

Abridged Threatened Species Nomination Form

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

Cover Page *(Office use only)*

Species name (scientific and common name):	<i>Gastrolobium argyrotrichum</i> (Metricup Pea)
Nomination for (addition, deletion, change):	Addition
Nominated conservation category and criteria:	Critically endangered: B1ab(iii,iv)+2ab(iii,iv); C2a(i)

Scientific committee assessment of eligibility against the criteria:		
This assessment is consistent with the standards set out in Schedule 1, item 2.7 (h) and 2.8 of the Common Assessment Method Memorandum of Understanding.		Yes <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 summary *(to be completed by nominator)*

Current conservation status				
Scientific name:	<i>Gastrolobium argyrotrichum</i>			
Common name:	Metricup Pea			
Family name:	Fabaceae	Fauna <input type="checkbox"/>	Flora <input checked="" type="checkbox"/>	
Nomination for:	Listing <input checked="" type="checkbox"/>	Change of status <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 6/1/2017	Critically endangered	B1ab(iii,iv)+2ab(iii,iv); C2a(i)
	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:				
<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:				
Nominated national conservation status: category and criteria				
Presumed extinct (EX) <input type="checkbox"/>	Critically endangered (CR) <input checked="" type="checkbox"/>	Endangered (EN) <input 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?		Critically endangered: B1ab(iii,iv)+2ab(iii,iv); C2a(i)			
Eligibility against the IUCN Red List criteria (A, B, C, D and E)					
Provide justification for the nominated conservation status; is the species eligible or ineligible for listing against the five criteria. For delisting , provide details for why the species no longer meets the requirements of the current conservation status.					
A.	Population size reduction (evidence of decline)	<ul style="list-style-type: none"> Unable to assess 			
B.	Geographic range (EOO and AOO, number of locations and evidence of decline)	<ul style="list-style-type: none"> Meets criteria for CR: B1ab(iii,iv) + B2ab(iii,iv) – see nomination below for further information. 			
C.	Small population size and decline (population size, distribution and evidence of decline)	<ul style="list-style-type: none"> Meets criteria for CR: C2a(i) – see nomination below for further information. 			
D.	Very small or restricted population (population size)	<ul style="list-style-type: none"> Number of mature individuals 85. Meets criteria for EN: D 			
E.	Quantitative analysis (statistical probability of extinction)	<ul style="list-style-type: none"> Unable to assess 			
Summary of assessment information					
EOO	0.5km ² calculated to 4km ² based on estimated AOO	AOO	4km ² (using 2 km x 2 km grid). Mapped area subpopulations 0.04km ²	Generation length	Unknown
No. locations	1	Severely fragmented	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Unknown <input type="checkbox"/>
No. subpopulations	2	No. mature individuals	85		
Percentage global population within Australia			100		
Percentage population decline over 10 years or 3 generations			The known extent of the species has not declined over the last 10 years which has been within the one generation of the species. The extent of decline of the species over three generations is unknown.		

Threats <i>(detail how the species is being impacted)</i>		
Threat <i>(describe the threat and how it impacts on the species. Specify if the threat is past, current or potential)</i>	Extent <i>(give details of impact on whole species or specific subpopulations)</i>	Impact <i>(what is the level of threat to the conservation of the species)</i>
Refer to nomination below.		
Management and Recovery		
Is there a Recovery Plan (RP) or Conservation Management Plan operational for the species?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
<p>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).</p> <ul style="list-style-type: none"> N/A 		
<p>List current management or research actions, if any, that are being undertaken that benefit the conservation of the species.</p> <ul style="list-style-type: none"> Land manager has been notified of the species presence. Utility provider has been notified of the species presence, and have installed Environmentally Sensitive Area markers. Ongoing monitoring of subpopulations. Ongoing liaison with land managers. Some seed collection of the species has been undertaken and 446 seed is held at the Departments Threatened Flora Seed Centre. The taxonomy of the species has been thoroughly researched using morphological criteria. 		
<p>List further recommended management or research actions, if any, that would benefit the conservation of the species.</p> <p>Management</p> <ul style="list-style-type: none"> Liaison with land manager to regulate adjacent recreation usage. Seek to increase the level of protection in the reservation status of the Recreation Reserve. Monitor weeds and manage if necessary. Protect the plants and habitat from land clearing or other development. Develop and implement a fire management strategy. Collect additional seed and place in long term storage for conservation. The private location with outcropping granite directly adjacent to sub-population 1 needs to be surveyed for the species. <p>Research</p> <ul style="list-style-type: none"> How the species responds to disturbance (seeder or resprouter), seedling survival rates, juvenile periods and overall life expectancy. The species soil seed bank dynamics, seed longevity and germination cues. Does the species have specific pollinators. 		

<ul style="list-style-type: none"> • What factors and processes are vital to long term viability, genetic diversity, differentiation of the sub-populations and gene flow between the subpopulations. • Clarify systematic affinities. 	
Nomination prepared by:	
Contact details:	
Date submitted:	13/1/2017
<i>If the nomination has been refereed or reviewed by experts, please provide their names and contact details:</i>	

Summary of subpopulation information <i>(detailed information to be provided in the relevant sections of the form)</i>						
Location <i>(include coordinates)</i>	Land tenure	Survey information: Date of survey and No. mature individuals	Area of subpopul ations	Site / habitat Condition	Threats <i>(note if past, present or future)</i>	Specific management actions
Refer to nomination below.						

Threatened species nomination

For nominations to the WA Threatened Species Scientific Committee (and the Minister for Environment) to amend threatened species listings under the WA *Wildlife Conservation Act 1950* or their IUCN Red List threat status.

Cover Page (Office use only)

Species name (scientific and common name):	<i>Gastrolobium argyrotrichum</i>
Nomination for (addition, deletion, change):	Addition
Nominated conservation category and criteria:	B1a,b(ii,iii,v)+B2a,b(ii,iii,v), C1

TSSC assessment of eligibility against the criteria:		
A.	Population size reduction	<ul style="list-style-type: none"> Unable to assess
B.	Geographic range	<ul style="list-style-type: none"> Meets criteria for CR: B1ab(iii,iv)+2ab(iii,iv)
C.	Small population size and decline	<ul style="list-style-type: none"> Meets criteria for CR: C2a(i)
D.	Very small or restricted population	<ul style="list-style-type: none"> Meets criteria for EN: D
E.	Quantitative analysis	<ul style="list-style-type: none"> Unable to assess

Outcome:			
TSSC Meeting date:	22/6/2016		
TSSC comments:	<p>Discussion of appropriate criteria and criteria changes from the nominated criteria as follows:</p> <p>C1 doesn't fit and C2a(i) does and so this was included instead.</p> <p>Committee queried the continuing decline in AOO, and so B1b(ii) and B2b(ii) not included.</p>		
Recommendation:	Critically endangered: B1ab(iii,iv)+2ab(iii,iv); C2a(i)		
Ministerial approval:	28/12/2016	Government Gazette:	06/01/2017

Nomination summary *(to be completed by nominator)*

Current conservation status				
Scientific name:	<i>Gastrolobium argyrotrichum</i>			
Common name:	Metricup Pea			
Family name:	Fabaceae	Fauna <input type="checkbox"/>		Flora X
Nomination for:	Listing X Change of status <input type="checkbox"/> Delisting <input type="checkbox"/>			
Is the species currently on any conservation list, either in WA, Australia or Internationally?		Yes X No <input type="checkbox"/> If Yes; complete the following table If No; go to the next question		
Jurisdiction	List or Act name	Date listed or assessed	Listing category i.e. critically endangered	Listing criteria i.e. B1ab(iii)+2ab(iii)
International	IUCN Red List			
National	EPBC Act			
State of WA	WC Act			
	DPaW Priority list	1 X 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/>		
Other States or Territories				
Nominated conservation status: category and criteria (including recommended categories for deleted species)				
Presumed extinct (EX) <input type="checkbox"/> Critically endangered (CR) X Endangered (EN) <input type="checkbox"/> Vulnerable (VU) <input type="checkbox"/>				
None <input type="checkbox"/> Priority 1 <input type="checkbox"/> Priority 2 <input type="checkbox"/> Priority 3 <input type="checkbox"/> Priority 4 <input type="checkbox"/> Other Specially Protected (Conservation Dependent) <input type="checkbox"/>				
What criteria support the conservation status category above? <i>Refer to Appendix A table 'Summary of the five criteria (A-E)' and the check version that can be completed to indicate all criteria options</i>			B1a,b(iii,v)+B2a,b(iii,v), C1	
Eligibility against the criteria				
Provide justification for the nominated conservation status; is the species eligible or ineligible for listing against the five criteria. For delisting , provide details for why the species no longer meets the requirements of the current conservation status.				

A.	Population size reduction	Unable to assess
B.	Geographic range	<p>CR category against B1ab(ii, iii, v)</p> <p>The species EOO is only 0.5 km² (calculated to 4km² based on estimated AOO) and it is known from 1 location (comprising two subpopulations). Continuing decline is inferred in the number of mature individuals, area of occupancy and quality of habitat. While some natural fluctuation in plant numbers will occur with fire events and subsequent regeneration, a continuing decline in the number of mature individuals will occur through the lack of net species recruitment and the loss of plants through human recreation and powerline infrastructure maintenance. Future loss is also likely to occur from development of private property and road works. As sub-population 2 is spread over a linear 400m area the loss of mature plants particularly from the edges will affect the species area of occupancy.</p> <p>Habitat quality will decline through weed spread within sub-population 2 and there is the risk that this may be enhanced by a more frequent fire regime resulting from community pressure. Weed spread and declining habitat quality is also likely to facilitate plant loss. Sub-population 1 is under a powerline and the habitat is disturbed by powerline maintenance; this maintenance will be ongoing and as such habitat quality will be continually modified affecting its quality.</p> <p>CR category against B2ab(iii, v)</p> <p>The species AOO is 4km² (mapped area subpopulations only 0.04 km²) and it is known from 1 location (comprising two subpopulations). Continuing decline is inferred in the number of mature individuals, area of occupancy and quality of habitat. While some natural fluctuation in plant numbers will occur with fire events and subsequent regeneration, a continuing decline in the number of mature individuals will occur through the lack of net species recruitment and the loss of plants through human recreation and powerline infrastructure maintenance. Future loss is also likely to occur from development of private property and road works. With sub-population 2 being spread over a 400m area the loss of mature plants particularly from the edges will affect the species area of occupancy.</p> <p>Habitat quality will continue to decline through weed spread within sub-population 2 and there is the risk that this may be exacerbated by a change to a more frequent fire regime. Weed spread and declining habitat quality is also likely to facilitate plant loss. Sub-population 1 is under a powerline and the habitat is modified by powerline maintenance; this maintenance will be ongoing and as such habitat quality will be continually modified affecting its quality.</p>
C.	Small population size and decline	<p>CR category against C2a(i)</p> <p>The number of mature individuals is less than 250 with an estimate of only 85 plants remaining. It is considered that a 25% decline of the species in one generation is highly likely given that would equate to a loss of approximately 20 plants. This could easily occur in one generation if there is a continuation in the lack of species recruitment as currently observed. However, the TSSC did not endorse this level of decline for criterion C1, however did accept Critically Endangered under C2a(i) as each subpopulation has ≤ 50 plants.</p> <p>Without considering small annual declines through recreation impact and minor powerline maintenance, other activities that could easily cause a significant decline would be:</p> <ul style="list-style-type: none"> • The development and/or clearing of the private location in which sub-population 2 extends, this by itself would represent a 10% decline in the species.

