Abridged Threatened Species Nomination Form

For nominations 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)*

Species name (scientific and common name)**:**	***Caladenia luteola* Lemon Spider Orchid**
Nomination for (addition, deletion, change)**:**	**Change**
Nominated conservation category and criteria:	**CR: B1ab(iii,v)+ 2ab(iii,v); C2a(ii)**

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 summary *(to be completed by nominator)*

Current conservation status				
Scientific name:	*Caladenia luteola*			
Common name:	Lemon Spider Orchid			
Family name:	Orchidaceae		Fauna ☐	Flora ☒
Nomination for:	Listing ☐	Change of status ☒		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	2011	Critically Endangered	B1ab(iii,v) + 2ab(iii,v); C2a(i)
	2. WA	2016	Critically Endangered	B1ab(iii,v)+ 2ab(iii,v); C2a(ii)
	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:	Additional surveys undertaken in 2012, 2013, 2014 and 2015 with one new population of 1 plant found in 2014 and an extension of another declining population (32 plants) found in 2012.
• 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:	The WA TSSC supported the nomination in 2011 with the CR criteria B1ab(iii,v) + 2ab(iii,v); C2a(i). The current assessment is consistent with that assessment, however, criterion C2a(i) is amended to C2a(ii) due to new information from field survey.

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?		**B1ab(iii,v) + 2ab(iii,v); C2a(ii)**
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)	• Repeated monitoring has shown a decline in observed plants at known sites, however, insufficient information to reliably show rate of decline.
B.	Geographic range (EOO and AOO, number of locations and evidence of decline)	• Known from 3 sites at 2 locations approximately 47 km apart (EEO < 100 km^2). As such the area of occupancy (AOO) is 8km^2 using the IUCN 2x2 km grid method. The combined mapped area of the population is 1.033 ha or 0.01033 km^2. • Observed ongoing decline in the number of mature individuals since 1985. A decline in condition of habitat has also occurred due to salinity and weeds. • The two locations are severely fragmented as each site is an isolated area of remnant vegetation due to extensive clearing of habitat in this region. • **Meets CR: B1ab(iii,v) + B2ab(iii,v)**
C.	Small population size and decline (population size, distribution and evidence of decline)	• Known from 71 mature plants – 1 at the Woodanilling sites and 70 at the Katanning site. • At the original Woodanilling site, the population size has decreased from over 50 mature plants when it is was first discovered in 1985, to 1 mature plant in 2013 and nil plants observed in 2014. • At the Katanning site, there has been a population decline from 216 mature plants in 2011 when a full survey was undertaken, to 70 plants in 2016, despite an additional record of 32 plants in 2012. • Observed ongoing decline in number of mature individuals since 1985. A decline in condition of habitat has also occurred due to salinity and weeds. • 70 (98%) mature plants occur in one location. • **Meets CR: C2a(ii)**
D.	Very small or restricted population (population size)	• 71 mature plants • **Meets EN: D**
E.	Quantitative analysis	• No data

	(statistical probability of extinction)	

Summary of assessment information

EOO	< 100km^2	AOO	8km^2 using the 2x2 km grid method. The mapped area of the population is 0.01 km^2.	Generation length	-

No. locations	2	Severely fragmented	Yes ☒ No ☐ Unknown ☐
No. subpopulations	3	No. mature individuals	71

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)*
Refer table at end		

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).

- Draft Interim Recovery Plan awaiting State approval.

List current management or research actions, if any, that are being undertaken that benefit the conservation of the species.

- Protect from Shire works including mechanical disturbance and fire.
- Liaise with private land owners to protect the remnant vegetation on which the species occurs, including through exclusion of stock.
- Liaise with road managers to minimise disturbance to adjacent vegetation when maintaining roads.
- Manage fire in the remnant areas to protect the species and maintain habitat condition.
- Location of additional populations.

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.

- Undertake weed control.
- Minimize changes in groundwater levels.
- Establishment of the limiting factors in germination (microhabitat, mycorrhizal).
- Collection of seed and mycorrhizal fungi for *ex situ* propagation.
- Develop an *ex situ* collection.
- Establishment of new populations in areas of suitable habitat with appropriate mycorrhizal fungi.

