

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

Scientific committee assessment of eligibility against the criteria:		
This assessment is consistent with the standards set out in Schedule 1, item 2.7 (h) and 2.8 of the Common Assessment Method Memorandum of Understanding.		Yes <input type="checkbox"/> No <input type="checkbox"/>
A.	Population size reduction	•
B.	Geographic range	•
C.	Small population size and decline	•
D.	Very small or restricted population	•
E.	Quantitative analysis	•

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

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

Current conservation status				
Scientific name:	<i>Grevillea acropogon</i>			
Common name:	None			
Family name:	Proteaceae	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	2008	Critically Endangered	B1ab(iv,v)+B2ab(iv,v); C2a(ii)
		5/4/2017	Endangered	B1ab(iii, v)+2ab(iii,v); C2a(ii)
	2.			
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:	As a result of further survey effort between 2006 and 2015, a new subpopulation was discovered, bringing the total known subpopulations to 2. Monitoring of management response has shown an increase in plants at Subpopulation 1 following the erection of an exclusion fence to protect the Subpopulation from grazing pressure. The number of recorded mature individuals increased from 53 to 280 plants.			
<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:	Since the assessment in 2007, one new subpopulation (location) has been discovered, and the number of recorded mature individuals has increased to 280. However, the habitat of			

	<p>Subpopulation 2 is highly threatened from grazing and trampling from kangaroos, with heavy grazing of seedlings and associated habitat recorded, delaying flowering and thereby reducing reproductive potential. A decline in number of plants has been observed at this site. At Subpopulation 1, the area of habitat within the fenced enclosure is secure, but the area of surrounding habitat would still be in decline due to grazing pressure. Without ongoing management a projected decline in habitat condition is expected. A translocated population into a nature reserve northwest of Subpopulation 1 has been established but has yet to produce second generation plants. Therefore it cannot be included in the threat assessment. Now meets criteria EN B1ab(iii)+2ab(iii).</p>	
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?	EN: B1ab(iii)+B2ab(iii)	
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"> Minor population reduction observed in one monitoring period at Subpopulation 2, but significant increase in total number of mature individuals due to management measures. Does not meet criteria
B.	Geographic range (EOO and AOO, number of locations and evidence of decline)	<ul style="list-style-type: none"> (B1) Using Minimum Convex Polygon (MCP) method, the EOO is approximately 44 km² which was calculated by drawing a polygon around the plants. (B2) Area of Occupancy is estimated as 8 km² using the 2km x 2km grid method. (a) Two locations, or two geographically distinct areas some 52km apart, which are exposed to different threatening processes. The main threat to Subpopulation 2 is grazing and trampling by kangaroos. The subpopulations are not classified as severely fragmented - the main subpopulation occurs in a water reserve that is contiguous with a nature reserve and State forest. (b) Continuing decline observed and projected: (iii) Historically known from one location on a shire road reserve at Kulikup which was believed to be lost through roadworks. No plants have been found at this location since and it is thought to be extinct. However a new subpopulation was found in immediate vicinity on private property, which may be part of the original subpopulation. The habitat is highly threatened by kangaroos, drought, salinity and fire. Historically kangaroos have caused considerable damage to the species through grazing and trampling. (v) Fencing has reduced the grazing and trampling threat to Subpopulation 1, and plant numbers have recovered, however impact

		<p>to the surrounding habitat is still occurring. Subpopulation 2 is not fenced, and the kangaroos are having an impact on the understorey vegetation, with a decline in <i>Grevillea acropogon</i> numbers recorded. The species also occurs in low lying seasonally inundated areas which are potentially at high risk from rising groundwater and salinity, with a projected decline in plant numbers feasible.</p> <ul style="list-style-type: none"> • Meets criteria for Endangered B1ab(iii)+B2ab(iii)
C.	Small population size and decline (population size, distribution and evidence of decline)	<ul style="list-style-type: none"> • Known from 280 mature individuals. • The number of mature individuals at Subpopulation 2 has declined from 7 in 2006 to 5 in 2015 (28% decline). If management does not succeed in protecting the remaining habitat on private property, then a continuing decline in the number of individuals is projected. However, at Subpopulation 1, the number of individuals has increased from 53 in 2006 to 275 in 2014, as the area of habitat within the fenced enclosure is secure. While the area of surrounding habitat would still be in decline due to grazing pressure, there has been an overall increase in the number of mature individuals. • (ii) Subpopulation 1 contains 98% of the total number of mature individuals. • Does not meet criteria
D.	Very small or restricted population (population size)	<ul style="list-style-type: none"> • (D) There are 280 mature individuals in total. • Meets criteria for Vulnerable D1
E.	Quantitative analysis (statistical probability of extinction)	<ul style="list-style-type: none"> • No information to assess.