		<ul style="list-style-type: none"> With sub-population 1 being in a road reserve under a powerline, there is the potential that a single road or major powerline upgrade/maintenance event could significantly impact this population achieving the 25% decline. With the increasing pressure for fire in sub-population 2, there is the potential that a single fire event or multiple short-rotation fire events could remove 60% of the species extent. This could occur if the species fails to respond to a fire event in the manner as expected (by seed germination) and/or if a sufficient juvenile period is not allowed for prior to another fire event.
D.	Very small or restricted population	EN category against D <ul style="list-style-type: none"> Number of mature individuals 85.
E.	Quantitative analysis	Unable to assess
Reasons for change of status		
Genuine change <input type="checkbox"/>	New knowledge <input type="checkbox"/>	Taxonomic change <input type="checkbox"/> Previous mistake <input type="checkbox"/> Other X
In formally naming and describing this species Hislop <i>et. al.</i> (2014) suggested that it may warrant listing as Threatened. This nomination is a review of available information to support such a notion.		
Summary of assessment information (<i>detailed information to be provided in the relevant sections of the form</i>)		
EOO	0.5 km ² calculated to 4km ² based on estimated AOO	AOO 4km ² (using 2x2km grid). Mapped area subpopulations 0.04 km ²
		Generation length
		Unknown
No. locations	1	Severely fragmented
		Yes <input type="checkbox"/> No X
No. subpopulations	2	No. mature individuals
		Approximately 85
Percentage global population within WA		100%
Percentage global population within Australia		100%
Percentage population decline over 10 years or 3 generations		The known extent of the species has not declined over the last 10 years which has been within the one generation of the species. The extent of decline of the species over three generations is unknown

Summary of subpopulation information (detailed information to be provided in the relevant sections of the form)						
Location (include coordinates)	Land tenure	Survey information: Date of survey and No. mature individuals	AOO	Site / habitat Condition	Threats (note if past, present or future)	Specific management actions
Sub-population 1 Commonage Road reserve under powerline approximately 300m north of the junction with Hayes Road. (33.666044, 115.094205)	City of Busselton Road Reserve	Last surveyed Spring 2014 estimated to be 35 plants	0.005 km ²	The site has been historically impacted by road and powerline construction and is subject to ongoing vegetation management to protect powerline infrastructure. Despite this impact due to a lack of weed invasion it is still of a Very Good condition (Keighery 1994 scale).	Vegetation clearing associated with agricultural and semi-rural land use has been a historical threat. These are also current threats together with powerline and road maintenance clearing. A change in fire regime to short interval fire without consideration of reproductive maturity is a future threat with a drying climate and the sub-population located in a particularly fire prone environment. A short fire interval may reduce habitat quality by promoting weeds. There is a lack of new plant recruitment within this sub-population; this is a future threat as the population ages.	Ongoing liaison with Western Power and their contractors to prevent plant loss through maintenance activities Ongoing liaison with the City of Busselton to prevent plant loss through road maintenance and from fire management.
Sub-population 2 In Crown Res.49378 and private lot 40 adjoining to the south. (33.65584, 115.09015)	C-class Crown reserve for the purpose of recreation vested with the City of Busselton	Last surveyed Spring 2014 estimated to be 50 plants	0.035 square-km	The site is a steep valley supporting remnant vegetation, it is predominantly surrounded by pasture and parkland cleared vegetation. With varying levels of weed invasion the condition of the habitat ranges from	Recreation; a walk trail traverses the valley habitat, plants of the species directly adjoin the trail and have been damaged or removed by trail users. The reserve purpose is recreation so there is the threat of future recreation expansion and associated impact.	Ongoing liaison with the City of Busselton to ensure the species and its habitat is protected in reserve management. Seek a change in reserve purpose to conservation.

	and Private Property			Very Good to Excellent (Keighery 1994 scale).	<p>Weeds; past agricultural grazing has introduced annual weeds; these are degrading the habitat in places and may suppress seedling germination. They are also likely to alter the future fire regime of the area.</p> <p>Clearing; part of this sub-population extends onto undeveloped private property, clearing associated with future development of this property is a threat</p> <p>A change in fire regime to short interval fire without consideration of reproductive maturity is a future threat. The valley habitat is considered a fire risk by local residents, with a drying climate and this area being particularly fire prone, there is the possibility of frequent fire that may not only affect the species reproductive capacity but may also facilitate spread and exacerbation of the existing weed infestation.</p> <p>There is a lack of new plant recruitment within this sub-population; this is a future threat as the population ages.</p>	
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Nomination detail

Please refer to the Departments guidelines on nominating species for amendment of the Western Australian threatened species lists at [http://www.dpaw.wa.gov.au/images/documents/plants-animals/threatened-species/Listings/Threatened Species Nomination Guidelines 2014.pdf](http://www.dpaw.wa.gov.au/images/documents/plants-animals/threatened-species/Listings/Threatened_Species_Nomination_Guidelines_2014.pdf)

For technical information on terminology used in this form, and the intent of information requirements, as they relate to an assessment of this nomination against the IUCN Red List criteria, refer to the 2001 *IUCN Red List Categories and Criteria. Version 3.1*

http://www.iucnredlist.org/documents/redlist_cats_crit_en.pdf

and *Guidelines for Using the IUCN Red List Categories and Criteria Version 11* (February 2014)

<http://cmsdocs.s3.amazonaws.com/RedListGuidelines.pdf>

Section 1: Taxonomy

1.1 Current taxonomy	
Species name and Author:	<i>Gastrolobium argyrotichum</i> Hislop, Wege & A.D.Webb
Subspecies name(s) and Author:	
Is the species/subspecies conventionally accepted?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Is there any controversy about the taxonomy?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
If not conventionally accepted and/or if there is any controversy; provide details:	
Has the species/subspecies been formally named?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Has the species/subspecies been recently described?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
If the species has not been formally named or described; is it in the process of being described? Is there an anticipated date for the publication of the description? Has a type specimen been deposited? And if so provide the registration number and where deposited.	
If there are any closely related taxa provide details and include key distinguishing features:	The species is one of several in <i>Gastrolobium</i> that have bicoloured calyx hairs, a dense, contracted inflorescence and a predominantly yellow or orange standard petal. It is most similar to <i>G.dorrienii</i> , <i>G.retusum</i> and <i>G.dilatatum</i> , but can be separated from these taxa by its distinctive leaf morphology. Its leaves are oblong to obovate, with recurved margins, an obtuse base, and apices that are shallowly emarginate to conspicuously bilobed, or almost truncate with flared lateral lobes, with a recurved, terminal mucro and often also smaller, lateral mucros. The upper leaf surface has very prominent, raised, papillose venation with scattered hairs on the midrib (otherwise glabrous, including when young), and a lower leaf surface with a very

	dense covering of silvery-white hairs. See Hislop <i>et. al.</i> (2014) for detailed information on the leaves of allied taxa.	
1.2 Taxonomic history		
Are there recent synonyms for the species?		Yes X No <input type="checkbox"/>
<i>If Yes; provide details of synonyms:</i>	Gastrolobium sp. Quindalup (H.Cole & D.Carter 577)	
Have there been recent changes in the taxonomy or nomenclature?		Yes X No <input type="checkbox"/>
<i>If Yes; provide details of changes:</i>	The species was formally described in 2014	
1.3 Hybridisation		
Is there any known hybridism with other species in the wild?		Yes <input type="checkbox"/> No X Unknown <input type="checkbox"/>
<i>If Yes; Where does this occur and how frequently?</i>		

Section 2: Species information

2.1 Morphology / physical description
<i>Insert photograph(s) of species or provide as an attachment:</i>



A – habitat with granite outcropping, with arrows pointing to two individuals; B – flowering branch showing the condensed inflorescence of predominantly orange flowers and whorled, spreading leaves with recurved margins; C – a whorl of 3 leaves showing the silvery-white appearance of the undersurface (middle leaf) and the dark green, strongly veined upper leaf surface; D – variation in leaf shape. Field photographs by Andrew Webb (A) and Ben Lullfitz (B) from A. Webb AW 09032 and AW 09031 respectively; leaf detail from H. Cole & D. Carter 577, with scale bars at 1 cm.

