

Abridged Threatened Species Nomination Form

For nominations/assessments under the Common Assessment Method (CAM) where supporting information is available, but not in a format suitable for demonstrating compliance with the CAM, and assessment against the IUCN Red List threat status.

Cover Page *(Office use only for Assessment)*

Species name (scientific and common name):	<i>Caladenia granitora</i> Hopper & A.P.Br.
Nomination for (addition, deletion, change):	Addition
Nominated conservation category and criteria:	Endangered: 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 <input type="checkbox"/> No <input type="checkbox"/>
A.	Population size reduction	•
B.	Geographic range	•
C.	Small population size and decline	•
D.	Very small or restricted population	•
E.	Quantitative analysis	•

Outcome:			
<i>Scientific committee Meeting date:</i>			
<i>Scientific committee comments:</i>			
<i>Recommendation:</i>			
<i>Ministerial approval:</i>		<i>Date of Gazettal/ Legislative effect:</i>	

Nomination/Proposal summary *(to be completed by nominator)*

Current conservation status				
Scientific name:	Caladenia granitora Hopper & A.P.Br.			
Common name:	Granite Spider Orchid			
Family name:	Orchidaceae	Fauna <input type="checkbox"/>	Flora <input checked="" type="checkbox"/>	
Nomination for:	Listing <input checked="" type="checkbox"/>	Change of status/criteria <input type="checkbox"/>	Delisting <input type="checkbox"/>	
1. Is the species currently on any conservation list, either in a State or Territory, Australia or Internationally? 2. Is it present in an Australian jurisdiction, but not listed?		Provide details of the occurrence and listing status for each jurisdiction in the following table		
Jurisdiction	State / Territory in which the species occurs	Date listed or assessed (or N/A)	Listing category i.e. critically endangered or 'none'	Listing criteria i.e. B1ab(iii)+2ab(iii)
International (IUCN Red List)				
National (EPBC Act)				
State / Territory	1. WA	2014	Endangered	D
	2.			
	3.			
Consistent with Schedule 1, item 2.7 (h) and 2.8 of the Common Assessment Method Memorandum of Understanding, it is confirmed that:				
<ul style="list-style-type: none"> this assessment meets the standard of evidence required by the Common Assessment Method to document the eligibility of the species under the IUCN criteria; 			Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Comments:				
<ul style="list-style-type: none"> surveys of the species were adequate to inform the assessment; 			Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Comments:	The species has been extensively searched for by competent persons for the past 25 years with few subpopulations/plants found and only one new subpopulation found in recent years (2016). Due to the predictability of its habitat (coastal granites) there is a high likelihood of detection if plants are present.			
<ul style="list-style-type: none"> the conclusion of the assessment remains current and that any further information that may have become available since the assessment was completed supports or is consistent with the conclusion of the assessment. 			Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Comments:	Assessment is consistent and criteria remains current. It is believed that on the basis of limited numbers of plants and the significant threat to the largest subpopulation through damage by Recreational 4WD vehicles, there is imminent threat of decline without formal protection as threatened flora.			
Nominated national conservation status: category and criteria				