Summary of assessment information

EOO	44 km ² (MCP)	AOO	8 km ² (2 km x 2 km grid). Mapped area of subpopulations 0.01316 km ²	Generation length	-
No. locations	2	Severely fragmented	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>		
No. subpopulations	2	No. mature individuals	280		
Percentage global population within Australia			100		
Percentage population decline over 10 years or 3 generations			Unknown		

Threats (detail how the species is being impacted)

Threat (describe the threat and how it impacts on the species. Specify if the threat is past, current or potential)	Extent (give details of impact on whole species or specific subpopulations)	Impact (what is the level of threat to the conservation of the species)

<p>Vehicle access</p> <ul style="list-style-type: none"> A vehicle track ran through the middle of the Subpopulation 1 constituting a disease risk, hampering regeneration and resulting in some plant deaths, however this track has now been closed following fencing of the population. <p>Past</p>	Whole Subpopulation 1	Severe
<p>Drought</p> <ul style="list-style-type: none"> The species grows on shallow soils over ironstone on the edges of seasonally inundated areas which are susceptible to drought. <p>Past, future</p>	Whole population	Catastrophic
<p>Trampling</p> <ul style="list-style-type: none"> Kangaroos were creating tracks while moving through Subpopulation 1 and causing considerable damage to the foliage. Fencing has reduced the impact at Subpopulation. Subpopulation 2 has not been fenced and kangaroos are impacting on the understorey vegetation. <p>Past, current, future</p>	Whole Subpopulation 2	Severe
<p>Grazing</p> <ul style="list-style-type: none"> Prior to the installation of fencing, seedlings at Subpopulation 1 were being grazed by kangaroos. Subpopulation 2 is not fenced and the vegetation is currently being grazed by kangaroos. <p>Past, current, future</p>	Whole Subpopulation 2	Severe
<p>Altered hydrology</p> <ul style="list-style-type: none"> The death of a number of <i>Eucalyptus decipiens</i> near Subpopulation 1, may be the result of elevated groundwater levels. The establishment of plantations in the areas has helped prevent further rises in ground water and while it is unlikely that the current groundwater level will have an impact on the species, ground water is likely to rise following the harvest of nearby plantations. This could lead to some secondary salinisation. <p>Potential</p>	Whole population	Catastrophic
<p>Salinity</p> <ul style="list-style-type: none"> Soils in the area are known to have a salt store which could be mobilised if there are rises in groundwater through the harvesting of the nearby plantations. Secondary salinisation of the site is likely to result in decline of the subpopulations. <p>Potential</p>	Whole population	Catastrophic
<p>Phytophthora dieback</p> <ul style="list-style-type: none"> <i>Phytophthora cinnamomi</i> kills plants and degrades associated habitat. It is not known if the species is 	Whole population	Catastrophic

<p>susceptible to dieback disease, however the associated vegetation is.</p> <p>Potential</p>		
<p>Altered fire regimes</p> <ul style="list-style-type: none"> The species is likely to respond to fire through regeneration of seed. If fire frequency is increased the soil seed bank could be depleted before juvenile plants have reached maturity. <p>Past, current and future</p>	Whole population	Severe
<p>Small population size</p> <ul style="list-style-type: none"> The species is restricted in number of plants and its area of occupancy placing it under serious risk from threatening processes. <p>Current, future</p>	Whole population	Catastrophic
<p>Poor recruitment</p> <ul style="list-style-type: none"> Plant health from 2006 to 2009 at Subpopulation 1 showed a marked decline from senescence of mature individuals. However recent surveys have shown there has been recruitment following the erection of the fence with 29 juveniles having been observed in 2009. The species is likely to require a disturbance to recruit, but if disturbance is too frequent or is followed by a drought, the population may be impacted. Ongoing grazing pressure at Subpopulation 2 is impacting regeneration. <p>Past, current and future</p>	Whole population	High
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"> Department of Environment and Conservation (2010) <i>Grevillea acropogon</i> Interim Recovery Plan 2010–2015. Interim Recovery Plan No. 321. Department Environment and Conservation, Western Australia. 		
<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; Re-alignment of a track through Subpopulation 1 by Department of Water; Erection of an exclusion fence around the water reserve subpopulation to reduce trampling by animals (kangaroos); Adjacent landowner has replaced the old boundary fence to prevent livestock from entering the reserve; Seed has been collected and stored at Parks and Wildlife Threatened Flora Seed Centre. Germination trials were conducted in 2007 and seed viability was found to be 88%; 		

- A translocation was undertaken in 2009 to establish a new subpopulation in nearby similar habitat, with supplementary planting in 2010. While individuals have reached maturity, there is no evidence of regeneration to date, despite the flowering and fruiting observed. Further investigation is required to determine germination triggers;
- Boot clean-down stations have been constructed at the Subpopulation 1 and the translocation site to prevent the spread of dieback disease.