Species description:

Erect shrubs to 1.5 m tall but more usually c. 1 × 1 m. *Branchlets* ascending, distinctly angular to subterete, densely sericeous. *Petioles* terete, continuous and decurrent with the branchlet, 1.5–3 mm long. *Leaves* patent to variously antrorse, in whorls of 3 (occasionally opposite or in whorls of 4), oblong to obovate, 10–30 × (4–)7–13 mm; apex shallowly emarginate to conspicuously bilobed, or almost truncate with flared lateral lobes, with a recurved, terminal mucro to 2 mm long and often also with short, fragile mucros, to 0.2 mm long, on the lateral lobes; margins undulate, recurved, thickened and minutely papillose; base rounded; upper surface with prominently reticulate and raised venation bearing minute papillae, scattered hairs usually present along the midrib; lower surface very densely sericeous. *Stipules* erect to recurved, linear-subulate, 4–6.5 mm long, sericeous. *Inflorescences* condensed, terminal (more rarely axillary), racemose, c. 6–20-flowered; peduncle 1–5 mm long, densely sericeous; rachis 2–10 mm long; subtending bracts caducous, 4.5–6 mm long, the lowest prominently trifid, the remainder entire or the margin distantly toothed, densely sericeous. *Pedicels* terete, 1.5–3 mm long, densely sericeous. *Calyx* campanulate, 5.5–6 mm long, including the c. 2.5 mm long receptacle, densely sericeous (the indumentum including some spreading hairs), hairs bicoloured, silky-white in the basal half becoming golden brown towards the apex; upper 2 lobes united higher than the lower 3, ± spreading, triangular, subacute, 2–2.3 mm long; lower 3 lobes erect, narrowly triangular, acute, 3.2–3.5 mm long. *Corolla*: standard limb transversely elliptic, 7–10 mm long including the 2.2–3 mm long claw, 7–10 mm wide, yellow with a dark red ring surrounding the yellow centre, apex emarginate or rounded, base ± truncate; wings

	6.5–8.5 mm long including the 2.2–3 mm claws, 2.2–3.5 mm wide, yellow with dark red markings toward the base, apex rounded, incurved and overlapping to enclose the keel, base auriculate; keel 7.3–8.5 mm long including the 2.2–3 mm claws, 2.8–3.5 mm wide, dark red, apex rounded, base auriculate, saccate. <i>Style</i> c. 4–5 mm long, incurved, lower portion pubescent; <i>ovary</i> shortly stipitate, densely pubescent, 4-ovulate. <i>Young pods</i> shortly stipitate, ovoid, moderately to densely pubescent. <i>Mature seeds</i> not seen. (Hislop <i>et al.</i> 2014).
2.2 Biology (provide details)	
<p><i>Gastrolobium argyrotichum</i> is a many branched woody shrub. Longevity of plants is unknown. The sub-populations comprise low numbers of individuals scattered among outcropping granite, at an average of about 10 plants per outcrop with a maximum of 30 per outcrop.</p> <p><i>Gastrolobium argyrotichum</i> flowers in October and November with mature seed recorded in late December. Fruits are dry, dehiscent legumes. Seed is small (approximately 3mm long), hard and black with a small pale brown aril.</p> <p>The species response to fire is unknown. Many species of <i>Gastrolobium</i> are colonizers of disturbed areas (Chandler <i>et. al.</i> 2002) and it is expected that <i>Gastrolobium argyrotichum</i> is an obligate seeder with seedlings recruiting from soil-stored seed following a stimulus event such as a fire, or possibly following soil disturbance resulting in suitable seed scarification.</p> <p>Specific pollinators are unknown, although species of <i>Gastrolobium</i> with orange and yellow standard petals are known to be insect-pollinated, and the majority of species are thought to be pollinated by bees (Chandler <i>et. al.</i> 2002).</p>	
2.3 Ecology (provide details)	
<p>The preferred habitat of the species is shallow loam soil between large outcropping rocks of granite. Associated vegetation is <i>Corymbia calophylla</i> woodland, over a shrubland dominated by <i>Xanthorrhoea preissii</i>, <i>Acacia pulchella</i>, <i>Darwinia citriodora</i>, <i>Cryptandra arbutiflora</i>, <i>Hibbertia hypericoides</i> and <i>Calothamnus sanguines</i> with <i>Lepidosperma squamata</i> and <i>Tetraria capillaris</i>.</p>	

Section 3: Geographic range

3.1 Distribution	
Insert map(s) of the species distribution, or provide as an attachment: A map of the species distribution is attached (Map 1)	
What is the current distribution of the species within Western Australia?	The species is only known from two sub-populations that are 1.5km apart in the northern extent of the Metricup Scarp between Dunsborough townsite and the Yelverton Forest block in the south-west of Western Australia.
What percentage of the species distribution is within WA?	100%
What is the current distribution of the species within the other Australian States and Territories?	0%
Does the species occur outside of Australia?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
If Yes, what percentage of the species distribution is within Australia, or	

what is the significance of the occurrence in Australia?			
What is the current international trend for the species?	N/A		
3.2 Migration			
Is the species migratory?			Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Is the migration within WA or within Australia or international?			
3.3 Extent of Occurrence (EOO) within Australia			
What is the current EOO?	0.5 km ² calculated to 4km ² based on estimated AOO		
How has this been calculated?	By using GIS and drawing a polygon that encompasses the sub-population extents and including an adjacent unsurveyed area that may potentially support the species (Map 2).		
What is the historical EOO?	It is technically unknown but with a history of agricultural grazing, clearing and now semi-rural development it is considered it would have been larger, potentially in the order of 19 km ² (the extent of the Metricup Scarp with outcropping granite).		
What is the current EOO trend?	Decreasing <input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input checked="" type="checkbox"/>		
<i>Provide details on the current trend – quantify if possible</i>	The majority of individuals are protected in Local Government reserves which are currently managed in a manner that provides a stable EOO. The EOO also extends into private land and that area is also currently being managed in a manner that provides a stable EOO.		
If there has been a change in EOO when did this change occur?	An historical change in EOO is likely to have occurred at least 30 years ago through clearing and grazing when the Metricup Scarps primary land use was agriculture.		
Was the change observed, estimated, inferred or projected?	Inferred		
If the EOO is decreasing / declining, is it continuing?			Yes <input type="checkbox"/> No <input type="checkbox"/>
Is the continuing decline observed, estimated, inferred or projected?			
Is there extreme fluctuation in EOO?			Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
<i>If Yes, provide details:</i>			
3.4 Area of Occupancy (AOO) within Australia			
What is the current AOO?	4km ² using 2x2km grid. Mapped area of subpopulations 0.04 km ²		
How has this been calculated?	By using GIS and drawing polygons over the known sub-population extents (Maps 1 & 2).		

What is the historical AOO?	Unknown		
What is the current AOO trend?	Decreasing <input type="checkbox"/>	Increasing <input type="checkbox"/>	Stable X
<i>Provide details on the current trend – quantify if possible</i>	While there has been some decline in plant numbers at sub-populations in recent years, the overall AOO of the sub-populations has not changed.		
If there has been a change in AOO when did this change occur?	With both of the sub-populations being directly adjacent to farmland, roads and powerlines, it is highly likely that clearing for those features has impacted the species AOO. It is unknown when these impacts may have occurred but it would have been at least 30 years ago.		
Was the change observed, estimated, inferred or projected? Give details.	Inferred		
If the AOO is decreasing / declining, is it continuing?		Yes <input type="checkbox"/>	No <input type="checkbox"/>
Is the continuing decline observed, estimated, inferred or projected? Give details.			
Is there extreme fluctuation in AOO?		Yes <input type="checkbox"/>	No X
<i>If Yes, provide details:</i>			
Does the species have a restricted AOO?		Yes X	No <input type="checkbox"/>
<i>If Yes, provide details:</i>	The species is considered to be associated with outcropping granite; this habitat is restricted within the Metricup Scarp and also the larger Leeuwin Block landform.		
3.5 Number of Locations			
'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).			
At how many locations does the species occur?	One (The two sub-populations are 1.5km apart, but linked by continuous forest and may be threatened by a single fire event. They are therefore counted as a single location.)		
Has there been a change in the number of locations?		Decrease <input type="checkbox"/>	Increase <input type="checkbox"/> No change X
If there has been a change, when did this change occur?	As clarification, it is inferred that the species may be endemic to the Metricup Scarp and at one stage more widely distributed within that landform. Given the Scarp is small it is considered that even with a larger extent all individuals would still have been at risk of impact by a single event (i.e. fire); hence the above selection of "no change".		
Was the change observed, estimated, inferred or projected? Give details.	Inferred		

If the number of locations is decreasing / declining, is it continuing?		Yes <input type="checkbox"/> No <input type="checkbox"/>
Is the continuing decline observed, estimated, inferred or projected? Give details.		
Is there extreme fluctuation in the number of locations?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
If Yes, provide details:		
Does this species occur on any off-shore islands?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
If Yes, provide details:		
3.6 Fragmentation		
Is the distribution fragmented?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
The phrase ' severely fragmented ' refers to the situation in which increased extinction risks to the taxon results from the fact that most of its individuals are found in small and relatively isolated subpopulations (in certain circumstances this may be inferred from habitat information). These small subpopulations may go extinct, with a reduced probability of recolonization.		
Is the distribution severely fragmented?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
If Yes, provide details:	Only known from one location, however, it is noted that the species is known from two sub-populations that are 1.5km apart, but they are associated with a specific habitat, outcropping granite. The sub-populations are not connected by the specific habitat and hence the likelihood of re-colonization if one sub-population was to go extinct is considered very low. There is thus natural 'fragmentation' of the habitat.	
3.7 Land tenure		
Is the species known to occur on lands managed primarily for nature conservation? i.e. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
If Yes; provide details:		
Is the species known to occur on lands that are under threat? i.e. mining tenement, zoned for development		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
If Yes; provide details:	Tenure on which the sub-populations occur includes road reserve and undeveloped private land. While these areas of land are not under immediate threat they are of a tenure in which species loss through private land development and road changes are possible.	
Provide details of other land tenures where the species occurs as this relates to the species conservation status	The land tenures on which the species is located includes, <ul style="list-style-type: none"> Local Government Road Reserve Private Property C-class Crown Reserve, purpose: recreation 	