Presumed extinct (EX) <input type="checkbox"/>	Critically endangered (CR) <input type="checkbox"/>	Endangered (EN) <input checked="" type="checkbox"/>	Vulnerable (VU) <input type="checkbox"/>
None (least concern) <input type="checkbox"/>	Data Deficient <input type="checkbox"/>	Conservation Dependent <input type="checkbox"/>	
What are the IUCN Red List criteria that support the recommended conservation status category?	D		
Eligibility against the IUCN Red List criteria (A, B, C, D and E)			
<i>Provide justification for the nominated conservation status; is the species eligible or ineligible for listing against the five criteria. For delisting, provide details for why the species no longer meets the requirements of the current conservation status.</i>			
A.	Population size reduction (evidence of decline)	<ul style="list-style-type: none"> No recent size reduction. 	
B.	Geographic range (EOO and AOO, number of locations and evidence of decline)	<ul style="list-style-type: none"> EEO 25.7km². AOO calculated on a 2x2km is 16 km². 3 locations based on the risk of fire occurrence at the 5 subpopulations Some decline in habitat condition noted at one location, but may not be ongoing with management. Insufficient information to assess. 	
C.	Small population size and decline (population size, distribution and evidence of decline)	<ul style="list-style-type: none"> Currently known from 103 mature individuals. Although there has been a decline in number of mature individuals at monitored sites since 2013, this may be attributable to survey or seasonal variation in flowering. Further survey is required to quantify any real decline. Insufficient information to assess. 	
D.	Very small or restricted population (population size)	<ul style="list-style-type: none"> Currently known from 103 mature individuals. Meets criterion D for Endangered 	
E.	Quantitative analysis (statistical probability of extinction)	<ul style="list-style-type: none"> No information to assess. 	
Summary of assessment information			
EOO	25.7km ² . Calculated by determining the area of the convex polygon clipped to the coastline.	AOO	Using a 2x2km grid, the AOO is 16 km ² .
Generation length			
No. locations	3	Severely fragmented	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>
No. subpopulations	5	No. mature individuals	103
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)
Recreational activities. <ul style="list-style-type: none"> Destruction of habitat by 4WD vehicles and track maintenance is a threat to part of Subpopulation 1. The subpopulation is located within a recreation reserve and adjoins a parking area, road and track. The margins of the parking area and track have been gradually expanding, destroying orchid habitat. Recent works have been carried out on the track, upgrading and resurfacing it to discourage vehicles running off its edge. However, some vehicles are still doing this. Past, current and potentially future	Subpopulation 1	High
Small population size. <ul style="list-style-type: none"> As <i>Caladenia granitora</i> is known from just 103 mature individuals, and its habitat is limited to a few coastal granites, the likelihood of the species falling victim to a chance demographic or environmental event is high. Future	Whole species	High
Road maintenance. <ul style="list-style-type: none"> Threats to the part of Subpopulation 1 alongside a main road include grading, chemical spraying, construction of drainage channels and the slashing of roadside vegetation. Future	Subpopulation 1	High
Altered fire regimes. <ul style="list-style-type: none"> Fire during the summer when plants are dormant has no known detrimental impact on the species. However, fire during late autumn, winter and early spring may adversely affect the viability of populations by directly killing plants and also preventing seed set. Most orchid species emerge from the soil by mid-April and dehisce their seed by late November. The optimum time for fire is therefore between December and mid-April. Future	Whole species	Medium
Management and Recovery		

Is there a Recovery Plan (RP) or Conservation Management Plan operational for the species?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<p><i>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).</i></p> <ul style="list-style-type: none"> Included in Western Australian Wildlife Management Program No 20 – Declared Rare and Poorly Known Flora in the Albany District, C.J. Robinson and D.J. Coates 1995 and Interim Recovery Plan No. 361 Granite Spider Orchid (<i>Caladenia granitora</i>) 2016-2021. 	
<p><i>List current management or research actions, if any, that are being undertaken that benefit the conservation of the species.</i></p> <ul style="list-style-type: none"> Monitoring and surveys have been carried out to determine plant numbers and impact of threats. Land managers (City of Albany) have been notified of the location and threatened status of <i>Caladenia granitora</i>. Notifications detail their legal obligations in regards to its protection. Threatened flora markers have been installed along the main road at Subpopulation 1. Seed collected by the Botanic Gardens and Parks Authority (BGPA) from Population 1 is in long term storage. Recent works have been carried out on the track running past Subpopulation 1, upgrading and resurfacing it to discourage vehicles running off its edge. 	
<p><i>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.</i></p> <ul style="list-style-type: none"> Ongoing monitoring and observations of subpopulation and threats. Rehabilitate habitat adjacent to the track through Subpopulation 1. Collect and store seeds along with samples of the orchid's symbiotic fungus to guard against the extinction of natural populations. Collections of seed should aim to sample and preserve the maximum range of genetic diversity possible. Develop and implement a translocation proposal if natural populations decline. Develop and implement a fire management strategy. <i>Caladenia granitora</i> is thought to be killed by fire if it occurs while the plant is in active growth. It is important therefore that a fire regime with appropriate fire frequency, intensity and seasonality be applied to areas occupied by the species. Continue undertaking surveys for new populations. Ensure long-term protection of habitat. Parks and Wildlife will investigate ways and means of improving the security of <i>Caladenia granitora</i> habitat at Subpopulation 1. This may include vesting change, acquiring land or developing management plans in consultation with land managers. Liaise with land managers and Aboriginal communities to ensure that populations of <i>Caladenia granitora</i> are not accidentally damaged or destroyed and its habitat is maintained in suitable condition for the conservation of the species. Aboriginal consultation will take place to determine if there are any issues or interests in areas that are habitat for the species. Map habitat critical to the survival of the species to facilitate its protection and appropriate management Promote awareness of the species with general public. 	
Nomination prepared by:	
Contact details:	
Date submitted:	6/9/2016
<p><i>If the nomination has been refereed or reviewed by experts, please provide their names and contact details:</i></p>	

