

## 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)*

<b>Species name</b> (scientific and common name):	<b><i>Eremophila</i> sp. Narrow leaves (J.D. Start D12-150)</b> (Previously known as <i>Eremophila microtheca</i> subsp. narrow leaves (J.D. Start D12-150))
<b>Nomination for</b> (addition, deletion, change):	<b>Addition</b>
<b>Nominated conservation category and criteria:</b>	<b>CR: B1ab(ii,iii,v)+B2ab(ii,iii,v)</b>

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"/>
<b>A.</b>	Population size reduction	•
<b>B.</b>	Geographic range	•
<b>C.</b>	Small population size and decline	•
<b>D.</b>	Very small or restricted population	•
<b>E.</b>	Quantitative analysis	•

Outcome:	
<i>Scientific committee Meeting date:</i>	
<i>Scientific committee comments:</i>	

<i>Recommendation:</i>			
<i>Ministerial approval:</i>		<i>Date of Gazetta/ Legislative effect:</i>	

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

Current conservation status				
Scientific name:	<i>Eremophila</i> sp. Narrow leaves (J.D. Start D12-150) (Previously known as <i>Eremophila microtheca</i> subsp. narrow leaves (J.D. Start D12-150))			
Common name:	None			
Family name:	Scrophulariaceae	Fauna <input type="checkbox"/>	Flora <input checked="" type="checkbox"/>	
Nomination for:	Listing <input checked="" type="checkbox"/>	Change of status/criteria <input type="checkbox"/>	Delisting <input type="checkbox"/>	
1. Is the species currently on any conservation list, either in a State or Territory, Australia or Internationally? 2. Is it present in an Australian jurisdiction, but not listed?		Provide details of the occurrence and listing status for each jurisdiction in the following table		
Jurisdiction	State / Territory in which the species occurs	Date listed or assessed (or N/A)	Listing category i.e. critically endangered or 'none'	Listing criteria i.e. B1ab(iii)+2ab(iii)
International (IUCN Red List)				
National (EPBC Act)				
State / Territory	1. WA	2014	Critically Endangered	B1ab(ii,iii,v)+B2ab(ii,iii,v)
	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"> <li>this assessment meets the standard of evidence required by the Common Assessment Method to document the eligibility of the species under the IUCN criteria;</li> </ul>			Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Comments:				
<ul style="list-style-type: none"> <li>surveys of the species were adequate to inform the assessment;</li> </ul>			Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Comments:	No further surveys have been undertaken since nominated in 2014.			
<ul style="list-style-type: none"> <li>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.</li> </ul>			Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Comments:	Assessment is consistent and criteria remains current.  <i>Eremophila</i> experts Andrew Brown and Bob Chinnock have noted a number of morphological differences between <i>Eremophila microtheca</i> subsp. narrow leaves at Eneabba and the type of the species <i>E. microtheca</i> from east of Kalbarri. These include plant size, leaf length/shape, flower			