Section 4: Habitat

4.1 Habitat (provide details in response to the question below)

<p>Described the habitat suitable for the species (biological and non-biological). Include descriptions of specific purpose habitat (e.g. foraging, breeding, roosting, seasonal migration, different life stages).</p>	<p>One sub-population of the species is found over 400m of remnant vegetation associated with shallow loam soil between large outcropping rocks of granite within an incised valley of an unnamed seasonal streamline. Vegetation associated with this sub-population is open <i>Corymbia calophylla</i> woodland, over a shrubland dominated by <i>Xanthorrhoea preissii</i>, <i>Acacia pulchella</i>, <i>Darwinia citriodora</i>, <i>Cryptandra arbutiflora</i>, <i>Hibbertia hypericoides</i> and <i>Calothamnus sanguines</i> with <i>Lepidosperma squamata</i>, <i>Tetraria capillaris</i> sedges.</p> <p>The other sub-population is found in a single site in regenerating shrubland vegetation on heavy lateritic gravelly loam. Associated species include <i>Darwinia citriodora</i>, <i>Hibbertia hypericoides</i> and <i>Xanthorrhoea preissii</i>. How representative this second occurrence is of a “natural” population is unknown, the reason being that it is under a powerline and adjacent to a relatively major road, as such it is suspected that this site has been heavily modified in the past. The sub-population is within 100m of a large upslope granite outcrop on private property from which it is separated by the road. While this outcrop has not been surveyed it is possible that the species is or once was on this outcrop and the road/powerline disturbance has fragmented or facilitated its growth in disturbed soil. Given this second sub-population does not extend into remnant vegetation on lateritic soils directly adjacent to the powerline clearing it is suspected that the lateritic soil type is not the species preferred habitat and that loam soils associated with outcropping granite is the preferred habitat.</p>	
<p>If the species occurs in a variety of habitats, is there a preferred habitat?</p>	<p>As detailed above, the preferred habitat for the species is considered to be shrubland vegetation associated with shallow loam soils and outcropping granite.</p>	
<p>Does the species use refugia? (include what is it and when is it used)</p>	<p>Granite outcrops are considered to be important as localized refugia where species have persisted in the microhabitats offered during times anthropogenic climate change. Given that granite outcrops are the preferred habitat of this species it could be stated that the species does use refugia.</p> <p>As a side-note, granite outcrops of the Leeuwin Block are known to provide refugial habitat to disjunct populations of species typically found on outcrops of the Darling Plateau. Some of these Leeuwin Block populations with this isolation have speciated into subspecies.</p>	
<p>Is the habitat restricted in extent or number of locations?</p>		<p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>
<p>If Yes, provide details:</p>	<p>The species is located on the Metricup scarp which is a small unit of the larger Leeuwin Block major landform. The Leeuwin Block is bound to the west by the Indian Ocean and to the east by the sedimentary Perth Basin; the landform is characterized by limestone and lateritic soils with areas of outcropping Precambrian granite and gneiss. The Perth Basin does not support any outcropping granite, beyond the Perth Basin the nearest area of outcropping granite is the Darling Plateau major landform approximately 70km east of the Leeuwin Block. In terms of habitat for <i>G. argyrotichum</i> it is restricted both in extent and number of locations and can be considered at two scales, being granite outcrops within the Metricup Scarp and within the larger Leeuwin Block.</p>	

	<p>The Metricup Scarp is very small approximately 14km long by 2km wide. Given that outcropping granite is visible on aerial images all such areas within or directly adjoining the scarp have been mapped and are shown on the attached Map 3, which is cumulatively an area of 0.2 km².</p> <p>The Leeuwin Block landform is considerably larger approximately 90km long by 15km wide. Once again outcropping granite is visible on aerial images and all areas (except those directly adjacent to the coast and lacking vegetation) have been mapped (Maps 4a, 4b), this mapping includes the Metricup Scarp outcrops and cumulatively represents a total of 6.2 km².</p>	
Is this species reliant on a threatened or priority species or ecological community?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
<i>If Yes, provide details:</i>		
Are there any other species (sympatric species) that may affect the conservation status of the nominated species?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
<i>If Yes, provide details:</i>		
What is the area, extent, abundance of habitat?	To err on the side of caution the extent of habitat has been defined as that within the larger Leeuwin Block landform, as shown in Maps 4a, 4b. The extent of outcropping granite as mapped is approximately 6.2 km ² .	
What is the quality of habitat?	Generally the quality of granite outcrop vegetation on the Leeuwin Block is of a Very Good to Excellent condition.	
Is there a decline in habitat area, extent or quality?		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
If there is a decline, is the decline continuing?		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
<i>Provide details:</i>	Given that many occurrences of habitat are on private land and often open to unrestricted grazing access and that areas of habitat, particularly within the Metricup Scarp are subject to semi-rural subdivision which facilitates clearing for dwelling construction and fire protection, it is considered that the habitat area is declining.	
What is the critical habitat or habitat important for the survival of the species?	Suitable habitat for the species has been subject to a high level of survey with the species only being located in the two sub-populations detailed in this document. In lieu of new populations being located (of which it is considered unlikely) the minimum critical habitat of the species would have to be the species EOO together with a 100m buffer. This would not only encompass all known individuals of the species but would include surrounding remnant vegetation and remnant vegetation that links the two-subpopulations (it is possible that this linkage is important for the movement of pollinators).	

Section 5: Population

'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)

'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).

5.1 Subpopulations

Location (include coordinates)	Land tenure	Survey information: Date of survey and No. mature individuals	AOO	Site / habitat Condition
Sub-population 1 Commonage Road reserve under powerline approximately 300m north of the junction with Hayes Road. (33.666044, 115.094205)	City of Busselton Road Reserve	Spring 2010 surveyed by B.Lullfitz ca.40 plants Spring 2014 surveyed by A.Webb ca.35 plants	0.005 km ²	The site has been historically impacted by road and powerline construction and is subject to ongoing vegetation management to protect powerline infrastructure. Despite this impact due to a lack of weed invasion it is still of a Very Good condition (Keighery 1994 scale).
Sub-population 2 In Crown Res.49378 and private lot 40 adjoining to the south. (33.65584, 115.09015)	C-class Crown reserve for the purpose of recreation vested with the City of Busselton and Private Property	Spring 2013 surveyed by B.Lullfitz, A.Webb 15 plants Spring 2014 surveyed by A.Webb ca.50 plants The location of this population was shown to us by local plant enthusiasts in 2013. Our initial 2013 survey was incomplete with more areas of occurrence found at the eastern extent of the reserve in 2014.	0.035 km ²	The site is a steeply incised valley supporting remnant vegetation it is predominantly surrounded by pasture and parkland cleared vegetation. With varying levels of weed invasion the condition of the habitat ranges from Very Good to Excellent (Keighery 1994 scale).

5.2 Population size (Australian context) (include how numbers were determined/calculated)

What is the total population size?	Approximately 85 plants (the number has been determined by field surveys)
What is the number of subpopulations?	Two
What percentage of the population is within WA?	100%
What percentage of the population is within Australia?	100%

5.3 Population dynamics (Australian context) <i>(include how numbers were determined/calculated)</i>	
What is the number of mature individuals?	Approximately 85 (the number has been determined by field surveys)
What is the number of immature individuals?	No immature individuals have been noted in field surveys
What is the number of senescing/past reproductive individuals?	Not enough is known about the species longevity to answer this, but it is worth noting that in sub-population 2 some plants (ca.10) appear old being very woody and with a reduced leaf volume.
What is the maximum number of mature individuals per subpopulation?	Approximately 35 plants in sub-population 1 and approximately 50 in sub-population 2
What is the percentage of mature individuals in the largest subpopulation?	58.8%
What percentage of mature individuals is within WA?	100%
What percentage of global mature individuals is within Australia?	100%
What is the age of sexual maturity?	Unknown
What is the life expectancy?	Unknown
What is the generation length?	Unknown
What is the reproductive capacity? (i.e. litter size or number of seeds)	Unknown. Each flower has 4 ovules, there are 6-20 flowers per inflorescence, and inflorescences are numerous per individual (terminal on the branches). Seed collection of the species has been undertaken and it was noted that mature pods produce 0-4 seeds (two seeds on average with very few pods having no seeds).
What is the reproductive success?	Unknown, seedlings have not been observed at either sub-population. It is possible that the species may need a stimulus event such as fire to promote germination.
5.4 Population trend	
What is the current population trend (mature individuals)?	Decreasing <input checked="" type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/>
What is the percentage of the population change and over what time period?	The species has not been formally monitored for very long (ca.7years), but it is estimated that there has been a 10% decline over that period.
How has this been calculated?	Estimated. It should be clarified that Section 5.1 indicates an increase in plant numbers in sub-population 2, but this is a reflection of the full population extent being realised not actual new plant occurrence. A partial survey of the sub-population 2 plants directly adjoining the recreation trail in 2015 noted that some plants had declined in health with 1-2 plants lost as a result of trail usage/maintenance. The decline in sub-population 1 is a result of a powerline maintenance vehicle being driven through the edge of the population.

If the trend is decreasing; are the causes of the reduction understood?		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Have the causes of the reduction ceased?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Are the causes of the reduction reversible?		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Is the reduction continuing (continuing decline)?		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Has the change been observed, estimated, inferred or is it suspected (direct observation, index of abundance appropriate to the species)?	<p>The reduction has been observed as the result of recreational impact and infrastructure maintenance. Reduction as a result of these causes is small and does not occur every year but without new species recruitment it is still a reduction.</p> <p>In principle these causes of decline should be reversible through better liaison with infrastructure managers/recreational users and by the implementation of trials to promote species germination.</p>	
When was the reduction or is it anticipated to occur?	Past <input type="checkbox"/> Present <input checked="" type="checkbox"/> Future <input checked="" type="checkbox"/>	
What is the period of time for the reduction (in years and generations)?	<p>The reduction is not only present but is highly likely to continue into the future. There is the risk that reduction in sub-population 2 may accelerate in the future with development of the private location that the population extends into and with the development of other vacant private land in the larger area resulting in increased recreational usage of the habitat. This accelerated reduction could occur within the next 10 years with the City of Busselton predicted to have the Western Australia's fastest population growth for the next 10 years after having experienced the state's fastest growth over the last 5 years (City of Busselton 2015).</p>	
Has there been a reduction in the number of subpopulations?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
<i>If Yes, provide details:</i>	<p>No sub-populations have been lost since the species has been formally recognised.</p> <p>It should be noted that it is highly likely that sub-populations were lost in the past prior to the species being formally recognised.</p>	
Are there extreme fluctuations in population size?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
<i>If Yes, provide details:</i>		
5.5 Translocations and captive/enclosed subpopulations		
Have there been translocations (introduction or re-introduction)?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Are there proposed translocations (introduction or re-introduction)?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Are there captive/enclosed/cultivated subpopulations?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Are there proposed captive/enclosed/cultivated subpopulations?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Are there self-sustaining translocated subpopulations?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
<i>If Yes, provide details:</i>		

Are there translocated subpopulations that are not self-sustaining?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
If Yes, provide details:		
Are there self-sustaining captive/enclosed subpopulations?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
If Yes, provide details:		
Are there captive/enclosed subpopulations that are not self-sustaining?		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
If Yes, provide details:		
Other information on translocations and captive/enclosed subpopulations for the species (including failures):		
5.6 Important subpopulations		
<p>Identify any subpopulations that are important or necessary for the long-term survival of the species and provide details for why they are considered as such (i.e. key breeding, edge or range, maintenance of genetic diversity):</p> <p>There are only two sub-populations both with very low plant numbers, hence they are both very important and necessary in regards to the representation of range and genetic diversity for the survival of the species.</p>		