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 subpopulat ions	Site / habitat Condition	Threats (note if past, present or future)	Specific management actions
Cheyne Beach (34.8792778 118.4089167)	Shire Recreation Reserve and Shire Road Reserve	1999: 40 2009: 56 2013: 53 2014: 20 2015: 50	Not recorded	Mostly moderate to good, part degraded	Recreational activities (past, present, future) Small population size (future) Road and track maintenance (future) Altered fire regimes (future)	Rehabilitate habitat adjacent to track through Subpopulation Collect and store further seed along with samples of the orchid's symbiotic fungus Develop and implement a translocation proposal if Subpopulation declines Develop and implement a fire management strategy Liaise with land manager to ensure the habitat of the Subpopulation is not accidently damaged or destroyed and its habitat is maintained in suitable condition for the conservation of the species Map habitat critical to the survival of the species to facilitate its protection and appropriate management
Mt Manypeaks (- 34.9138889 118.2441667)	Nature reserve	1987: 10 2015: 2 leaves	Not recorded	Healthy, habitat excellent	Altered fire regimes (future)	Develop and implement a fire management strategy Liaise with land manager to ensure the habitat of the Subpopulation is not accidently damaged or destroyed and its habitat is maintained in suitable condition for the conservation of the species Map habitat critical to the survival of the species to facilitate its protection and appropriate management

Mt Many Peaks (- 34.9088889 118.2461111)	Nature reserve	1987: 8	Not recorded	Healthy, habitat excellent	Altered fire regimes (future)	Develop and implement a fire management strategy Liaise with land manager to ensure the habitat of the Subpopulation is not accidentally damaged or destroyed and its habitat is maintained in suitable condition for the conservation of the species Map habitat critical to the survival of the species to facilitate its protection and appropriate management
SW of Cheyne Beach (- 34.9013333 118.3997778)	Geodetic station	2002: 12 2015: 13	Not recorded	Healthy, habitat excellent	Altered fire regimes (future)	Develop and implement a fire management strategy Liaise with land manager to ensure the habitat of the Subpopulation is not accidentally damaged or destroyed and its habitat is maintained in suitable condition for the conservation of the species Map habitat critical to the survival of the species to facilitate its protection and appropriate management
Mt Gardner	Nature reserve	2016: 40	Not recorded	Habitat recovery after severe fire	Altered fire regimes (current and future)	Develop and implement a fire management strategy Liaise with land manager to ensure the habitat of the Subpopulation is not accidentally damaged or destroyed and its habitat is maintained in suitable condition for the conservation of the species Map habitat critical to the survival of the species to facilitate its protection and appropriate management



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 2013 (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:

[DEC 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 \(September 2011\). \[www.iucnredlist.org\]\(http://www.iucnredlist.org\)](#)

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

Species and Communities Branch
Department of Environment and Conservation
Locked Bag 104
BENTLEY DC WA 6983

Telephone: (08) 9334 0455

Email: tssc@dec.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. DEC staff can advise you on how to fill out the form and may be able to supply additional, unpublished information.