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 subpopulations for evidence of grazing impacts, hydrological changes (including changes to salinity), or changes in plant or site health;
- Install exclusion fencing around Subpopulation 2 to reduce the impact of grazing and trampling from kangaroos;
- Liaise with Water Authority and private landowners to ensure that subpopulations of the species are not accidentally damaged or destroyed, and the habitat is maintained in a suitable condition for the conservation of the species;
- Liaise with Forest Products Commission regarding harvest timelines for nearby plantations and possible options to minimise threats;
- Develop and implement a fire management strategy, including the need for, and method of, the construction and maintenance of firebreaks;
- Undertake surveys in areas of potentially suitable habitat;
- Continue to follow dieback hygiene measures and apply phosphite if required;
- Monitor hydrology and salinity changes in the local area and encourage regional revegetation and salinity management strategies;
- Continue to establish new subpopulations through translocation into disease free areas;
- Investigate formal conservation arrangement, management agreement and covenant on private land and water reserve land, and investigate inclusion in reserve tenure if possible.

Research

- Research biology and ecology of the species, with a focus on genetic diversity, pollination effectiveness, seed viability, conditions required for natural germination, response to threats (particularly dieback disease) and disturbances and reproductive biology.

Nomination prepared by:

Contact details:

Date submitted:

24/10/2016

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 subpopulations	Site / habitat Condition	Threats (note if past, present or future)	Specific management actions
Subpopulation 1: NNE of Lake Unicup.	Water Authority	2004: 51 2006: 53 2014: 275	0.825 ha (4km ² using the 2x2km grid method)	Previously condition of <i>Grevillea acropogon</i> and associated species poor with many individuals dead or senescing. Currently healthy.	Vehicle access (past) Drought (past, present, future) Trampling (past) Grazing (past) Fire (past, present, future) Altered hydrology (past, present, future) Salinity (future) Phytophthora dieback (past, present, future) Small population size (past, future) Poor recruitment (past) Climate change (future)	Re-align access track Fence subpopulation Monitor hydrology and salinity Develop a fire management plan Collect seed and test viability, conduct regeneration trials Implement disease hygiene measures Conduct further surveys Secure tenure of subpopulation Continue to implement translocations
*Subpopulation 2: east of Boyup Brook. *new subpopulation	Private property	2014: 7 2015: 5	0.491 ha (4km ² using the 2x2km grid method)	Healthy. Vegetation impacted by kangaroos grazing and trampling.	Trampling (past, present, future) Grazing (past, present, future) Fire (past, present, future) Drought (past, present, future) Altered hydrology (past, present, future) Salinity (future) Phytophthora dieback (past,	Fence subpopulation Develop a fire management plan Collect seed and test viability, conduct regeneration trials Liaise with landowners Implement disease hygiene measures Improve security of

					present, future) Small population size (past, future) Poor recruitment (past) Climate change (future)	subpopulation through conservation covenant Implement translocations
Kulikup.	Shire road reserve	<2006: 1 >2006: 0	0 ha	Location extinct		



Nomination of a Western Australian species for listing as threatened, change of status or delisting (Updated 2016).

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

Answer all relevant sections, indicating when there is no information available. Mark boxes with a cross ☒.

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 or write “N/A”.

SECTION 1. NOMINATION	
1.1. Nomination information	
Flora <input checked="" type="checkbox"/>	Fauna <input type="checkbox"/> Nomination for: Addition
Scientific Name Grevillea acropogon Makinson	
1.2. 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	
1.3. Current Conservation Status	
If none, write ‘None’.	
International	
IUCN Red List	None
Categories and Criteria applicable to the highest rank category only e.g. B1ab(iv);D	None
National	
EPBC Act 1999	None
State of Western Australia	
Wildlife Conservation Notice Schedule	Endangered
IUCN Ranking	Endangered: B1ab(iii,v)+B2ab(iii,v); C2a(ii)
Priority	
Is the species listed as ‘Threatened’ in any other Australian State or Territory No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>	
If Yes, list these States and/or Territories and the status for each.	
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? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>	
If yes, please provide details.	
1.4. Nominated Conservation Status	
Write one category for each of the fields. If none, write ‘None’.	