Section 6: Survey

6.1 Survey methods (Provide details)		
What survey methods are applicable to the species?	Field observations conducted during the day and on foot are the best method of survey. While the plant is easily located in spring when flowering, it is also quite distinctive vegetatively and as such is able to be surveyed for at any time of the year.	
Are there preferred or recommended survey methods that yield better results for the species?	Spring surveys are preferred since the species is flowering.	
Are there special requirements, techniques, expertise or other considerations that are necessary when surveying for this species?	Knowledge of the local areas flora is ideal for the most effective surveys.	
Are there reasons why the species may not be detected during surveys?	No	
Can the species be identified in the field?		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Provide details:	In the Metricup Scarp area there is no other comparable species.	
Can the species be easily confused within similar species in the field?		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Provide details:	Outside of the Metricup Scarp in the larger Leeuwin Block (particularly in the Gracetown/Bramley area) outlying populations of <i>G. retusum</i> occur. While	

	<i>G. argyrotichum</i> has not been found in this area despite numerous surveys there is the possibility that an inexperienced surveyor may confuse these species.	
List any published survey guidelines, guidance statements, protocols, standard operating procedures or other documents that are relevant to conducting surveys for this species.		
6.2 Survey effort		
Has the species been well surveyed?		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Have targeted surveys been conducted for the species?		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Provide details of the successful and unsuccessful surveys undertaken for the species:	<p>The Metricup Scarp and the larger Leeuwin Block have been subject to extensive floristic survey over a long period of time with some of these surveys specifically targeting outcropping granite.</p> <p>The species was originally found by Hazel Cole and Don Carter who in the 1990's established the Cape Naturaliste Regional Herbarium at Dunsborough. For almost 20years Hazel and Don together with other volunteers of the Toby Inlet Group undertook extensive bushland surveys of the Dunsborough area predominantly within the Metricup Scarp. In undertaking these surveys they accessed large tracts of private bushland and lodged in the order of 650 collections with the WA Herbarium. They only located <i>G. argyrotichum</i> in the two locations detailed by this document.</p> <p>In regards to the larger Leeuwin Block the following floristic surveys have been undertaken that we are aware of.</p> <ul style="list-style-type: none"> • Keating & Trudgen (1986) surveyed remnant vegetation north and west of Bussell Highway and Caves Road between Forest Beach and Wilyabrup. • The Department of Conservation and Land Management conducted floristic survey of the Warren bioregion (Lyons <i>et. al.</i> 2000) which includes a significant portion of the Leeuwin Block landform. • Debra Rooks and the Margaret River Regional Herbarium made extensive collections along the Cowaramup Brook including its granite outcrops on both public and private land in the mid 2000's. These surveys lodged over 200 Herbarium collections including the only collections of <i>G. retusum</i> lodged for the Leeuwin Block landform (Western Australian Herbarium 1998). • Species lists obtained from a variety of survey sources have been compiled for conservation reserves of the Leeuwin Block landform, these have been published in Keighery <i>et.al</i> (2010) and Keighery <i>et. al.</i> (2011) • Webb (2013) has recently conducted a detailed floristic survey of the Meelup reserve system. The Meelup reserves represent the most extensive area of outcropping granite in the Leeuwin Block (approximately 2 km²) and is located directly the north of the Metricup Scarp. <p>Further to these surveys, in recent years the South West Region of Parks and Wildlife has undertaken targeted surveys of Leeuwin Block granite outcrops. Outcrops that have been inspected in the last 10 years are indicated on Maps 4a, 4b. These represent:</p> <ul style="list-style-type: none"> • In the Metricup Scarp approximately 0.12 of the scarps 0.2 km² of outcropping granite. This includes all the outcrops on public land and some on private land. <i>G. argyrotichum</i> was specifically targeted with no plants being found. • In the larger Leeuwin Block approximately 4.4 of the landforms 6 km² of outcropping granite as shown in Maps 4a, 4b has been inspected (primarily 	

	<p>public land outcrops). In these surveys, more populations of <i>G. retusum</i> were located in the Bramley area but no <i>G. argyrotrichum</i> was found.</p> <p>With the extent of survey work that has been undertaken in the Leeuwin Block and the range of granitic outcrops targeted for survey in recent years it is considered that the only place that further plants of the species may be located is on or adjacent to outcropping granites within private land of the Metricup Scarp. A key area of potential plant location would be the private outcrops directly adjacent to sub-population 1; access to these locations for inspection purposes is hoped to be obtained. The reason this nomination has been submitted prior to those inspections is that the outcrops are small (approximately 0.02 km²) and that even with <i>G. argyrotrichum</i> discovery, the criteria for this Threatened Flora nomination would remain the same.</p>
6.3 Research (Provide details)	
Has the species been well researched?	Yes <input type="checkbox"/> No <input type="checkbox"/> Partially X
What research has been or is being conducted?	The taxonomy of the species has been thoroughly researched using morphological criteria.
What are the knowledge gaps for the species?	<p>Ecology</p> <ul style="list-style-type: none"> • How the species responds to disturbance (seeder or resprouter), seedling survival rates, juvenile periods and overall life expectancy. • The species soil seed bank dynamics, seed longevity and germination cues. • Does the species have specific pollinators <p>Population genetics</p> <ul style="list-style-type: none"> • What factors and processes are vital to long term viability, genetic diversity, differentiation of the sub-populations and gene flow between the sub-populations. <p>Taxonomy</p> <ul style="list-style-type: none"> • Precise systematic affinities.
Research recommendations:	<p>Genetic analysis to inform conservation management.</p> <p>Research into the species' life cycle and its response to disturbance.</p>
6.4 Monitoring (Provide details)	
Is the species being monitored, either directly (targeted) or indirectly (general monitoring)?	The species is being monitored directly by annual field inspections.
What methods are used for monitoring?	On foot field inspections of the known sub-populations.
Monitoring recommendations:	If a fire or other disturbance event impacts a sub-population then detailed disturbance response and life cycle monitoring is required.

Section 7: Threats

7.1 Threats (detail how the species is being impacted, i.e. how severe, the extent, evidence of the impact)				
Threat <i>(describe how the threat impacts on the species. Include abiotic and biotic causes, human related e.g. exploitation, and biological characteristics of the species e.g. low genetic diversity)</i>	Extent <i>(give details of impact on whole species or specific subpopulations)</i>	Impact <i>(what is the level of threat to the conservation of the species)</i>	Evidence	Time period <i>(past, present, future)</i>
Recreation A walk trail traverses the valley in which sub-population 2 occurs, some plants directly adjoin the trail and have been noted to have been damaged or removed by trail users. The reserves vested purpose is recreation; hence there is the risk of future recreation expansion that may result in additional species and/or habitat impact.	Approximately 10 plants of sub-population 2 are directly adjacent to the walk trail. Monitoring has shown that some of these adjacent plants are being damaged by either traffic impact and/or having parts broken off with 1-2 plants seemingly to have been lost.	The plants adjacent to the walk trail are old mature plants with relatively few branches and as such the loss of branches affects overall plant health. A partial inspection of sub-population 2 in late 2015 noted that one or two plants adjacent to the trail seemed to be missing, either they have died or have been broken back to only small parts.	Direct observation of plants with broken and lost branches directly adjacent to the walk trail	Direct impact of plants adjacent to the trail is a present and future impact issue. The valley in which sub-population 2 occurs is particularly scenic and it is likely that with increased development of the surrounding area there will be an increased demand for recreation in the species habitat.
Weeds The majority of sub-population 2 is surrounded by land that has been impacted by historical agricultural usage; it is likely that the sub-population was open to stock access. This has resulted in the introduction of annual weeds; in places the infestations are dense and degrading	The western extent of sub-population 2 (approximately 10 plants) is subject to and/or directly adjacent to annual weed invasion.	There is no current evidence of species impact as a result of annual weed invasion. The level of weed invasion directly around plants of the species is low, but given weeds are already present there is the risk of future weed	Flora surveys have been undertaken of the sub-population 2 valley and annual weeds, in particular <i>Briza</i> , Capeweed, <i>Cotula</i> and <i>Ehrharta</i> species are well established in places.	While these weeds are a low threat at current it is considered that they pose a future risk as their density increases and they compete with native seedlings. It is a concern that a combination of more frequent fire and annual weed infestation

the habitat, potentially suppressing native species recruitment. With annual weeds being very difficult to control it is likely that increased invasion and associated degradation will occur. Annual weeds are particularly responsive to regular fire and as such any change to a more frequent fire regime may accelerate this degradation.		proliferation and seedling competition.		may lead to sub-population 2 habitat degradation in the future.
Vegetation clearing Part of sub-population 2 extends onto undeveloped private property. There is the potential for future development and associated clearing of this location which may impact the species Sub-population 1 has been historically cleared, most likely for both road and powerline construction. With the population being in a road reserve and directly under a powerline there is the threat of future impact associated with powerline maintenance/upgrade and/or road works.	Separate to the above 10 plants in sub-population 2 that are impacted by weeds and recreation a further 10 plants of this sub-population occur in undeveloped private property directly adjacent to the crown reserve. There is a risk that future development of this private location will impact those plants. The entirety of sub-population 1 is under a powerline, vegetation management is regularly undertaken which risks inadvertent clearing. In addition to this the sub-population is in a road reserve and as such vulnerable to clearing from future road changes.	This is probably one of the biggest threats to the species. The loss of sub-population 2 plants in private property through development would represent a 10% loss of that population. With all the sub-population 1 plants under a powerline and in a road reserve there is the risk of 100% loss of this population should major road or powerline works be undertaken.	Evidence of the potential for clearing impact on this species is an incident in 2011 when powerline contractors drove a vehicle through the edges of sub-population 1 when undertaking pole inspections. Fortunately clearing impact was only a few plants but it showed how easily impact could occur through routine infrastructure management. In regards to clearing of private land and road reserves there is a long history of such tenures being cleared for development at the expense of conservation values.	The vegetation clearing threat as detailed here is a future threat as the surrounding area becomes more developed.
Lack of recruitment Both sub-populations do not seem to be showing any sign of seedling recruitment. Being a <i>Gastrolobium</i> it is possible that fire or some other	There is no evidence of species recruitment in either sub-population.	The method of species recruitment is not understood. There is the potential that as the sub-populations age the species will senesce and	Evidence of a lack of recruitment would be the failure to observe any seedlings in population surveys.	If the current trend of a lack of recruitment continues then this will be a future threat as the population ages.