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

SECTION 1. NOMINATION					
1.1. Nomination for:					
Flora <input checked="" type="checkbox"/>	Fauna <input type="checkbox"/>	as: Threatened / DRF <input type="checkbox"/> Change of category <input type="checkbox"/> Delisting <input type="checkbox"/>			
1.2. Scientific Name This name will be used to identify the species on all official documentation. Use the approved name used by the Western Australian Museum or Herbarium, if possible.					
<i>Caladenia granitora</i> Hopper & A.P.Br.					
1.3. Common Name If the species has a generally accepted common name, please show it here.					
Granite Spider Orchid					
1.4. Family Name					
Orchidaceae					
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				
National EPBC Act 1999	None				
State of Western Australia	Endangered			D	
State of WA Priority	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
1.6. Nominated Conservation Status.					
	IUCN Red List Category			IUCN Red List Criteria	
State of Western Australia	Endangered			D	
State of WA Priority	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Is the species listed as 'Threatened' in any other Australian State or Territory? If Yes, list these States and/or Territories and the status for each.					
No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> 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.					
<ul style="list-style-type: none"> As at 5 September 2016 <i>Caladenia granitora</i> is known from four subpopulations comprising a total of 63 mature (flowering) individuals. These include a large population of 50 mature individuals in an area under threat from 4WD recreational activity and a small population of 13 mature individuals in currently undisturbed habitat. Two subpopulations are not known to contain extant mature plants but habitat is intact and it is possible plants were missed given they were found over just a few square meters when seen previously. The species has been extensively searched for by competent persons for the past 25 years with few subpopulations/plants found. Due to the predictability of its habitat (coastal granites) there is a high likelihood of detection if plants are present. It is believed that on the basis of limited numbers of 					

plants and the significant threat to the largest subpopulation through damage by 4WD vehicles, there is imminent threat of decline without formal protection as threatened flora.

- The species meets EN under IUCN criterion D based on a population size of less than 250 mature individuals.

Subpopulation and threat details are as follows:

- **Subpopulation 1.** On a granite headland, NE of Cheynes Beach Caravan Park (Crown Reserve 41252 vested with the Town of Albany). This is the largest subpopulation, containing 50 mature plants when surveyed in 2015. The primary threat is destruction of habitat by 4WD vehicles. Altered fire regimes may also be a risk to this subpopulation
- **Subpopulation 2.** East end of Normans Beach near Mt. Manypeaks (Mount Manypeaks Nature Reserve). When surveyed in 1987 this subpopulation contained just 10 mature plants over a few square meters. The area was surveyed again in 2001 by Sarah Barrett and independently by Andrew Brown with no plants located. In 2015 just 2 leaves that could have been this species were located.
- **Subpopulation 3.** Approximately 2km WSW of main peak of Mt. Manypeaks (Mount Manypeaks Nature Reserve). When surveyed in 1987 this subpopulation contained just 8 mature plants over a few square meters. No plants have since been found.
- **Subpopulation 4.** Approximately 2km SW of Cheyne Beach Caravan Park, 2km due north of Mermaid Point. When surveyed in 2015 this subpopulation contained 13 mature plants.

All above subpopulations are threatened by altered fire regimes and the genetic and demographic risks associated with small subpopulation size.

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 granitora (granite spider orchid) was formally described by Stephen Hopper and Andrew Brown in 2001 from specimens collected near Mt Manypeaks by Stephen Hopper in 1987 (Hopper & Brown 2001).

The species is most closely related to *Caladenia infundibularis* which occurs between the Leeuwin-Naturaliste Ridge and Northcliffe. *Caladenia granitora* can be distinguished from *C. infundibularis* by its smaller flowers, paler colouration (especially the mainly white labellum mid-lobe) and easterly distribution (Brown et al 2008, 2013; Hoffman & Brown 2011; 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.