Nomination prepared by:	
Contact details:	
Date submitted:	22/6/2016
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	Area of population	Site / habitat Condition	Threats *(note if past, present or future)*	Specific management actions
10.5 km W of Woodanilling on Robinson Rd	Unmanaged Reserve	1985: 50 2011: 6 2013: 1 2014: 0	0.03 ha	Generally good, though some weed invasion along creeks and margins of reserve. The site of the original discovery along the edge of a creek is becoming saline. Currently known plants are found further upslope.	Past: • Land clearance, roadworks Current: • Weeds, salinity • Small population size • Low rainfall • Grazing • Road widening • Winter and spring fires • Low fruit set • Low recruitment Future • Changing groundwater levels • Salinity	As above
Reserve 6272, 25 km ESE of Katanning	Unmanaged Reserve and adjacent private property	2009: 50 2011: 216 2012: 211* 2014: 179* 2015: 70* *includes additional occurrence	1.0 ha	Generally good	Past • Land clearance • Gravel extraction • Rubbish dumping • Timber harvesting Current • Declining population size • Rubbish dumping	As above

		recorded on adjacent private property. 32 plants in 2012.			• Track access • Low rainfall • Salinity Future • Weed invasion • Changing groundwater levels • Small population size • Low fruit set • winter and spring fires	
11 km W of Woodanilling on Douglas Rd	Private property	2014: 1	0.003 ha	Very good	Past • Land clearance Current • Similar to other Woodanilling site Future • Changing groundwater levels	As above

Department of
Environment and Conservation

Our environment, our future

Form to nominate a Western Australian species for listing as threatened, change of category or delisting 2011 (updated 2016).

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

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

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

SECTION 1. NOMINATION					
1.1. Nomination for:					
Flora ☒ | **Fauna** ☐ | **Threatened / DRF** ☒ **Change of category** ☐ **Delisting** ☐					
1.2. Scientific Name **This name will be used to identify the species on all official documentation. Use the approved name used by the Western Australian Museum or Herbarium. If this is not possible, use unpublished names or numbers of voucher specimens.**					
Caladenia luteola					
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.**					
Lemon Spider Orchid					
1.4. Current Conservation Status. If none, type 'None'.					
	IUCN Red List Category e.g. Vulnerable		**IUCN Red List Criteria e.g. B1ab(iv);D(1)**		
International IUCN Red List	None				
National EPBC Act 1999	None				
State of Western Australia	Critically Endangered		B1ab(iii,v) +2 ab(iii,v); C2a(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** ☐

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

No ☒ **Yes** ☐

1.5. Nominated Conservation Status.

	IUCN Red List Category e.g. Vulnerable	**IUCN Red List Criteria e.g. B1ab(iv);D(1)**
National	**Critically Endangered**	**B1ab(iii,v)+2ab(iii,v); C2a(ii)**
State of WA Priority	1☐ 2☐ 3☐ 4☐ 5☐	

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.

- The species was listed as Critically endangered in WA in 2012.
- It has been surveyed for over many years by members of the Western Australian Native Orchid Study and Conservation Group (WANOSCG) and also extensively surveyed for by Department of Parks and Wildlife staff and the former Department of Environment and Conservation staff. Despite these survey efforts *C. luteola* is known from only three sites in two locations.
- The species meets Critically Endangered under IUCN criteria B1ab(iii,v)+2ab(iii,v); C2a(ii) as the extent of occurrence is less than 100km^{2,}, the area of occupancy is less than 10km^2, the occurrences are severely fragmented, there has been an ongoing decline in the number of mature individuals and quality of habitat, a total of 71 individuals known and more than 90% (98%) of mature individuals occur in one population.

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.

Caladenia luteola (Lemon Spider Orchid) was described in 2001 by Stephen Hopper and Andrew Brown from specimens collected by Stephen Hopper in 1985, *S.D. Hopper 5650* (Hopper & Brown 2001). *C. luteola* shares with *C. xantha*, *C. elegans* and *C. caesarea* glistening tops to the labellum calli and predominantly yellow floral colouration (Hopper & Brown 2001). *C. luteola* differs from *C. caesarea* in its paler yellow to cream flowers with narrow less conspicuous stripes and markings on the labellum (Hopper & Brown 2001). From *C. elegans*, *C. luteola* differs in its stiffly held obliquely descending lateral sepal apices and its lemon-yellow to cream and usually longer labellum lamina. *C. luteola* differs from *C. xantha* in its later flowering season and larger flowers (Hopper & Brown 2001).