International	
IUCN Red List	
Categories and Criteria applicable to the highest rank category only e.g. B1ab(iv);D	
National	
EPBC Act 1999	Endangered: B1ab(iii)+B2ab(iii)
State of Western Australia	
Wildlife Conservation Notice Schedule	
IUCN Ranking	
Priority	
1.5. Reasons for the Nomination	
<p>Briefly summarise the reasons for the nomination in dot points. Please include details relevant to the IUCN Categories and Criteria where appropriate.</p> <ul style="list-style-type: none"> <i>Grevillea acropogon</i> was known from one subpopulation in 2006 consisting of 58 mature individuals in 2006. This subpopulation was in decline with plants heavily grazed and trampled by kangaroos. Following the erection of an exclusion fence in 2008, the number of individuals increased to 275 in 2014. Surveys around the Lake Unicup area and north to Kulikup up to 2006 failed to locate additional subpopulations. However, a further survey in 2014 located a new subpopulation on private property in the vicinity of a previously recorded occurrence in the Kulikup area, consisting of 7 mature individuals. This subpopulation is threatened by grazing and trampling by kangaroos. Threats include; grazing, habitat degradation, drought, possibly salinity, dieback and altered fire regime. 	
SECTION 2. SPECIES	
2.1. Taxonomy	
<p>Describe the taxonomic history, using references, and describe the key distinguishing features that can be used to separate this taxa from closely related taxa. Include details of the type specimen, changes in taxonomy, scientific names and common names used for the species.</p> <p><i>Grevillea acropogon</i> was first collected in 1993 by Ted Middleton and formally described in 2000 as a new species. It is closely related to <i>G. ripicola</i>, which is different in having, longer leaves, with a glabrous leaf under-surface, longer and wider ultimate lobe and a longer pistil; (<i>Aust biological Research Study; Canberra 2000; Flora of Australia; Vol 17A Proteaceae 2 Grevillea</i>); <i>G. humifusa</i>, has a prostrate habit, markedly hispid branchlets and leaves bearing hairs with ramets up to 3mm long and <i>G. delta</i> has hairy pedicels (<i>Grevillea Study Group 14 sensu Olde and Marriot</i>).</p>	
<p>Is this species conventionally accepted? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> If no, explain why. For example, is there any controversy about the taxonomy? For undescribed species, detail the location of voucher specimens (these should be numbered and held in a recognised institution and be available for reference purposes).</p>	
<p>Describe any known hybridisation with other species in the wild, indicating where this occurs and how frequently.</p> <p>N/A</p>	

2.2. Description

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

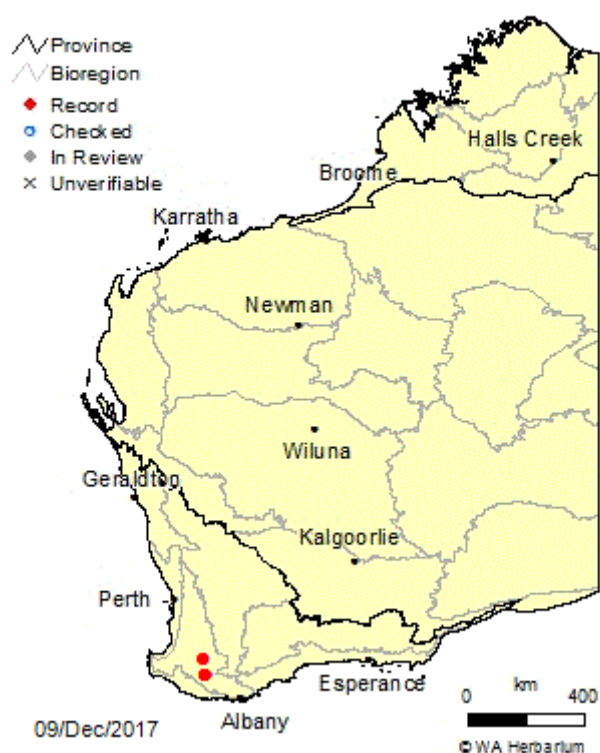
Grevillea acropogon is a prostrate to erect shrub to 108cm high. Branchlets softly angular to subterete, loosely to sparsely sub-tomentose with straight hairs, becoming glabrous. Leaves rigid, divaricately pinnatisect with 5 – 7 primary lobes, the basal 1 or 2 pairs again divaricately 2 or 3 sect, ultimate lobes linear, pungent. Perianth and style both red. Perianth glabrous outside except for a few inconspicuous appressed hairs near tip of limb segments; densely bearded inside. Pistil 20 – 25mm long, glabrous. The epithet, from the Greek *across* (summit) *pogon* (bearded) refers to the hairs near the apices of the petals. Fruits 12 – 14 mm long, erect with a prominent basal ridge and somewhat shiny.