A possible hybrid between *Caladenia granitora* and *C. longicauda* has been recorded at Misery Beach, Torndirrup. However, the solitary plant was found outside of the known distribution of *C. granitora*. The area was most recently surveyed in October 2011 by volunteers in the "Adopt an

Orchid Program" with no plants found.
2.2. Description Describe the physical appearance, habit, behaviour/dispersion and life history. Include anatomy or habit (e.g. size and/or weight, sex and age variation, social structure) and dispersion (e.g. solitary, clumped or flocks etc), and life history (eg short lived, long lived, geophytic, etc).
<p><i>Caladenia granitora</i> is a geophytic herbaceous perennial which produces a single hirsute leaf from an underground tuber in late autumn and grows through winter and spring. The leaf dehisces at the end of spring and the plant spends summer and early autumn as a dormant tuber. The species is not believed to be clonal. In spring it produces a single flower stem to 40 cm high with 1-2 flowers 5 cm across. The bilaterally symmetrical flowers are predominantly yellowish-green to white with variable suffusions, lines and spots of maroon to pinkish maroon. The tip of the labellum is typically maroon to pinkish maroon. The distinctly projecting labellum has four rows of lamina calli and marginal fringing hairs (see Appendix 1). There is no obvious floral odour.</p>
2.3. Distribution Describe the distribution of the species in <u>Australia</u> and, if possible, provide a map.
<p>The species is confined to coastal granite headlands and slopes between Mt Many Peaks and Cheyne Beach with an outlying record of a possible hybrid with <i>Caladenia longicauda</i> at Misery Beach, Torndirrup. Note: There is some doubt as to parentage of this plant as <i>C. granitora</i> has not been located at the site.</p>
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
<p><i>Caladenia granitora</i> grows in shallow grey sands (sometimes coarse) on exposed coastal granite outcrops (see Appendix 1). In Subpopulation 1 a small number of plants have colonised an area of deeper grey sand on a road verge.</p>
Biological habitat
<p>Habitat is low heath 0.2-1.2m in height. Associated species include <i>Andersonia sprengelioides</i>, <i>Anthocercis viscosa</i>, <i>Banksia formosa</i>, <i>Calothamnus quadrifidus</i>, <i>Darwinia citriodora</i>, <i>Darwinia diosmoides</i>, <i>Eutaxia obovata</i>, <i>Hakea trifurcata</i>, <i>Ricinocarpus glaucus</i>, <i>Spyridium globulosum</i> and <i>Taxandria marginata</i>. Also recorded from a <i>Lepidosperma</i> herbfield.</p>
Does the (fauna) species use refuge habitat e.g. in times of fire, drought or flood? Describe this habitat.
<p>N/A</p>
Is the species part of, or does it rely on, a listed threatened ecological community? Is it associated with any other listed threatened species?
<p>The species is not known to occur in a threatened ecological community.</p>

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 late September to early November. The sepaline clubs on the flowers of *Caladenia granitora* emit pheromones which deceive male thynnine wasps into thinking a female wasp is present. Once attracted, the wasps attempt copulation with the labellum of the flower and inadvertently deposits or removes pollen. Research on *Caladenia* pollination (Stoutamire 1983; Phillips *et al.* 2009) and preliminary studies of the pollination of *C. granitora* (R. Phillips, unpublished data), suggest that this is likely to involve an undescribed species of wasp in the genus *Thynnoides*.

Fruit set is during November. Based on an estimate for the similarly sized *Caladenia arenicola*, seed capsules are likely to contain up to 30,000 seeds which are wind dispersed (Batty 2000). Related species of *Caladenia* require the presence of a specific mycorrhizal fungus for germination and annual growth (Ramsay *et al.* 1986; Swarts *et al.* 2010). There are no estimates of seed viability available for *C. granitora*. However, in other *Caladenia* species seed viability is approximately 60-90 % (Swarts 2007).

Fire can enhance flowering of some *Caladenia* species in the following growing season. However, winter and early spring fires, when the leaf is present and the new tuber is being formed, can be detrimental and may kill plants. Neither fire nor disturbance is required for the flowering of this species.

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.