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.

It is known on rare occasions to hybridize with *Caladenia caesarea* subsp. *caesarea* (Hopper & Brown 2001).

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).

Herbaceous perennial geophyte to 30 cm. Occurs singularly or as small groups. Flowers in spring (September to October). Leaf green and hairy, originating from the base of the scape; flowers 1-2, 6-9 cm across; creamy yellow perianth segments spreading widely and stiffly held; 2 rows of calli on the labellum (Figure 1).

2.3. Distribution

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

It is known from three sites at two locations, two approximately 10 km west of Woodanilling (Figures 2 and 3) and another approximately 25 km east-south-east of Katanning (Figure 2 and 4).

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

Soils are sandy clays to rich sandy loams.

Biological habitat

West of Woodanilling the species grows amongst dense herbs and grasses in a mixed woodland of *Eucalyptus wandoo*, *Acacia acuminata* and *Allocasuarina huegeliana*. East of Katanning it grows in open *Eucalyptus longicornis* woodland.

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 occurs between September and October with fruit set from mid-October until mid-November. The number of flowering plants is lower in years of poor rainfall. There has been no testing undertaken on the viability of seed. Based on the biology of closely related species it is likely that *C. luteola* attracts nectar foraging insects through prominent floral display but does not provide any nectar (Phillips *et al.* 2009). While *C. luteola* has not been examined for clonality, it is likely to occasionally be clonal based on the behaviour of closely related species. The species does not require disturbance to reproduce. Rather, disturbance is likely to be detrimental. Germination requires the presence of mycorrhizal fungi. Based on other *Caladenia*, *C. luteola* is likely to use only one or few species of mycorrhizal fungus (Swarts *et al*. 2010).

2.6. Population dynamics

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

No information is available on population dynamics.

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.

Known from three sites at two locations in South-western Australia; two sites west of Woodanilling and one site east-south-east of Katanning, a distance of approximately 40 km.

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

Does not occur outside of 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?

Does not occur outside of Australia.

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).

Known from 71 plants – 1 at the Woodanilling sites and 70 at the Katanning site. At the original Woodanilling site population size has decreased from over 50 plants when it is was first discovered in 1985, to 1 plant in 2013 and nil plants observed in 2014.

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

No plants occur in *ex situ* collections. There are currently no plans for reintroductions though areas of suitable habitat are potentially available for reintroduction.

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.

Two locations. Detailed surveys in this region have failed to locate any further populations.

For <u>flora</u>, and where applicable, for <u>fauna</u>, detail the location, land tenure, estimated number of individuals, area of occupancy, and condition of site for each known date, location or occurrence.

Date of last survey	Location	Land status	Number of individuals at location	Area of occupancy at location	Condition of site
17/09/2014	10.5 km W of Woodanilling on Robinson Rd	Unmanaged Reserve	1985: 50 2011: 6 2013: 1 2014: 0	0.03 ha	Generally good, though some weed invasion along creeks and margins of reserve. The site of the original discovery along the edge of a creek is becoming saline. Currently known plants are found further upslope.

1/09/2015	Reserve 6272, 25 km ESE of Katanning	Unmanaged Reserve and adjacent private property	2009: 50 2011: 216 2012: 213* 2014: 179* 2015: 70* *includes additional occurrence recorded on adjacent private property.	1.0 ha	Generally good
25/09/2014	11 km W of Woodanilling on Douglas Rd	Private property	2014: 1	0.003 ha	Very good

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

An exact count has been conducted at all sites by volunteer observers. Repeated transects have been walked by small groups of surveyors through the known sites and other potential areas of habitat.

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

No current reduction in the number of known locations, with one new (nearby) site discovered in 2014 and additional occurrences of plants (32) on adjacent private property at the Katanning site in 2012. However, reduction is likely to occur in the future as those populations with repeated monitoring have shown a decline in observed plants.