disturbance event may be required to stimulate soil stored seed. It is possible that the species is an obligate seeder and hence an event that kills mature plants may be required to promote germination (i.e. a fire event). With such small numbers and the species response being unknown, there is a risk that a disturbance introduced to promote recruitment may fail and instead severely impact plant numbers.		without recruitment both sub-populations will be lost.	It should be noted that the species has only relatively recently been recognized and formally monitored. As such evidence of a lack of recruitment is only based on a short monitoring period.	
<p>A change in fire regime</p> <p>The species occurs in an area that is considered very high fire risk. The City of Busselton is under pressure from local residents to burn sub-population 2.</p> <p>With a drying climate and the sub-populations being close to houses it is likely that both (in particular sub-population 2) will be subject to either a changed fire regime and/or vegetation modification to mitigate a perceived fire risk.</p> <p>There is a risk that any fire regime introduced may involve frequent fire without consideration of the species reproductive maturity. Burning prior to the species producing adequate seed for population replacement will result in a decline in the population.</p> <p>With annual weeds already established in sub-population 2 there is the future threat that frequent fire will</p>	This threat is particularly relevant to all of sub-population 2.	<p>Both sub-populations of the species are long unburnt. There are community expectations of more frequent fire particularly in sub-population 2. The impact of fire on the actual species is unknown. While it may promote seedling recruitment there is the possibility that it may not or that too frequent fire may result in species loss without a consideration of reproductive maturity.</p> <p>Increased weed invasion is a major risk from fire, particularly if it is too frequent and facilitates annual weed growth.</p> <p>Annual weeds are already established in sub-population 2 any proliferation of them may out-compete native seedlings resulting in species loss and habitat degradation.</p>	Both sub-populations are within what is considered a very high fire risk area with semi-rural subdivision, steep hills and relatively large areas of long unburnt forest. There are concerns about these sorts of situations at all levels of risk management and with recent wildfire events throughout the state and the larger country it is highly likely that there will be pressure for more frequent fire in these such areas.	A threat from altered fire regime is a future threat.

<p>exacerbate weed populations resulting in habitat degradation.</p> <p>It also needs to be considered, as noted earlier, that the species response to fire and germination triggers are unknown. There is the risk that a fire event may both fail to promote seedling germination and adversely impact mature plants. As such until the species fire ecology is known any change to the current fire regime is a risk.</p>				
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Section 8: Management

8.1 Current management	
Is the species managed?	Yes, directly <input type="checkbox"/> Yes, indirectly X No <input type="checkbox"/>
<i>If Yes; provide details of current or past management actions:</i>	<p>The species predominantly occurs on land managed by the City of Busselton, the City has been notified of the species presence. Sub-population 1 occurs under a powerline, Western Power has been notified of the species presence and they have installed their Environmentally Sensitive Area markers.</p> <p>Department of Parks and Wildlife staff regularly inspect the sub-populations and liaise with City of Busselton and Western Power staff to assist with the species protection.</p>
Does the species benefit from the management of another species or ecological community?	Yes <input type="checkbox"/> No X
<i>If Yes; provide details:</i>	
8.2 Recovery planning	
Is there an approved Recovery Plan (RP) or Interim Recovery Plan (IRP) for the species?	Yes <input type="checkbox"/> No X
<i>List all relevant recovery plans or interim recovery plans (including draft, in-preparation, out-of-date, national and other State/Territory plans, and plans for other species or ecological communities that may benefit or be relevant to the nominated species)</i>	
<i>List other documents that may be relevant to the management of the species or the lands on which it occurs (i.e. area management plans, conservation advices, referral guidelines)</i>	
8.3 Management recommendations	
<ul style="list-style-type: none"> Some seed collection of the species has been undertaken and 446 seed is held at the Departments Threatened Flora Seed Centre. Further seed needs to be collected. The private location with outcropping granite directly adjacent to sub-population 1 needs to be surveyed for the species With the very low plant numbers found in both sub-populations there should be investigations into what promotes seed germination and establishment. 	

Section 9: Nominator details

Nominator name(s):	
Contact details:	
Date submitted:	28 January 2016

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

The following people have reviewed and provided comment on drafts of this nomination:

- Juliet Wege (Parks and Wildlife Herbarium)
- Kim Williams (Parks and Wildlife South West Region)
- Ben Lullfitz (Parks and Wildlife South West Region)

Section 10: References

9.1 References

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SUMMARY OF THE FIVE CRITERIA (A-E) USED TO EVALUATE IF A TAXON BELONGS IN AN IUCN RED LIST THREATENED CATEGORY (CRITICALLY ENDANGERED, ENDANGERED OR VULNERABLE).¹

A. Population size reduction. Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered	Endangered	Vulnerable
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3 & A4	≥ 80%	≥ 50%	≥ 30%
A1 Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND have ceased.	based on any of the following:	(a) direct observation [except A3]	
A2 Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.		(b) an index of abundance appropriate to the taxon	
A3 Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3].		(c) a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality	
A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.		(d) actual or potential levels of exploitation	
		(e) effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.	
B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)			
	Critically Endangered	Endangered	Vulnerable
B1. Extent of occurrence (EOO)	< 100 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			
C. Small population size and decline			
	Critically Endangered	Endangered	Vulnerable
Number of mature individuals	< 250	< 2,500	< 10,000
AND at least one of C1 or C2			
C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):	25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2. An observed, estimated, projected or inferred continuing decline AND at least 1 of the following 3 conditions:			
(a) (i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
(ii) % of mature individuals in one subpopulation =	90–100%	95–100%	100%
(b) Extreme fluctuations in the number of mature individuals			
D. Very small or restricted population			
	Critically Endangered	Endangered	Vulnerable
D. Number of mature individuals	< 50	< 250	D1. < 1,000
D2. Only applies to the VU category Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.	-	-	D2. typically: AOO < 20 km ² or number of locations ≤ 5
E. Quantitative Analysis			
	Critically Endangered	Endangered	Vulnerable
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)	≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)	≥ 10% in 100 years

¹ Use of this summary sheet requires full understanding of the IUCN Red List Categories and Criteria and Guidelines for Using the IUCN Red List Categories and Criteria. Please refer to both documents for explanations of terms and concepts used here.

FORM VERSION OF IUCN RED LIST SUMMARY OF THE FIVE CRITERIA (A-E) to assist with determining eligible criteria

Check boxes in one or more of the following fields to support your nomination; refer to summary table above for explanations

A. Population size reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4

A1 <input type="checkbox"/>	and one of the following	≥ 90% <input type="checkbox"/>	≥ 70% <input type="checkbox"/>	≥ 50% <input type="checkbox"/>
	and any of the following	(a) <input type="checkbox"/>	(b) <input type="checkbox"/>	(c) <input type="checkbox"/> (d) <input type="checkbox"/> (e) <input type="checkbox"/>
A2 <input type="checkbox"/>	and one of the following	≥ 80% <input type="checkbox"/>	≥ 50% <input type="checkbox"/>	≥ 30% <input type="checkbox"/>
	and any of the following	(a) <input type="checkbox"/>	(b) <input type="checkbox"/>	(c) <input type="checkbox"/> (d) <input type="checkbox"/> (e) <input type="checkbox"/>
A3 <input type="checkbox"/>	and one of the following	≥ 80% <input type="checkbox"/>	≥ 50% <input type="checkbox"/>	≥ 30% <input type="checkbox"/>
	and any of the following	(b) <input type="checkbox"/>	(c) <input type="checkbox"/>	(d) <input type="checkbox"/> (e) <input type="checkbox"/>
A4 <input type="checkbox"/>	and one of the following	≥ 80% <input type="checkbox"/>	≥ 50% <input type="checkbox"/>	≥ 30% <input type="checkbox"/>
	and any of the following	(a) <input type="checkbox"/>	(b) <input type="checkbox"/>	(c) <input type="checkbox"/> (d) <input type="checkbox"/> (e) <input type="checkbox"/>

B. Geographic range in the form of either B1 (extent of occurrence) and/or B2 (area of occupancy)

	and one of the following	< 100 km ² X	< 5,000 km ² <input type="checkbox"/>	< 20,000 km ² <input type="checkbox"/>
B1 X	and at least two of the following three conditions [(a), (b), (c)]	(a) X	and one of the following	1 X ≤ 5 <input type="checkbox"/> ≤ 10 <input type="checkbox"/>
		(b) X	and any of the following	(i) <input type="checkbox"/> (ii) X (iii) X (iv) <input type="checkbox"/> (v) X
		(c) <input type="checkbox"/>	and any of the following	(i) <input type="checkbox"/> (ii) <input type="checkbox"/> (iii) <input type="checkbox"/> (iv) <input type="checkbox"/>
	and one of the following	< 10 km ² X	< 500 km ² <input type="checkbox"/>	< 2,000 km ² <input type="checkbox"/>
B2 X	and at least two of the following three conditions [(a), (b), (c)]	(a) X	and one of the following	1 X ≤ 5 <input type="checkbox"/> ≤ 10 <input type="checkbox"/>
		(b) X	and any of the following	(i) <input type="checkbox"/> (ii) X (iii) X (iv) <input type="checkbox"/> (v) X
		(c) <input type="checkbox"/>	and any of the following	(i) <input type="checkbox"/> (ii) <input type="checkbox"/> (iii) <input type="checkbox"/> (iv) <input type="checkbox"/>

C. Small population size and decline

C1 X	and one of the following	< 250 X	< 2,500 <input type="checkbox"/>	< 10,000 <input type="checkbox"/>
	and one of the following	25 % X	20 % <input type="checkbox"/>	10 % <input type="checkbox"/>
C2 <input type="checkbox"/>	and one of the following	< 250 X	< 2,500 <input type="checkbox"/>	< 10,000 <input type="checkbox"/>
	and at least one of the following three conditions [(a)(i), (a)(ii), (b)] plus applicable size and/or percentage	(a)(i) <input type="checkbox"/>	≤ 50 X	≤ 250 <input type="checkbox"/> < 1,000 <input type="checkbox"/>
		(a)(ii) <input type="checkbox"/>	90 - 100 % <input type="checkbox"/>	95 - 100 % <input type="checkbox"/> 100 % <input type="checkbox"/>
		(b) <input type="checkbox"/>		

D. Very small or restricted population

D <input type="checkbox"/>	and one of the following	< 50 <input type="checkbox"/>	< 250 <input type="checkbox"/>	D1 (< 1,000) <input type="checkbox"/>
D2 <input type="checkbox"/>	and one of the following	< 20 km ² <input type="checkbox"/>	≤ 5 <input type="checkbox"/>	