Based on studies of *Caladenia huegelii*, it is expected that *Caladenia granitora* will reach reproductive maturity about three years following germination (Swarts 2007). Estimates for other *Caladenia* species have shown that they can live in excess of 30 years (K. Dixon, unpublished observation). There are no estimates available for population structure. However, an estimate of reproductive success in 2012 indicated capsule set to be approximately 25% at the Cheynes Beach subpopulation. The pollinator is common in the vicinity of this subpopulation suggesting that fruit set is likely to be common in most years (R.D. Phillips, unpublished data). The pollinator has been recorded at several sites in Waychinocup National Park.

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.

N/A

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

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)

Caladenia granitora has a total current population size of 63 mature individuals. This estimate is based on exact counts at each of the two known extant occurrences. Note: no plants were located at Subpopulations 2 and 3 when surveyed in 2015, however, it is possible plants were missed given they were found over just a few square meters when seen previously.

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

Caladenia granitora is found in four locations. Note: these are regarded as populations by Parks and Wildlife and subpopulations under IUCN. The thinnine wasp pollinator of the species is very

territorial and travels just short distances. It is therefore unlikely that pollen transfer will occur between locations. Once pollinated, orchid seed can disperse long distances (Arditti & Ghani 2000), however, most seed falls close to the parent plant (Jersakova & Malinova 2007) and the chances of seed dispersal between locations is likely to be extremely low.

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?

The Botanic Gardens and Parks Authority has seed in long term storage (collected from the Cheynes Beach subpopulation). There are no plants currently held in *ex situ* collections and no reintroductions into wild subpopulations have occurred or are currently planned.

For flora, and where applicable, for fauna, detail the location, land tenure, estimated number of individuals, area of occupancy, and condition of site for each known date, location or occurrence. More specific detail is expected for WA occurrences for taxa that are not endemic to WA.

Date of survey	Location Description (include coordinates of the site)	Land status	Number of mature individuals at location	Area of occupancy at location	Condition of site
September 2015	Subpopulation 1. Cheyne Beach along track running E from Cheyne Road, 34°52'49.12"S 118°24'39.93"E	Crown Reserve 41252 vested with the Town of Albany	50	6380m ²	mostly good, but becoming degraded in places
October 1987 when plants last seen (site surveyed in October 2001 with no plants located and in September 2015 with 2 leaves that may be this species located)	Subpopulation 2 End of Normans Beach near Mt. Manypeaks, approximately 300m upslope from the ocean, 34°54'50"S 118°14'39"E.	Mount Manypeaks Nature Reserve	2 leaves? (10 in 1987)	5m ²	good
October 1987	Subpopulation 3. Approximately 2km WSW of main peak of Mt. Manypeaks, coastal slope, WNW aspect, 150m up from ocean, 34°54'32"S 118°14'46"E	Mount Manypeaks Nature Reserve	0 (8 in 1987)	0.1m ²	good
September 2015	Subpopulation 4. Approximately 2km SW of	Waychinocup National Park	13	unknown	good

	Cheyne Beach Caravan Park, 2km due N of Mermaid Point, plants on SE edge of NW-facing sheet 80m due W of trig point on summit [trig at 34°54'04.8"S 118°23'59.2"E]				
<p>What is the total area of occupancy (in km²) for the species; explain how it was calculated and datasets used. If an accurate estimate is unavailable, provide a range of values or a minimum or maximum area estimate. Where separate breeding habitat is applicable, if possible, also provide area of breeding habitat.</p>					
<p>The actual AOO is approximately 0.0064km². However, almost the entirety of this area is formed by the Cheynes beach subpopulation. AOO calculated using 2x2km grid is 16 km².</p>					
<p>What is the extent of occurrence (in km²) for the species; explain how it was calculated and datasets used. If an accurate estimate is unavailable, provide a range of values or a minimum or maximum area estimate.</p>					
<p>The extent of occurrence is 28.62km². This was calculated by determining the area of the convex polygon formed using the position of the four known sites.</p>					
<p>Identify important occurrences necessary for the long-term survival and recovery of the species? This may include: key breeding populations, those near the edge of the range of the species or those needed to maintain genetic diversity.</p>					
<p>All known subpopulations of <i>Caladenia granitora</i> need to be maintained to maximise the species' genetic diversity.</p> <p>The subpopulation near Cheynes Beach is the only one larger than 13 plants. Large subpopulations are less likely to suffer extinctions through stochastic or genetic processes suggesting this subpopulation has a much higher chance of long term persistence than the other subpopulations. It is also the only subpopulation large enough to be reliably used for conservation actions such as seed collection. Therefore, continued protection of this subpopulation and its associated habitat are necessary for the long-term survival of the species.</p>					
<p>Is the distribution of the species severely fragmented? Why?</p>					
<p>The distribution of <i>Caladenia granitora</i> is severely fragmented. However, this is likely to be natural and not in itself a threat as the species is both rare and occurs in a specific habitat type (coastal granite) that is in isolated patches.</p>					
<p>Is the taxon subject to extreme fluctuations? If so, provide evidence.</p>					
<p>No</p>					
<p>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.</p>					
<p>Note: A continuing decline is a recent, current or projected future decline (which may be smooth, irregular or</p>					