<p>colour. In addition, molecular studies conducted in 2013 using nine microsatellite markers have shown plants in the Eneabba population to be genetically divergent from those found east of Kalbarri.</p> <p>Brown considers the differences significant and has prepared a draft paper raising the phrase name <i>Eremophila microtheca</i> subsp. narrow leaves (J.D. Start D12-150) to species status. The taxon is now curated by the WA Herbarium as the phrase name <i>Eremophila</i> sp. Narrow leaves (J.D. Start D12-150).</p>		
<b>Nominated national conservation status: category and criteria</b>		
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"/>		
<b>What are the IUCN Red List criteria that support the recommended conservation status category?</b>	<b>B1ab(ii,iii,v)+B2ab(ii,iii,v)</b>	
<b>Eligibility against the IUCN Red List criteria (A, B, C, D and E)</b>		
<i>Provide justification for the nominated conservation status; is the species eligible or ineligible for listing against the five criteria. For <b>delisting</b>, provide details for why the species no longer meets the requirements of the current conservation status.</i>		
<b>A.</b>	Population size reduction (evidence of decline)	<ul style="list-style-type: none"> <li>Insufficient information is available to reliably show rate of decline as the subpopulations have not been regularly surveyed and changes in plant numbers partially attributed to the subspecies being a relatively short-lived disturbance opportunist. The main decline due to flooding was greater than 10 years past, and generation length is unknown.</li> </ul>
<b>B.</b>	Geographic range (EOO and AOO, number of locations and evidence of decline)	<ul style="list-style-type: none"> <li>(B1) Using Minimum Convex Polygon (MCP) the EOO is approximately 0.6 km<sup>2</sup> which was calculated by drawing a polygon around the plants.</li> <li>(B2) Area of Occupancy estimated as 8 km<sup>2</sup> using the 2km x 2km grid method. Area of occupied habitat is 0.0174 km<sup>2</sup> or 1.74 hectares.</li> <li>(a) Known from one location with subpopulations severely fragmented as each site is an isolated area of remnant vegetation on the margins of winter-wet flats and lakes due to extensive clearing for agriculture.</li> <li>(b) Continuing decline observed and projected:</li> <li>(ii) (v) Flooding in 1999 resulted in a significant decline in the number of plants and area of habitat, with one subpopulation declining from 10,000 in 1992 to 16 in 2014.</li> <li>(iii) Ongoing threats to habitat condition and extent from road works, habitat degradation, poor recruitment, weeds, grazing and a drying climate.</li> <li><b>Meets criteria for Critically Endangered B1ab(ii,iii,v)+B2ab(ii,iii,v)</b></li> </ul>
<b>C.</b>	Small population size and decline	<ul style="list-style-type: none"> <li>Known from 81 mature individuals in total.</li> <li>Before being surveyed in 2013/14, plant counts are only available since the 1999 flood from 2003, some 10 years prior. Therefore</li> </ul>

	(population size, distribution and evidence of decline)	<p>insufficient information is available to reliably show current rate of decline as the subpopulations have not been regularly surveyed.</p> <ul style="list-style-type: none"> <li>66 mature individuals (81%) in one subpopulation.</li> <li><b>Meets criteria for Endangered C2(a)(i).</b></li> </ul>
<b>D.</b>	Very small or restricted population (population size)	<ul style="list-style-type: none"> <li>(D) There are approximately 81 mature individuals in total.</li> <li><b>Meets criteria for Endangered D.</b></li> </ul>
<b>E.</b>	Quantitative analysis (statistical probability of extinction)	<ul style="list-style-type: none"> <li>No information to assess.</li> </ul>

#### Summary of assessment information

EOO	0.6 km <sup>2</sup> (MCP) – calculated to 8 km <sup>2</sup> based on the AOO estimation	AOO	8 km <sup>2</sup> (2 km x 2 km grid), Mapped area of occupied habitat 0.0174 km <sup>2</sup> .	Generation length	-
No. locations	1	Severely fragmented	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/>		
No. subpopulations	2	No. mature individuals	81		
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 <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>
<p>Flooding</p> <ul style="list-style-type: none"> <li>Flooding following substantial summer rainfall in 1999 led to significant plant deaths at both populations. Population 2 in particular declined significantly from over 10,000 plants in 1992 to 16 plants in 2014.</li> </ul> <p>Past, future</p>	Whole population	Catastrophic
<p>Habitat degradation</p> <ul style="list-style-type: none"> <li>Habitat on private property subject to scrub-rolling and grazing by stock.</li> </ul> <p>Past and present</p>	Whole population	Severe
<p>Weeds</p> <ul style="list-style-type: none"> <li>Habitat of private property subpopulation comprises mostly introduced grasses. Weeds suppress early plant growth by competing with germinants for soil moisture, nutrients and light. They also increase the fire hazard due to</li> </ul>	Whole population	Severe