E. Quantitative analysis

E <input type="checkbox"/>	and one of the following	≥ 50 <input type="checkbox"/>	≥ 20 % <input type="checkbox"/>	≥ 10 % <input type="checkbox"/>
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The following table is to assist with determining eligibility under criteria B, C & D

What is the total number of mature individuals?						
Global	< 50 <input type="checkbox"/>	< 250 X	< 1,000 <input type="checkbox"/>	< 2,500 <input type="checkbox"/>	< 10,000 <input type="checkbox"/>	Unknown <input type="checkbox"/>
National	< 50 <input type="checkbox"/>	< 250 X	< 1,000 <input type="checkbox"/>	< 2,500 <input type="checkbox"/>	< 10,000 <input type="checkbox"/>	Unknown <input type="checkbox"/>
WA	< 50 <input type="checkbox"/>	< 250 X	< 1,000 <input type="checkbox"/>	< 2,500 <input type="checkbox"/>	< 10,000 <input type="checkbox"/>	Unknown <input type="checkbox"/>
How has this number been determined or calculated? Plant numbers have been counted from field surveys (approximately 85 plants), given that in places several plants are growing close together those counts have been called approximate.						
Reliability of total number of individuals (other than for 'unknown' above)						
Global	Known X		Estimated <input type="checkbox"/>	Modelled <input type="checkbox"/>	Expert opinion <input type="checkbox"/>	
National	Known X		Estimated <input type="checkbox"/>	Modelled <input type="checkbox"/>	Expert opinion <input type="checkbox"/>	
WA	Known X		Estimated <input type="checkbox"/>	Modelled <input type="checkbox"/>	Expert opinion <input type="checkbox"/>	
If from expert opinion, provide name of expert: Authors and reviewers						
How many locations?						
Global	1 X	≤ 5 <input type="checkbox"/>	≤ 10 <input type="checkbox"/>		Unknown <input type="checkbox"/>	
National	1 X	≤ 5 <input type="checkbox"/>	≤ 10 <input type="checkbox"/>		Unknown <input type="checkbox"/>	
WA	1 X	≤ 5 <input type="checkbox"/>	≤ 10 <input type="checkbox"/>		Unknown <input type="checkbox"/>	
How has this number been determined or calculated? The species is only known from two areas of occurrence given they are distinct groups in the larger population they are considered sub-populations.						
How many subpopulations?						
Global	1 <input type="checkbox"/>	≤ 5 X	≤ 10 <input type="checkbox"/>		Unknown <input type="checkbox"/>	
National	1 <input type="checkbox"/>	≤ 5 X	≤ 10 <input type="checkbox"/>		Unknown <input type="checkbox"/>	
WA	1 <input type="checkbox"/>	≤ 5 X	≤ 10 <input type="checkbox"/>		Unknown <input type="checkbox"/>	
Reliability of number of populations/locations (other than for unknown above)						
Global	Known X		Estimated <input type="checkbox"/>	Modelled <input type="checkbox"/>	Expert opinion <input type="checkbox"/>	
National	Known X		Estimated <input type="checkbox"/>	Modelled <input type="checkbox"/>	Expert opinion <input type="checkbox"/>	
WA	Known X		Estimated <input type="checkbox"/>	Modelled <input type="checkbox"/>	Expert opinion <input type="checkbox"/>	
If from expert opinion, provide name of expert:						
What is the total number and percentage of mature individuals in each subpopulation/location? (include all known subpopulations/ locations; add subpop./ location name or reference below and add additional rows as required)						
Sub-population 1			≤ 50 <input checked="" type="checkbox"/>	≤ 250 <input type="checkbox"/>	≤ 1000 <input type="checkbox"/>	> 1000 <input type="checkbox"/>
			90 - 100 % <input type="checkbox"/>	95 – 100 % <input type="checkbox"/>	100 % X	<90% <input checked="" type="checkbox"/>

<i>Sub-population 2</i>	≤ 50 <input checked="" type="checkbox"/>	≤ 250 <input type="checkbox"/>	≤ 1000 <input type="checkbox"/>	>1000 <input type="checkbox"/>
	90 - 100 % <input type="checkbox"/>	95 – 100 % <input type="checkbox"/>	100 % X	<90% <input checked="" type="checkbox"/>
How has this number been determined or calculated? From field surveys of sub-populations it is considered that all plants are mature (being approximately 35 and 50 plants respectively).				
Reliability of the total number of mature individuals in each subpopulation/location? (<i>other than for unknown above</i>)				
Known X Estimated <input type="checkbox"/> Modelled <input type="checkbox"/> Expert opinion <input type="checkbox"/>				
If from expert opinion, provide name of expert:				

Map 1: Extent of *G. argyrotrichum***Legend**

Species extent



1:40,000 (A4)

0 250 500 750 m

Geographic Projection
Datum: GDA94



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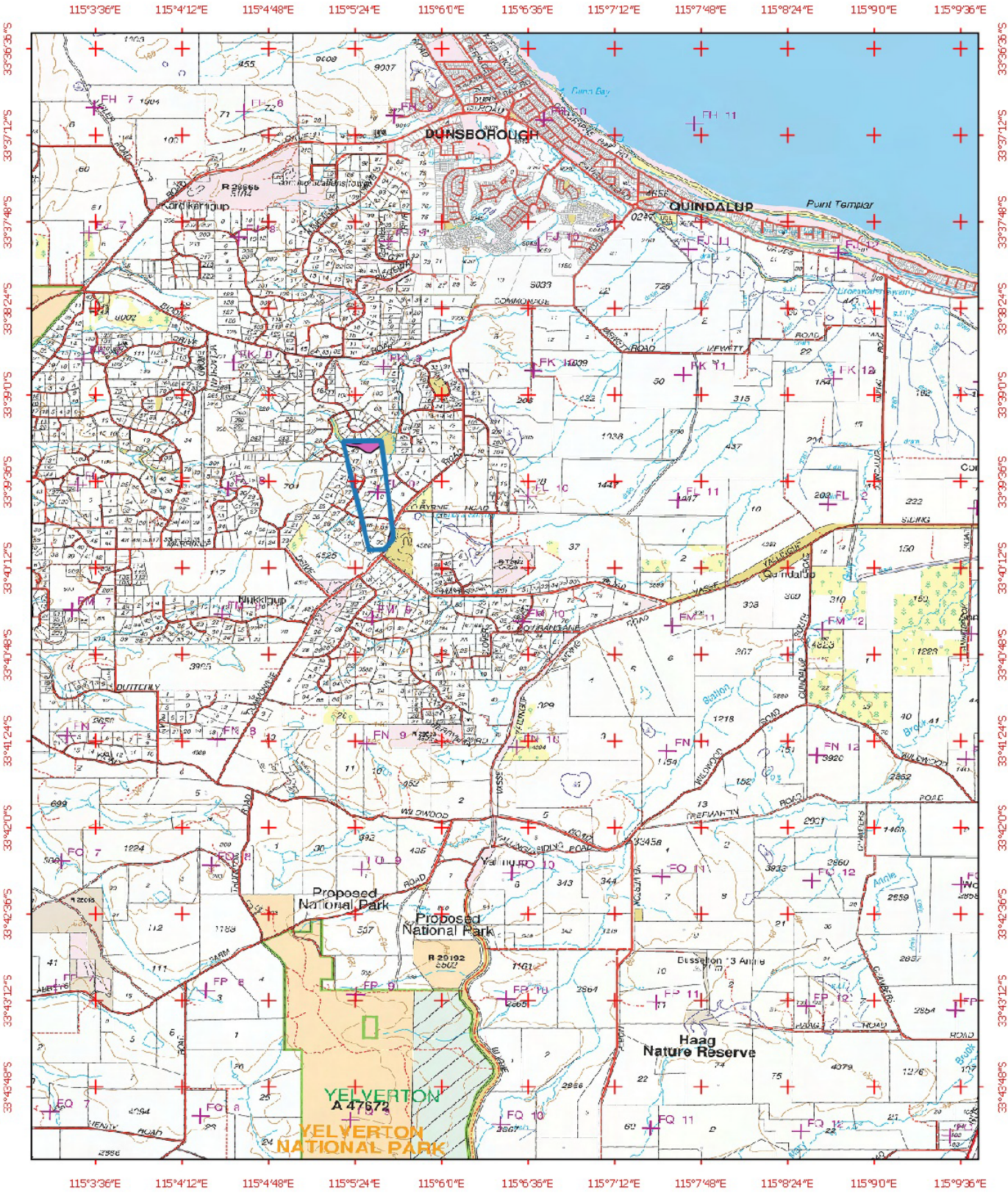
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Map 2: AOO and EOO Extent of *G. garyotrichum*