2.3. Distribution

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

Was only known from the Type population near Lake Unicup area for many years. In 2015 the species was known from 2 subpopulations approximately 52km apart, one on a water reserve near Lake Unicup, the other on private property near Kulikup, east of Boyup Brook (see map below from Western Australian Herbarium 1998–).

Grevillea acropogon



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

The species is recorded as growing in shallow soils on the slopes of low ironstone expressions on the margins of seasonally inundated areas. The area's topography is low, swampy marshland receiving a high natural rainfall. The sites frequently have surface water running over it.

Biological habitat
The associated vegetation type is open proteaceae mallee heath with <i>Hakea</i> and <i>Banksia</i> (<i>Dryandra</i>) species.
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
<p>Provide an overview of the breeding system.</p> <p>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?</p> <p>Flowering is July – Sept, but probably as early as June and late as October. Immature and mature fruit are present late Nov - early Dec.</p> <p>Seed was lodged with the Threatened Flora Seed Centre (Dec 2004).</p> <ul style="list-style-type: none"> Seed viability – Testing conducted at Threatened Flora Seed Centre found 88% viability. Pollinating mechanism – Bees have been observed on flowers (Sept 2006). Vegetative reproduction – Unknown. <p>Response to fire and soil disturbance – Unknown.</p>
2.6. Population dynamics
<p>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).</p> <ul style="list-style-type: none"> Age to first flowering – Unknown Life expectancy and natural mortality – Unknown Population structure – Total number of individuals as at 2006 was 58: Adults – 33, Juveniles – 3, Senescing – 20 (Cause unknown), Dead – 2. As at 2015: 280 mature individuals and 37 seedlings.
SECTION 3. INTERNATIONAL CONTEXT
For species that are distributed both inside and outside Australia
3.1. Distribution
Describe the global distribution.
N/A
Give 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? – give 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).

- Mature individuals – 53 (including 20 individuals with dead or yellowing of foliage) in 2006 and 280 in 2014/15.
- Juveniles – 3 juveniles at Subpopulation 1 in 2006 and 37 seedlings at Subpopulation 2 in 2015
- Dead individuals – 2 at Subpopulation 1 in 2006.
- Observations recorded for 2006 monitoring indicate that the condition of approximately 15 individuals had deteriorated since the population was monitored in 2004, but the decline ceased when the subpopulation was fenced.

Give 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?

599 seeds collected for storage in the Threatened Flora Seed Centre.

An experimental translocation for the species was undertaken in 2009 into a nature reserve northwest of Subpopulation 1. Approximately 154 seedlings were planted and a further 214 seedlings in 2010.

Monitoring in 2015 counted 248 plants alive. While individuals have reached maturity with flowering and fruiting observed, there is no evidence of regeneration to date.

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.

Grevillea acropogon occurs at two locations. A survey conducted in Sept 2006 to relocate the single record at Kulikup resulted in no plants found.

Extensive surveys conducted from 2000 – 2006 in the Lake Unicup / Lake Muir area and the area north of the population to Kulikup failed to find any additional populations.

A survey in 2014 located a new subpopulation on private property, 52km north of the existing location near Kulikup which is the vicinity of a previous record of the species.

A translocated population into a nature reserve northwest of Subpopulation 1 has been established but has yet to produce a second generation. The translocation may be confirmed as a third subpopulation (location) and hence be included in the threat assessment once it has been shown to be self- sustainable and showing recruitment.

For flora, and where applicable, for fauna, detail the location, land tenure, estimated number of individuals, area of occupancy, and condition, 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
NNE of Lake Unicup	WA Water Authority	29.11.06 2014	58 275	Approx 1ha	Previously in poor condition with many individuals dead or senescing. Currently healthy in fenced enclosure
East of Boyup Brook	Private property	2014 2015	7 5	0.491 ha	Seedlings and associated vegetation impacted by grazing and trampling from kangaroos

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

- Each plant was checked as being an individual and marked with pink tape.
- Individuals were tagged with a metal tag with identification number.
- Each individual had GPS coordinates recorded, photographed, measured, health status determined by condition of foliage and % of dead or dying foliage; abundance of buds, flowers and fruit and if pollinators observed on flowers.