<p>the high fuel loads that are produced annually by many grass weed species. Slashing of road verges also promotes weeds.</p> <p>Past, current and future</p>		
<p>Road and fenceline maintenance</p> <ul style="list-style-type: none"> <li>Threats include grading, chemical spraying, construction of drainage channels and the slashing of roadside vegetation. Plants that occur along the boundary of a private property are threatened by fence maintenance.</li> </ul> <p>Past, current and future</p>	Whole population	Severe
<p>Altered fire regimes</p> <ul style="list-style-type: none"> <li>The subspecies is relatively short-lived and requires infrequent fire to stimulate germination of soil-stored seed. Frequent fire however may result in a reduced seed bank if it occurs before plants reach maturity.</li> </ul> <p>Past, current and future</p>	Whole population	Severe
<p>Poor recruitment</p> <ul style="list-style-type: none"> <li>Both populations of the subspecies are showing little or no natural recruitment with many plants senescing.</li> </ul> <p>Past, present, future</p>	Whole population	High
<p>Low genetic diversity</p> <ul style="list-style-type: none"> <li>The subspecies has relatively low genetic diversity which places it at risk of inbreeding.</li> </ul> <p>Future</p>	Whole population	Severe
<p>Drought</p> <ul style="list-style-type: none"> <li>Equivalent to a major disturbance.</li> </ul> <p>Past, present, future</p>	Whole population	Severe
<b>Management and Recovery</b>		
Is there a Recovery Plan (RP) or Conservation Management Plan operational for the species?		Yes <input type="checkbox"/> No <input checked="" 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"> <li>Department of Parks and Wildlife (2016 DRAFT) <i>Eremophila microtheca</i> subsp. narrow leaves Interim Recovery Plan 2016–2021. Interim Recovery Plan No. #. Department of Parks and Wildlife, Western Australia.</li> </ul>		
<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"> <li>Monitoring and surveys have been carried out to determine plant numbers and impact of threats;</li> <li>Liaison with local shire to minimise disturbance to remnant vegetation when maintaining road;</li> <li>Liaison with private land owners to protect remnant vegetation on which the subspecies occurs;</li> </ul>		

- Installation of markers on road reserves to protect habitat when maintaining road;
- Protecting the sites from fire unless required for ecological reasons, and implemented early intervention in any wildfires which may threaten the site;
- Monitoring the populations for evidence of weed impacts, or changes in plant or site health;
- Surveying for additional populations;
- Collecting approximately 3,700 seed for storage at Parks and Wildlife's Threatened Flora Seed Centre.

*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

- Liaison with land managers to ensure protection of subpopulations from farming practices;
- Ongoing monitoring and observations of subpopulations and threats;
- Develop and implement a fire management strategy, including associated weed control measures and the need for and method of the construction and maintenance of firebreak;
- Install fencing at subpopulations to reduce grazing and trampling by stock and allow recruitment within a larger area of habitat;
- Revegetate areas on private property affected by flooding and clearing;
- Collect and store additional seeds to guard against the extinction of natural populations. Collections should aim to sample and preserve the maximum range of genetic diversity possible;
- Develop a translocation proposal and select a disease free translocation site;
- Map habitat critical to the survival of the subspecies to facilitate its protection and appropriate management;
- Improve security through placement of conservation covenants;
- Promote awareness of the subspecies with general public.

#### Research

- Research biology and ecology of the subspecies, with a focus on pollination effectiveness, seed viability, conditions required for natural germination and plant establishment, response to threats and disturbances and reproductive biology.
- Quantify generation length.

**Nomination prepared by:**

**Contact details:**

**Date submitted:**

12/9/2016

*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	Year/no. mature individuals	AOO	Site / habitat Condition	Threats (note if past, present or future)	Specific management actions
Eneabba-Coolimba Road (Subpopulation 1a).	Shire road reserve	1986: 26 1990: 20 1992: 12 1999: 0 2003: 42 2013: 64	1.24 ha (includes NR subpop)	Plants healthy, habitat degraded	Road maintenance Flooding (past, future) Habitat degradation (past, present, future) Fire (past, present, future) Weeds (past, present, future) Lack of recruitment (past, present, future) Low genetic diversity (future) Climate change (future)	Install markers Develop a fire management plan Collect seed and test viability, conduct regeneration trials Establish new populations through translocation Liaise with local Shire
Lake Logue NR 29073, northern side of Eneabba-Coolimba Road (Subpopulation 1b)	Nature reserve	1985: 22 1990: 11 1992: 20 1996: 20 1999: 0 2003: 0 2013: 1		Plants healthy, habitat good	Flooding (past, future) Habitat degradation (past, present, future) Fire (past, present, future) Weeds (past, present, future) Lack of recruitment (past, present, future) Low genetic diversity (future) Climate change (future)	Rehabilitate habitat Develop a fire management plan Collect seed and test viability, conduct regeneration trials Establish new populations through translocation
Location 8354, Eneabba-Coolimba Road (Subpopulation 1e)	Private property	1985: 20 2013: none located		Thought to be cleared	Not recorded	
Location 8354, Eneabba. Fenced area in the northern	Private property	1992: 10,000 1994: 16	0.5 ha	Plants moderate, habitat poor	Flooding (past, future)	Rehabilitate habitat Install fencing