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.

C. luteola is known from 3 sites at 2 locations approximately 47 km apart. If the decline in the Woodanilling population is maintained and this population becomes extinct, then the area of occurrence would be reduced to 0.02 km^2.

Area of occupancy is 1.033 ha or 0.01033 km^2.

Is the distribution of the species severely fragmented? Why?

Yes, the species is known from just three sites at two locations approximately 47 km apart. Each site is an isolated area of remnant vegetation. Due to extensive clearing of habitat in this region any future populations discovered will also be highly fragmented (Figure 3, 4).

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.

Protection of all populations is necessary for the long-term survival of the species.

4.2. Survey effort

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

Surveys conducted during mid September to mid October. Groups of surveyors walked transects through areas of suitable habitat.

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

C. luteola is highly detectable through a combination of prominent floral display and preference for open habitats. The only co-occurring predominantly yellow spider orchid flowering during late September and October is *Caladenia caesarea* subsp. *caesarea*. *C. luteola* is readily distinguished from this species by its paler yellow to cream flowers with narrow less conspicuous stripes and markings on the labellum (Hopper & Brown 2001).

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.

This species has been very well surveyed. Members of the Western Australian Native Orchid Study and Conservation Group, the Department of Parks and Wildlife and the former Department of Environment and Conservation have surveyed the original site between 1985- 2010. Likewise, both groups have targeted the relatively few remaining areas of suitable habitat specifically searching for this species over the same time frame. *C. luteola* grows in a habitat well known for its abundance of orchids and, as such, this habitat is extensively surveyed by amateur groups. Given the extensive survey effort and limited extent of remaining habitat, it is likely that current estimates are close to actual population and distribution sizes.

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?).

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

Location	Past threats	Current threats	Potential threats	Management requirements (see section 4.4)
10.5 km W of Woodanilling on Robinson Rd	Land clearance, roadworks	Weeds, salinity	Changing groundwater levels	
		Small population size	Salinity	
		Low rainfall		
		Grazing		
		Road widening		

		Winter and spring fires		
		Low fruit set		
		Low recruitment		
25 km ESE of Katanning	Land clearance	Declining population size	Weed invasion	
	Gravel extraction	Rubbish dumping	Changing groundwater levels	
	Rubbish dumping	Track access	Small population size	
	Timber harvesting	Low rainfall	Low fruit set	
		Salinity	winter and spring fires	
11 km W of Woodanilling on Douglas Rd	Land clearance	Similar to other Woodanilling site	Changing groundwater levels	

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.

The comparatively late flowering period of *C. luteola* may limit its reproduction. Through a trend of decreased rainfall in south-western Australia (Li *et al.* 2005) there are likely to be relatively few years where reproduction is possible. Further, nectarless orchids tend to have relatively low levels of fruit set (Phillips *et al*. 2009).

4.4. Management

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

Listed in the Wildlife Management Program - Declared Rare Flora in the Katanning District as *Caladenia caesarea* ssp. *subdita* ms.
Draft Interim Recovery Plan in prep

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

No. The habitat it occurs in is not managed for conservation.

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

Not represented in conservation reserves. The reserves and private land are not managed for the species.

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

- Protect from Shire works including mechanical disturbance and fire.
- Liaise with private land owners to protect the remnant vegetation on which the species occurs, including through exclusion of stock.
- Liaise with road managers to minimise disturbance to adjacent vegetation when maintaining roads.
- Manage fire in the remnant areas to protect the species and maintain habitat condition.
- Location of additional populations.
- Undertake weed control.
- Minimize changes in groundwater levels.
- Establishment of the limiting factors in germination (microhabitat, mycorrhizal).
- Collection of seed and mycorrhizal fungi for *ex situ* propagation.
- Develop an *ex situ* collection.
- Establishment of new populations in areas of suitable habitat with appropriate mycorrhizal fungi.

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

SECTION 5. NOMINATOR

Nominator(s) name(s)	
Organisation(s)	
Address(s)	
Telephone number(s)	
Email(s)	
Date	

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

SECTION 6. REFERENCES

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

Hopper, S.D. & Brown, A.P. (2001) Contributions to Western Australian Orchidology: 2. New taxa and circumscriptions in *Caladenia* (Spider, Fairy and Dragon Orchids of Western Australia). *Nuytsia*, 14, 27-307.

