish dump, fence lines, fire scar areas, Morawa Airport and areas of disturbed vegetation surrounding townsite, picnic spots at granite outcrops and car park bays between Canna and Morawa.

Young plants thought to be *Androcalva adenothalia* were found during an opportunistic visit to the known subpopulation by Andrew Crawford (DPaWs Threatened Flora Seed Centre) in 2014. A follow up visit when the plants had matured revealed they were not the species and was a *Keraudrenia*.

Androcalva adenothalia was not found at any of the locations surveyed other than the single individual at the one known recent location. It may be possible that some individuals do occur in nearby areas, such as in vegetation on private property, which have not been accessible to survey. It is likely that if further individuals persist in other locations, they are possibly not in secure locations.

Due to the recent subpopulation consisting of a single individual it appears that the species may not recruit readily and there may be factors relating to its reproduction that are contributing to its rarity. If other subpopulations persist in vegetation on nearby private property it is possible these may consist of only a few individuals rather than in large numbers.

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?).

Agricultural clearing – predominantly a past threat that is likely to have removed subpopulations and habitat for this species. Bushland surrounding Canna siding is quite different to that in surrounding areas and other similar vegetation that may have previously existed does not appear to remain. This observation is based only on my experience of flora survey in the District over a number of years (2000 – 2010) rather than actual vegetation mapping. The expected effect of this on the future for this species may be that it may not be viable to conserve the species other than to attempt to maintain and re-introduce subpopulations at the Canna bushland, although there is little known about the species recruitment and survival requirements so this is very difficult to predict with any certainty.

Roadworks and accidental clearing – suspected as a current threat to the only known site due to its road verge location. It is likely that this threat has already resulted in the loss of one mature individual, which was present at the subpopulation prior to the last road maintenance event. The lack of a disturbance could also threaten long term survival and disturbance response trials are required to determine how best to manage the site.

Poor recruitment is also suspected as a current threat, based on the fact that there was only one plant in the subpopulation it does not appear to recruit readily. Disturbance response, seed viability and germination trials are required for future management.

Drought and climate change are suspected as current and future threats. The recent drought may have resulted in the death of recently recorded plants. It is possible that this plant may have a summer dormancy period during which it loses foliage. Research into its longevity and drought response would be required to determine if watering is a viable management option for any new subpopulations that may be found in the future. Long term climate change may impact the viability of any new subpopulations that are located or established, if the species is existing in habitat at the extreme of its moisture tolerance.

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

Location	Past threats	Current threats	Potential threats	Management requirements (see section 4.4)
Morawa (historical collection site, unconfirmed)	Agricultural clearing	Unknown	Road works, weeds, grazing, salinity, drought	Further survey of remnant vegetation Canna – Morawa to locate new subpopulations.
Canna	Roadworks, drought	Roadworks, drought	Inappropriate fire regimes, poor recruitment	Roadside makers, liaise with land managers. Monitor periodically to check for new recruits.

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.

Clones from one plant exist at BGPA, therefore extremely low genetic diversity is an obvious threat and poor recruitment is also a likely threat. Trials to stimulate recruitment in the vicinity of the known subpopulation could result in germination of new seedlings and increase the genetic diversity. Trials could include prescribed fire and mechanical disturbance, but careful consideration would be required to minimise unproductive expenditure of any currently existing seed in the soil.

The likelihood that the species is disturbance responsive is also a threat to individuals due to the locations they are likely to germinate in. Disturbed areas nearby the known subpopulation (road verges, gravel pits, rubbish dumps and rail reserves) are unlikely to be secure habitats as they are often threatened by further disturbance and weed invasion. Research into the plants longevity and the frequency with which disturbances may be required to maintain populations would provide information required to effectively manage possible new subpopulations. However, this information is extremely difficult to gain without the presence of wild subpopulations.

4.4. Management

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

An Interim Recovery Plan was developed for the species in 2013.

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

The vegetation where the species was known to occur is not subject to any obvious current or past land uses (Crown reserve and UCL) so the surrounding habitat is pristine, despite the road verge being disturbed it is relatively weed free.

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

The species is not known to occur on conservation reserves or covenanted land. The only previously known subpopulation was on a Shire road reserve.

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

It is recommended that seed viability and germination research would be useful as it appears the species does not recruit readily, if it were possible to obtain seed at some point in the future. Research into response to fire or other disturbance would be useful if possible.

Further management recommendations include:

- Monitoring for evidence of germinants, grazing impacts, or changes in site health;
- Installation of threatened flora markers on the road reserve;
- Attempt to stimulate recruitment through germination trials;
- Propagation of vegetative material for collection of viable seed for future translocation;
- Develop and implement a fire management strategy, including the need for, and method of, the construction and maintenance of firebreak;
- Undertake surveys in areas of potentially suitable habitat.

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

None

SECTION 5. NOMINATOR

Nominator(s) name(s)	
Organisation(s)	
Address(s)	
Telephone number(s)	
Email(s)	
Date	Updated by Species and Communities Branch 15/12/2016

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

Carol Wilkins

Paul Offszanka

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.

Department of Environment and Conservation (2013) *Androcalva adenothalia* (formerly *Commersonia adenothalia*) Interim Recovery Plan 2013–2018. Interim Recovery Plan No. 336. Department of Environment and Conservation, Western Australia.

Western Australian Herbarium (1998–) *FloraBase – The Western Australian Flora.* Department of Environment and Conservation. http://florabase.calm.wa.gov.au/.

Whitlock BA, Hale AM, Indorf JL, Wilkins CF (2011) Polyphyly of *Rulingia* and *Commersonia*, (Lasiopetaleae, Malvaceae *s.l.*). *Australian Systematic Botany* 24: 215–225.

Wilkins, C.F. and Whitlock, B.A. (2011) A new genus *Androcalva* separated from *Commersonia* (Malvaceae *s.l.* or Byttneriaceae). *Australian Systematic Botany* 24: 284−349.

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Dr Eric Bunn, Senior Research Scientist (Conservation Biotechnology), Botanic Gardens and Parks Authority, Perth WA.

Paul Offszanka.

Jenny Borger.

Robert Davis, Botanist, WA Herbarium Kensington.

DEC Midwest File *Commersonia adenothalia* ms