area of Lakeland Farm.		2003: 7 2014: 16			Habitat degradation (past, present, future) Fenceline maintenance Fire (past, present, future) Farming practices (past, present, future) Weeds (past, present, future) Lack of recruitment (past, present, future) Low genetic diversity (future) Climate change (future)	Develop a fire management plan Collect seed and test viability, conduct regeneration trials Establish new populations through translocation Improve security through conservation covenants
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Department of  
Environment and Conservation

*Our environment, our future*



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## **Form to nominate a Western Australian species for listing as threatened, change of category or delisting 2013 (Updated 2016).**

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The purpose of this nomination form is to bring your nomination to the attention of the Western Australian Threatened Species Scientific Committee (TSSC) for its consideration and subsequent advice to the Minister for Environment, who makes the final decision on changes to the threatened species lists. Please read through both the guidelines and the nomination form to familiarise yourself with the information required before filling out the nomination form.

The assessment of the conservation status is according to IUCN red list category and criteria, and whilst it is a State listing process, the TSSC will consider the status of Western Australian species throughout their total natural range in Australia, and where appropriate (eg, for species that do not breed in Australia), their range and status outside Australia. Therefore, information provided in the nomination should include information on populations outside WA where applicable.

**Note**, this nomination form applies to both flora and fauna species, and hence some questions or options may not be applicable to the nominated species – for these questions, type “N/A”.

### **Nominators should refer to:**

[DEC Nomination Guidelines](#)

[IUCN \(2001\). IUCN Red List Categories and Criteria Version 3.1 \(IUCN, Gland, Switzerland\)](#)

[IUCN \(2011\). Guidelines for using the IUCN Red List Categories and Criteria. Version 9.0 \(September 2011\). \[www.iucnredlist.org\]\(http://www.iucnredlist.org\)](#)

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

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

Telephone: (08) 9334 0455

Email: [tssc@dec.wa.gov.au](mailto:tssc@dec.wa.gov.au)

TSSC meetings are usually held near the end of the first quarter of the calendar year. The closing date for nominations for TSSC meetings is the last Friday of January that year.

**NOTICE: Incomplete forms may result in delays in assessment, or rejection of the nomination. DEC staff can advise you on how to fill out the form and may be able to supply additional, unpublished information.**

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

SECTION 1. NOMINATION					
<b>1.1. Nomination for:</b>					
Flora <input checked="" type="checkbox"/>	Fauna <input type="checkbox"/>	as:	Threatened / DRF <input checked="" type="checkbox"/>	Change of category <input type="checkbox"/>	Delisting <input type="checkbox"/>
<b>1.2. Scientific Name</b>					
This name will be used to identify the species on all official documentation. Use the approved name used by the Western Australian Museum or Herbarium, if possible.					
<i>Eremophila microtheca</i> subsp. narrow leaves (J.D. Start D12-150)					
<b>1.3. Common Name</b>					
If the species has a generally accepted common name, please show it here.					
None					
<b>1.4. Family Name</b>					
Scrophulariaceae					
<b>1.5. Current Conservation Status. If none, type 'None'.</b>					
	IUCN Red List Category e.g. Vulnerable			IUCN Red List Criteria e.g. B1ab(iv); D1	
International IUCN Red List	None				
National EPBC Act 1999	None				
State of Western Australia	Critically Endangered			B1ab(ii,iii,v)+2ab(ii,iii,v)	
State of WA Priority	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
<b>1.6. Nominated Conservation Status.</b>					
	IUCN Red List Category e.g. Vulnerable			IUCN Red List Criteria e.g. B1ab(iv);D1	
State of Western Australia	Critically Endangered			B1ab(ii,iii,v)+2ab(ii,iii,v)	
State of WA Priority	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
Is the species listed as 'Threatened' in any other Australian State or Territory? If Yes, list these States and/or Territories and the status for each.					
No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> Details:					
<b>1.7. Reasons for the Nomination.</b>					
Briefly summarise the reasons for the nomination in dot points. Please include details relevant to the IUCN Category and each Criteria.					
The subspecies is known from two extant subpopulations near to one another (these may have been one subpopulation prior to clearing) with both declining substantially since 1992. Flooding in 1999 caused a substantial decline in subpopulation 1 and just 65 plants were located in November 2013. A second nearby subpopulation on private land has declined from 10,000 mature plants in 1992 to just 16 plants in January 2014.					
Subpopulation 1 is threatened by habitat degradation, road works, poor recruitment, possible future flooding and lack of suitable habitat. Most plants occur on the side of, or immediately					