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 insufficient data available to test if there has been a decline. Although subpopulation 3 was not located when surveyed in 2015, due to its small size it may have been missed. The species appears naturally rare.
Has there been a decline in the size of the population (number of mature individuals)?
There is insufficient data available to test if the population has undergone a decline.
- 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.
N/A
- 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.
N/A
Has there been a decline in the number of locations, extent of occurrence or area of occupancy?
No extant plants are known from one location. However, habitat is intact.
Has there been a decline in the area or quality of habitat?
There has been decline in the quality of some habitat at Subpopulation 1 (Cheynes Beach) due to damage by 4WD vehicles going off the existing track.
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.
As <i>Caladenia granitora</i> occurs on exposed coastal granites, systematic surveys have targeted these areas during its flowering season (October). The species is easily identified, meaning that volunteers involved with the "Adopt an Orchid Project" and members of The Western Australian Native Orchid Study and Conservation Group have been able to contribute extensively to the survey effort, particularly over the past 6 years.
Provide details on the distinctiveness and detectability of the species, or the distinctiveness of its habitat, that would assist survey success.
Given its floral distinctiveness <i>Caladenia granitora</i> is unlikely to be confused with other orchid species within its distribution range. It also occurs in very specific coastal granite habitat. Orchid enthusiasts are familiar with this species from having observed it at the Cheynes Beach subpopulation. While the flower is relatively large and obvious, it can sometimes be obscured by the dense coastal vegetation in which plants grow.
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.
<i>Caladenia granitora</i> has been extensively surveyed due to a combination of scientific interest in the genus <i>Caladenia</i> and ongoing studies of granite outcrop floras, and the enthusiasm of members of WANOSCG including skilled volunteers based in Albany. Given the small geographic range of <i>C.</i>

granitora and the predictability of its habitat, the estimate of population size provided here is likely to be accurate.

Extensive searches of coastal granites in the Albany region over 25 years have not yielded any new subpopulations of the species which appears confined to the Mt Manypeaks-Cheynes Beach area. Details of the main survey effort is provided below:

Between 1987 and 2013, Stephen Hopper (UWA, formerly CALM) and Andrew Brown (DPaW, formerly CALM and DEC) undertook surveys for the species on coastal granites from west of Albany to the Beaufort Inlet. Members of WANOSCG have also searched for the species during this period. Since 1987 no new subpopulations have been found.

In 2001 Sarah Barrett surveyed the east end of Normans Beach near Mt. Manypeaks (Subpopulation 2) without success. In 2015 Sarah Barrett and volunteers located 2 leaves of what may be this species at this site.

Between 2009 and 2013, Keith Smith of Formosa Flora (a consultant specialising in orchid work) dedicated a total of 130 hours searching for the species, including searches of coastal granites at Torbay, Cape Riche, West Cape Howe, Albany/Torndirrup, Cheynes Beach, Two Peoples Bay and Betty Beach. No new subpopulations were found.

Between 2011 and 2015, Trevor Cunningham (Adopt an Orchid Project - WANOSCG) undertook detailed surveys with plants only being found in Subpopulation 1 (Cheynes Beach).