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

Grevillea acropogon was recorded from 2 subpopulations. The subpopulation of a single plant along a road reserve at Kulikup was believed to be lost through road-works. A survey was conducted on 6th September 2006 to relocate the plant and search for additional populations. No plants were found at this site and no additional plants found.

A new subpopulation consisting of 7 mature individuals was located near this site on private property in 2014. In 2015 the number had declined to 5 due to grazing and trampling from kangaroos.

What is the extent of occurrence (in km²) for the species; explain how it was calculated and datasets used. If an accurate estimate is unavailable provide a range of values or a minimum or maximum area estimate. Include estimates of past, current and possible future extent of occurrence. 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 extent of occurrence for *G. acropogon* is approx. 52km between the 2 subpopulations. EOO = 44 km² roughly calculated from an ArcGIS polygon that encompassed all known subpopulations. This figure does not include the translocated subpopulation as it is not yet self-sustainable and regenerating.

What is the 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. Include estimates of past, current and possible future area of occupancy. 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 2007 area of occupancy for *G. acropogon* was approx. 10,000m² (150m -200m x 40m - 50m) within one population calculated by counting 13 steps at normal walking pace for 10m distance. In 2015 the mapped area of subpopulations was 0.01316 km² or 1.316 hectares. Estimated AOO is 8 km² using the 2km x 2km grid method. This figure does not include the translocated subpopulation as it is not yet self-sustainable and regenerating.

Is the distribution of the species severely fragmented? Why?

No. The two sites occur on areas of remnant vegetation on shallow soils on ironstone on the margins of seasonally inundated areas which have been isolated by clearing for agriculture, however, the main subpopulation occurs in a water reserve contiguous with a nature reserve and State forest. The available habitat is thus sustainable for this subpopulation.

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 genetic diversity of *G. acropogon* has been compromised by the low number of plants. The species is also at risk from the small number of subpopulations. Both subpopulations are important for maintaining 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 for *Grevillea acropogon* have been conducted since 2000. Surveys to 2006 were most intensive, and took the form of three methods:

- I. Opportunistic – R.Hearn has been working extensively in the Lake Unicup/Lake Muir Catchment and has searched areas of suitable habitat for *G. acropogon*. J. Smith has worked in the Lake Unicup/lake Muir Catchment on Rare Flora work and has searched areas of suitable habitat for *G. acropogon*.
- II. Rare Flora Searches required for DEC pre-operational searches have been conducted by DEC Nature Conservation staff in season in areas suitable for *G. acropogon*.
- III. Surveys specifically for *G. acropogon* conducted by:
 - R. Hearn Warren Region ecologist
 - I. Wheeler Warren Region Recovery Catchment Officer
 - R. Cranfield, DEC botanist
 - E. Middleton, Frankland Nat Cons
 - S. Clarke Donnelly Nat. Cons Flora Officer (2004)
 - I Wilson, Donnelly Nat Cons Coordinator
 - J. Smith Nat Cons Flora Officer (2006)
 - J Northin, Y Caruso, B Whittred, D Butcher, J Jackway, Donnelly Nat Cons staff.

Worked in 1 - 3 vehicles at any given time and having 1 person with good botanical knowledge in each vehicle. The teams were briefed on *G. acropogon* habitat and diagnostic characteristics at the known location of the species. Each vehicle was equipped with GPS, camera, RFRForms, hand-lens, compass and field identification cards and communications between vehicles were conducted via radio or mobile phone. Maps marked with the landform type conducive to *G. acropogon* were distributed and areas to be surveyed delegated. If habitat was found by any one member then a thorough search on foot to be conducted at that site along transects by all team members.

Further survey in 2014 by Parks and Wildlife staff located a new subpopulation near Kulikup.

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

Although the foliage of *G. acropogon* is similar to a *Hakea* species at the known location it is quite distinctive during its flowering period. The habitat in which it occurs (shallow soils on the slopes of a low ironstone expression on the margins of a seasonally inundated area) and the associated vegetation type (open proteaceae mallee heath with *Hakea* and *Dryandra* species) is quite distinctive and specific. Habitat and associated vegetation very similar to this was found at Kulikup and just north of the known record with no additional populations found.

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.