Legend

- EOO extent_region
- AOO extent

1:40,000 (A4)
0 250 500 750 m

Geographic Projection
Datum: GDA94



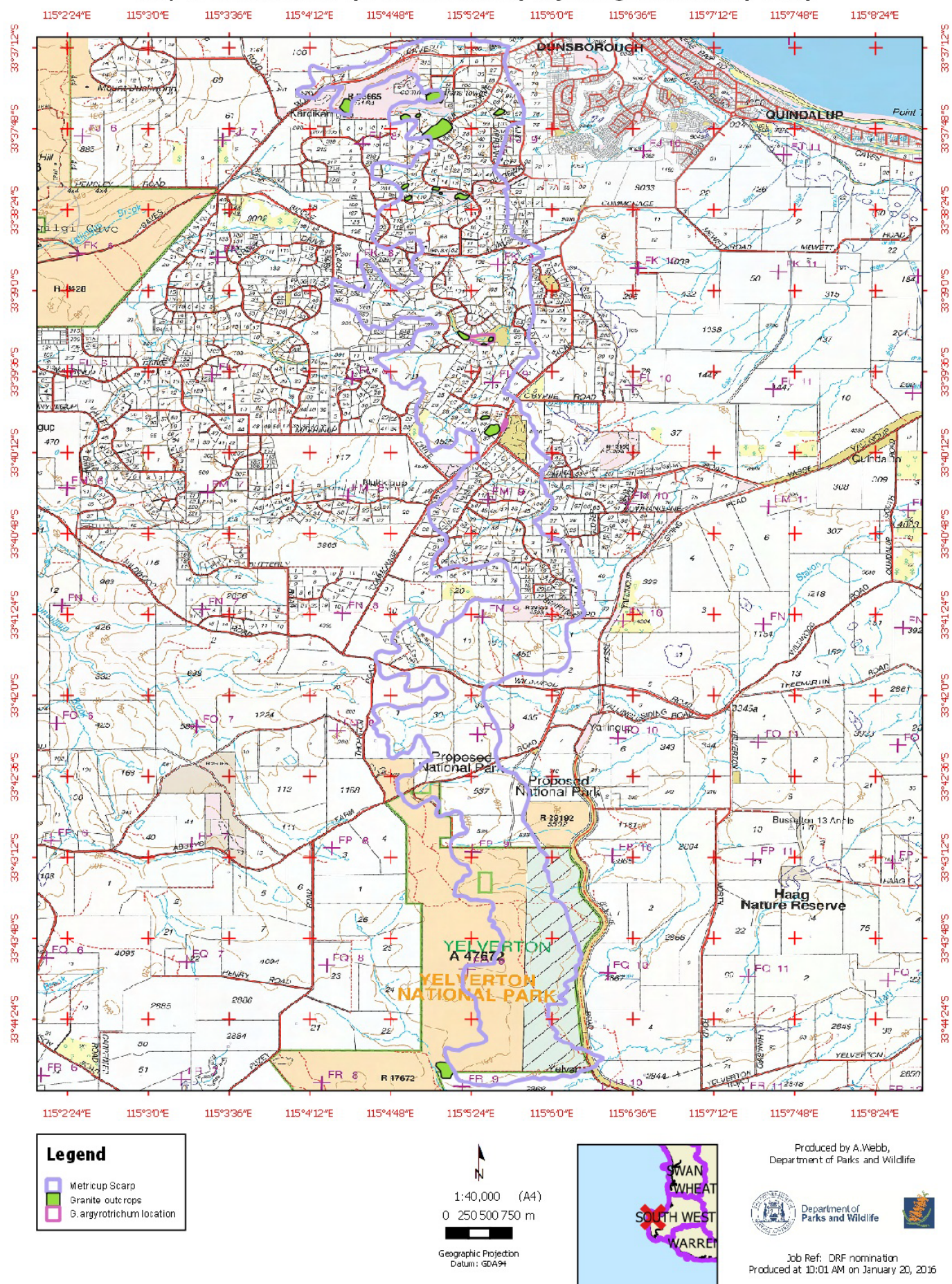
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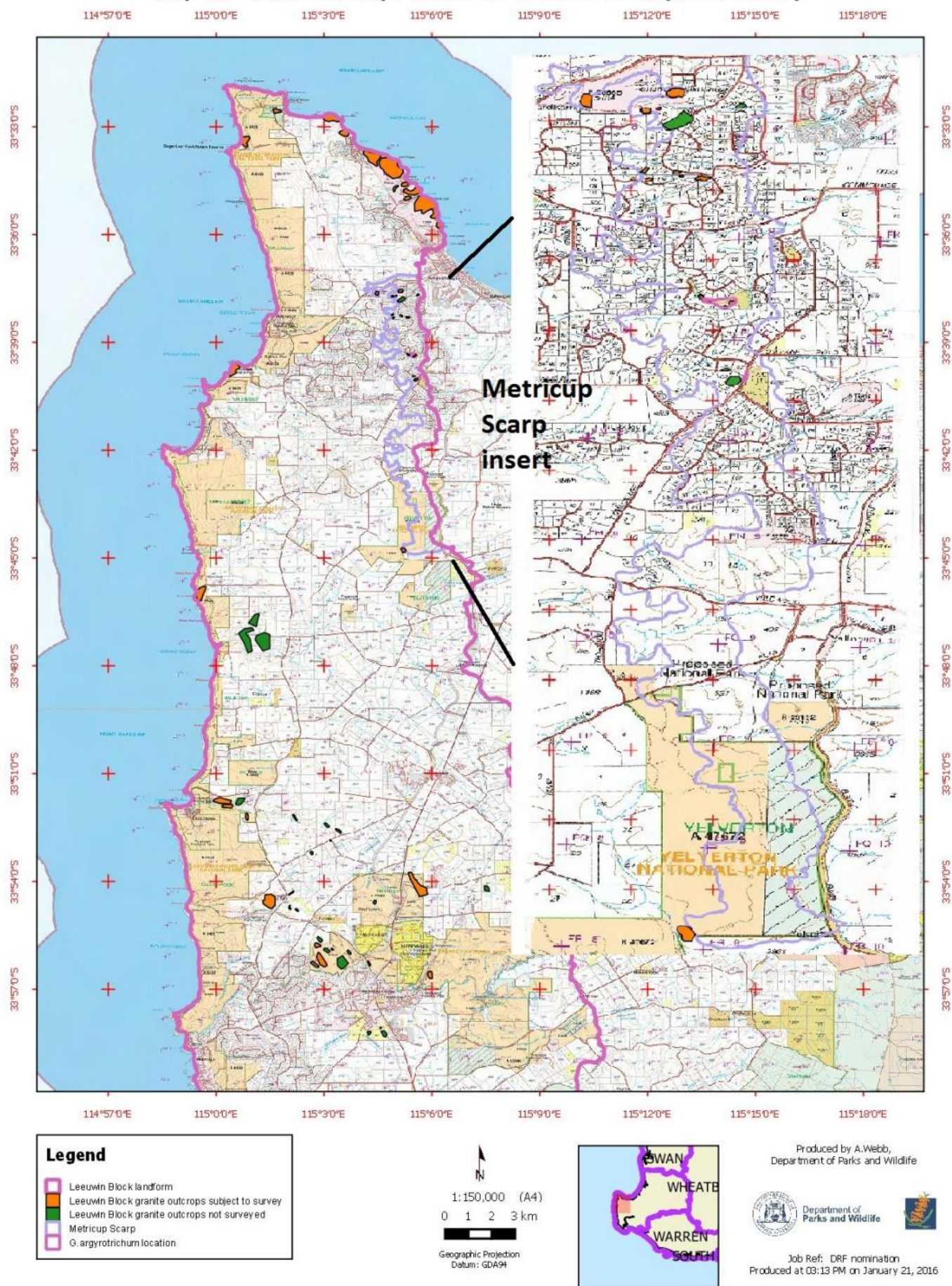
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Map 3: Granite outcrops within/directly adjoining the Metricup Scarp



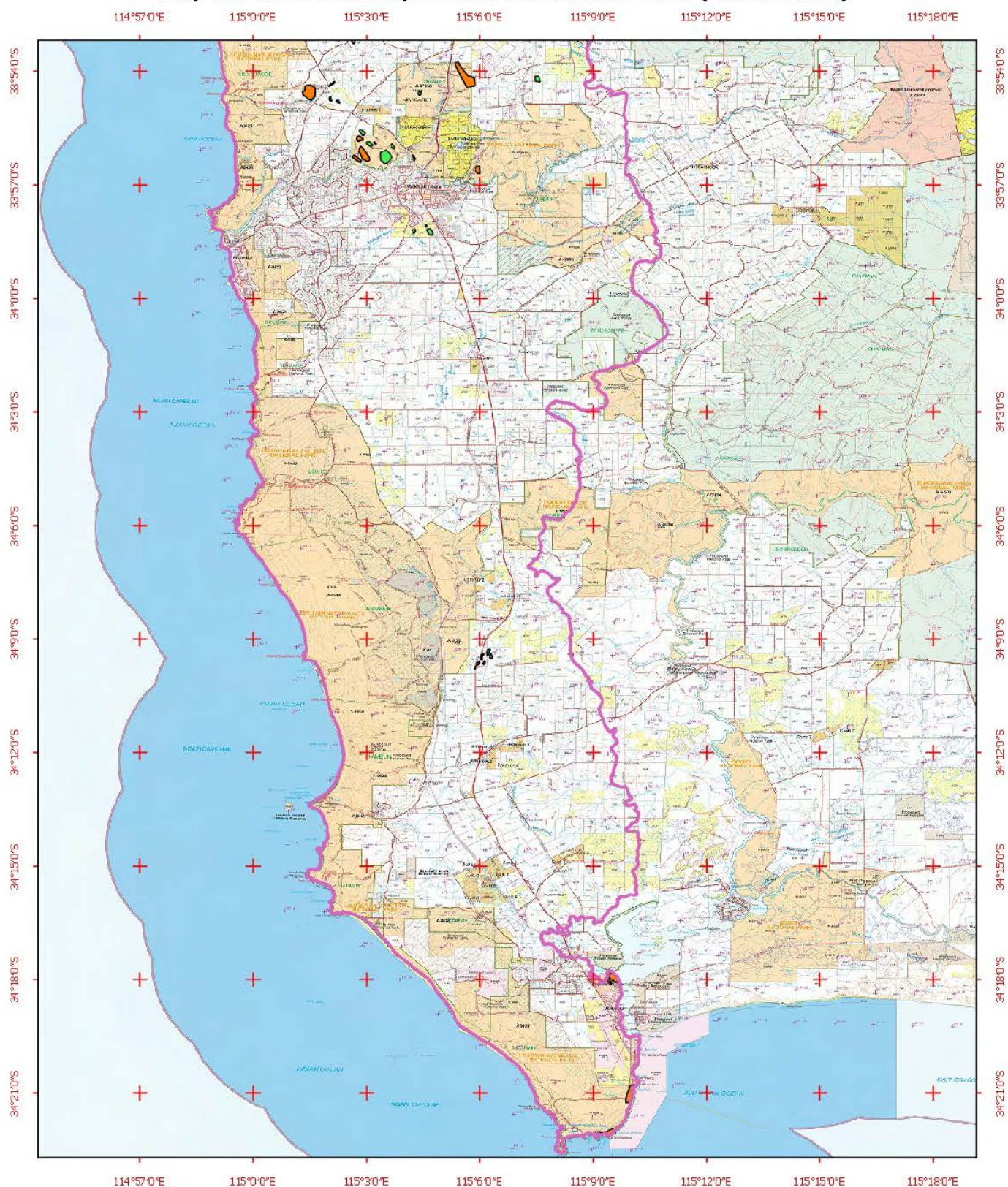
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Map 4a: Granite outcrops within the Leeuwin Block (north extent)



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Map 4b: Granite outcrops within the Leeuwin Block (south extent)



Legend

- Leeuwin Block landform
- Leeuwin Block granite outcrops subject to survey
- Leeuwin Block granite outcrops not surveyed

1:150,000 (A4)
0 1 2 3 km

Geographic Projection
Datum: GDA94



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