Li, Y., Cai, W.J. & Campbell, E.P. (2005) Statistical modelling of extreme rainfall in south-west Western Australia. *Journal of Climate*, 18, 852-863.

Phillips, R.D., Faast, R., Bower, C.C., Brown, G.R. & Peakall, R. (2009) Implications of pollination by food and sexual deception for pollinator specificity, fruit set, population genetics and conservation of *Caladenia* (Orchidaceae). *Australian Journal of Botany*, 57, 287-306.

Swarts, N.D., Sinclair, E.A., Francis, A. & Dixon, K.W. (2010) Ecological specialisation in the orchid mycorrhizal interaction leads to rarity in the endangered terrestrial orchid *Caladenia huegleii*. *Molecular Ecology*, 19, 3226-3242.

Figure 1: *Caladenia luteola*, the Lemon Spider Orchid.

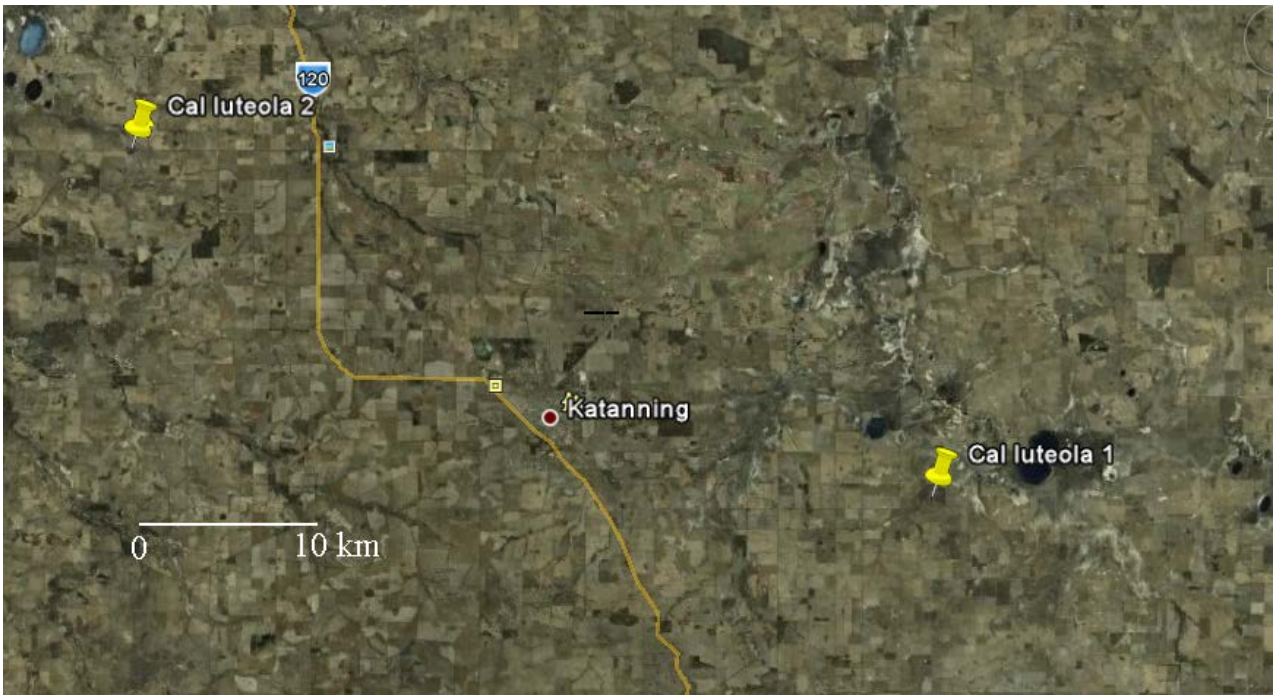

Figure 2: The known locations of *Caladenia luteola* demonstrating the scarcity of natural vegetation remaining within its distribution.

Figure 3: The sites of *Caladenia luteola* at the location west of Woodanilling.

Figure 4: The location of *Caladenia luteola* south-east of Katanning.