- In November 2000 (*G. acropogon* flowering season), E Middleton, R. Cranfield & R. Hearn surveyed areas in the Lake Unicum area. No additional populations found. - 3man days
- In September 2004, S. Clarke surveyed the Kulikup population & surrounding area. 2 man days.
- In September 2004, S. Clarke, I. Wilson, J. Northin, I. Wheeler, B. Whittred undertook intensive surveying of site and surveyed suitable habitat between Lake Unicum and the Frankland District – 16 man days
- Between 2000 and 2006, R. Hearn, I. Wheeler has conducted opportunistic surveys whilst working in suitable habitat in the Lake Unicum-Lake Muir area during *G. acropogon* flowering season July – Sept. No additional populations found. 12man days
- In September 2006 (*G. acropogon* flowering season), J Smith surveyed suitable habitat between the Lake Unicum population and the Kulikup population and around the Kulikup area. The Kulikup population was not relocated and no additional populations found. – 1 man day
- In September and October 2006 (*G. acropogon* flowering season), J Smith, I. Wilson, J Northin, D. Butcher, B. Whittred surveyed suitable habitat in the Lake Unicum and Lake Muir area. No additional populations found. – 14 man days
- In October 2006 (*G. acropogon* flowering season), J. Smith and J. Jackway surveyed similar habitat on road reserves and DEC Nature Reserves north and north-west of Donnelly District. No additional populations found – 2 man days
- During Sept to Dec 2006 (*G. acropogon* flowering season), J. Smith conducted opportunistic surveys whilst working in suitable habitat in the Lake Unicum/Lake Muir areas. No additional populations found. 5man days.
- Further survey in 2014 by Parks and Wildlife staff located a new subpopulation near Kulikup.

In November 2006, J. Smith emailed Y. Caruso regards survey effort for *G. acropogon* in the Blackwood District. There is currently no species file (corporate or otherwise) for this species in the Blackwood District, or the Bunbury Region according to the admin filing database and no record of it occurring in the Blackwood District on the DEFL corporate database, or Regional database. No survey effort has been conducted by Blackwood District staff.

4.3. Threats

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

1. How and where they impact this species.

- Actual threat to the species genetic diversity. *Grevillea acropogon* population is very restricted in both area of occupancy and reduced in the number of locations (two).
- Actual threat – Animals grazing the plants and trampling through the population.
- Potential threat – possibly salinity <200m ESE of population.
- Potential threat. Vehicle access transporting *Phytophthora* and weed seeds along track which dissects the population.
- Potential threat – drought and climate change.
- Feb 2007 fires 500m from only population.

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 populations?)

- Comparative data for population health monitoring is limited, but observations for 2004 and 2006 monitoring in subpopulation 1 indicated that the population's health had declined. Approx. 36% of individuals had <70% healthy foliage cover. The population recovered after exclusion fencing was erected.
- Observations of animal tracks through both subpopulations and destroyed branches. Approx. 15% of Subpopulation 1 had been affected by animal tracks. Subpopulation 1 recovered following the erection of the exclusion fence.
- A number of *Eucalyptus decipiens* approx. 200m to the ESE of Subpopulation 1 had died in 2006 with further eucalypts towards the *G. acropogon* senescing. Cause unknown, but could be salinity
- Many of the plants in Subpopulation 1 grow along the edge of a track that is used by the Department of Water staff.

2. What is its expected effect in the future (is there supporting research/information; is the threat only suspected; does it only affect certain populations?).

At present this species is poorly known for its' response to disturbance and therefore urgent research is required for this species' survival. Numbers indicate that the Type population has been stable since it was first described in 1993, with the observed decline in mature individuals being reversed after fencing the subpopulation.

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

Location	Past threats	Current threats	Potential threats	Management requirements (see section 4.4)
NNE of Lake Unicup	Trampling, grazing, drought, fire, altered hydrology, disease, small population size	Trampling, grazing, drought, fire, altered hydrology, disease	Salinity, small population size, climate change	See below
East of Boyup Brook	Trampling, grazing, drought, fire, altered hydrology, disease, small population size	Trampling, grazing, drought, fire, altered hydrology, disease	Salinity, small population size, climate change	See below