It is worth noting that the Albany region has one of the best surveyed orchid floras in south-western Australia. Skilled amateur orchidologists have been intensively searching the area for many decades without locating other subpopulations of the species. Of particular note is the late Ron Heberle, an authority on orchids of this region, who surveyed around Albany for over 50 years.

4.3. Threats

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

- how and where they impact this species**
- what the effect of the threat(s) has been so far (indicate whether it is known or suspected)**
- present supporting information/research**
- does it only affect certain subpopulations?**
- what is its expected effect in the future (is there supporting research/information; is the threat only suspected; does it only affect certain subpopulations?).**

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

Location	Past threats	Current threats	Potential threats	Management requirements (see section 4.4)
Subpopulation 1. NE of Cheynes Beach Caravan Park	Creation and maintenance of fire breaks. A 4WD track runs along the edge of the subpopulation.	Partial destruction of habitat by 4WDs. This subpopulation adjoins a parking area and access track. Although the access track	Altered fire regimes, 4WD activity and track maintenance.	Prevent 4WD access. Avoid burning during late Autumn, Winter and Spring when plants are in active growth.

		has been upgraded vehicles are continuing to run off the sides.		
Subpopulation 2. E end Norman's Beach	None known	None known	Altered fire regimes, small population size	Avoid burning during late Autumn, Winter and Spring when plants are in active growth.
Subpopulation 3. Approximately 2km WSW of main peak of Mt. Manypeaks	None known	None	Altered fire regimes, small population size	Avoid burning during late Autumn, Winter and Spring when plants are in active growth.
Subpopulation 4. Approximately 2km due N of Mermaid Point,	None known	None	Altered fire regimes, small population size	Avoid burning during late Autumn, Winter and Spring when plants are in active growth.
Identify and explain why additional biological characteristics particular to the species are threatening to its survival (e.g. low genetic diversity). Identify and explain any models addressing the survival of the species.				
<p><i>Caladenia granitora</i> is confined to coastal granite outcrops, presumably in part due to the additional water runoff provided by granite sheets. This limits the species to small areas of habitat.</p> <p>As with most sexually deceptive orchids, <i>Caladenia granitora</i> is visited by a single pollinator species. A decline in the pollinator species will lead to a decline in the abundance of the orchid.</p>				
4.4. Management				
Identify key management documentation for the species e.g. recovery plans, conservation plans, threat abatement plans etc.				
Included in Western Australian Wildlife Management Program No 20 – Declared Rare and Poorly Known Flora in the Albany District, C.J. Robinson and D.J. Coates 1995. A species recovery plan “Interim Recovery Plan No. 361 Granite Spider Orchid (<i>Caladenia granitora</i>)” has been prepared.				
Does this species benefit from the management of another species or community? Explain.				
<i>Caladenia granitora</i> benefits from the preservation of habitat for the threatened bird species, Noisy Scrub-bird, Western Bristlebird and Western Whipbird and two Threatened flora species – <i>Banksia verticillata</i> and <i>Daviesia ovata</i> .				
How well is the species represented in conservation reserves or covenanted land? Which of these are actively managed for this species? Provide details.				
Three of the four known subpopulations are in conservation estate. However, these represent just 13 of the known 63 plants. Subpopulation 1 occurs in Crown Reserve 41252 vested with the Town of				

Albany.	
None of the reserves in which <i>Caladenia granitora</i> occurs are actively managed for the species.	
Are there any management or research recommendations that will assist in the conservation of the species? Provide details.	
All subpopulations should be excluded from prescribed burning where possible.	
4WD access should be excluded from the area of Subpopulation 5 by closing the access track and car park or by fencing the subpopulation.	
4.5. Other	
Is there any additional information that is relevant to consideration of the conservation status of this species?	
No.	
SECTION 5. NOMINATOR	
Nominator(s) name(s)	
Organisation(s)	
Address(s)	
Telephone number(s)	
Email(s)	
Date	31 January 2014
If the nomination has been refereed or reviewed by experts, provide their names and contact details.	
Keith Smith "Formosa Flora"	
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.	
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Appendix 1. *Caladenia granitora* flowers and habitat (Photos Garry Brockman)