<p>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> <p><i>Grevillea acropogon</i> is restricted to an area of occupancy (<20km²) and reduced in the number of locations, which will affect the species genetic diversity.</p>
<p>4.4. Management</p> <p>Identify key management documentation for the species e.g. recovery plans, conservation plans, threat abatement plans etc.</p> <p>Department of Environment and Conservation (2010) <i>Grevillea acropogon</i> Interim Recovery Plan 2010–2015. Interim Recovery Plan No. 321. Department Environment and Conservation, Western Australia.</p>
<p>Does this species benefit from the management of another species or community? Explain.</p> <p>No.</p>
<p>How well is the species represented in conservation reserves or covenanted land? Which of these are actively managed for this species? Give details.</p> <p>One subpopulation of <i>Grevillea acropogon</i> occurs on Crown land managed by the Department of Water. The Department has given verbal permission for DEC to access the population for monitoring purposes with prior notification. A translocation into a nature reserve northwest of Subpopulation 1 has been established but is not yet recruiting and therefore not self- sustainable.</p>
<p>Are there any management or research recommendations that will assist in the conservation of the species? Give details.</p> <ul style="list-style-type: none"> • A letter was sent to the Department of Waters and Rivers Sept 2004 informing them of the population's location and status and asking for their cooperation in avoiding disturbance to the species' habitat. Ongoing liaising with Department of Water and private landowners to ensure subpopulations of the species are not accidentally damaged or destroyed; • Investigate responses to fire, soil disturbance, disease, change in soil moisture, weed invasion; • Testing required for salinity upslope to the ESE of population; • Further seed to be collected and lodged with Threatened Species Seed Centre; • Research on first time to flowering, seed viability, pollinating mechanism, vegetative reproduction; • Monitor subpopulations specifically for effects of drought, evidence of grazing impacts, hydrological changes (including salinity) or changes in plant or site health; • Install exclusion fencing around Subpopulation 2 to reduce the impact of grazing and trampling from kangaroos; • A sample of a dead plant of <i>Banksia littoralis</i> close to the population was sent for testing for <i>Phytophthora</i> in November 2004 with a negative result. • Collect seed for testing susceptibility to <i>Phytophthora</i>. • Restrict access by vehicles during periods of rain and inundation; • Investigate triggers required to stimulate natural recruitment in translocated subpopulation.
<p>4.5. Other</p> <p>Is there any additional information that is relevant to consideration of the conservation status of this species?</p> <p>No.</p>

SECTION 5. NOMINATOR	
Nominator(s) name(s)	
Signature(s)	
Organisation (s)	
Address(s)	
Telephone number(s)	
Email(s)	
Date – 25 th January 2007	Updated 17/10/2016 by Species and Communities Branch, Parks and Wildlife
If the nomination has been refereed or reviewed by experts, provide their names and contact details:	
<p>Roger Hearn – Regional Ecologist, Warren Region, Department of Environment and Conservation, WA</p> <p>Warren Region Threatened Flora Recovery Team – Andrew Brown, Coordinator Threatened Flora Recovery, Department of Environment and Conservation, WA</p>	
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.	

- Aust Biological Research Study; Canberra (2000); *Flora of Australia; Vol 17A Proteaceae 2 Grevillea*.
- Brown A (1996): “*Endangered*”; *Landscape*, vol 11 No. 2.
- Olde and Marriot - *Grevillea Study Group 14 sensu*.
- Olde P 2003: *New Species in Flora of Australia Vol 17a; Taxonomy; Grevillea Study Group No. 66*.
- WA Herbarium 05:58(941): (1996) – *Nuytsia Vol 11 No.1 – (pp 33-36)*.
- Clarke S Conservation Officer (Flora) (2004) – *Rare Flora Report Form (2004) (G. acropogon –Type population)*.
- Smith J – Conservation Officer (Flora) (2006) - *Rare Flora Report Forms (2006) (G. acropogon Type population & Kulikup population)*.
- Clarke S (2004) – 2005 Nomination (Draft) (*G. acropogon*).
- <http://florabase.calm.wa.gov.au/browse/flora>
- Gillard J; Clarke S (2004) – *Letter to Department of Environment Water and Rivers Commission, 52 Bath St, Manjimup; Att: DeMunk. S.*
- Caruso Y - Conservation Officer (Flora) (2006) – *G. acropogon surveys in Blackwood District*.
- Cranfield. R; DEC botanist (2006) – verbal communication - *G. acropogon surveys in Warren Region*.
- Hearn R; Warren Region Ecologist (2006) – verbal communication - *G. acropogon surveys in Warren Region*.
- Middleton E. - Nature Conservation Volunteer (2006) *G. acropogon surveys in Warren Region*.
- O'Reilly G (2006) – verbal communication – Department of Water-*permission to access Dept of Water managed lands for survey work; provision of maps*.
- Wheeler I, Warren Region Recovery Catchment Officer (2006) – verbal communication - *G. acropogon surveys in Warren Region*.