adjacent to, a built-up causeway.
Subpopulation 2 is threatened by small population size (16 plants), poor recruitment, grazing, weeds (see Appendix 3), possible future flooding and a lack of habitat. The protective fence has fallen into disrepair and stock now have access to the subpopulation.
These subpopulations could be considered a single location under IUCN as both are threatened by poor recruitment and a lack of suitable habitat. Also, because of past clearing and small population size, the subpopulations could be considered fragmented.
<b>SECTION 2. SPECIES</b>
<b>2.1. Taxonomy.</b> <b>Describe the taxonomic history, using references, and describe the key distinguishing features that can be used to separate this taxon from closely related taxa. Include details of the type specimen, changes in taxonomy, scientific names and common names used for the species.</b>
<p><i>Eremophila microtheca</i> was described by Ferdinand von Mueller (as <i>Pholidia microtheca</i>) in 1870 from specimens collected at Port Gregory and Murchison River by Augustus Oldfield. It was moved to the genus <i>Eremophila</i> by Mueller in 1882.</p> <p>The species occurs in two disjunct areas - between Kalbarri and Port Gregory and 265km to the south near Lake Logue.</p> <p>The species was listed as threatened flora in July 1982. However, following 10,000+ plants being found in Kalbarri National Park in 1993 the species was delisted in 2000. Note: surveys carried out by Alanna Chant (Geraldton District Conservation Officer) in 2000 located over 25,000 plants.</p> <p>In 2004, the Western Australian Threatened Species Scientific Committee recommended that tissue samples be collected from the Lake Logue subpopulations and tested to determine whether there were any significant genetic differences between them and the Kalbarri subpopulations.</p> <p>Molecular studies conducted in 2013 using nine microsatellite markers showed the Lake Logue subpopulations to be genetically divergent from the Kalbarri subpopulations. Plants in the two subpopulation areas share few alleles with one another and show very high and significant values for measures of genetic differentiation (<math>G_{ST} = 0.293</math> and <math>0.375</math>; <math>D_{est} = 0.756</math> and <math>0.774</math>; <math>P &lt; 0.001</math>). Results from several other statistical methods supported these results in showing a clear divergence in the two forms of <i>E. microtheca</i>.</p> <p>Plants in the Lake Logue area differ morphologically from those in the Kalbarri area in having narrower, more or less terete leaves 0.5–1mm wide (1.5–2mm wide on the typical subspecies). The leaves are also consistently longer, usually between 6–12mm (rarely 5–18mm) as opposed to 3–6mm (rarely 2–10mm).</p> <p>In December 2013 the Lake Logue plants were provided the phrase name subsp. narrow leaves (J.D. Start D12-150).</p>
<b>Is this species conventionally accepted? If no, explain why. For example, is there any controversy about the taxonomy? For undescribed species, detail the location of voucher specimens (these should be numbered and held in a recognised institution and be available for reference purposes).</b>
No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>
PERTH 08490910; PERTH 04581679; PERTH 04867289; PERTH 01938428; PERTH 01055887; PERTH 01055909; PERTH 01055917; PERTH 01058053; PERTH 04506634
<b>Describe any known hybridisation with other species in the wild, indicating where this occurs and how frequently.</b>

None known
<b>2.2. Description</b> <b>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).</b>
<p>An erect heath-like shrub 70cm–1.6m high. Branches finely stellate-pubescent, except for some glabrous resinous bands extending down below leaf basis. Leaves 6–12mm (rarely 5–18mm) by 0.5–1mm wide, erect to spreading, linear, grey-green, sessile, margins entire, sparsely to densely stellate-pubescent, often with resin globules. Flowers one per axil. Pedicle 3–6mm long, terete, sparsely stellate-pubescent. Sepals five, 4–6mm x 0.5–1.5mm, lanceolate, attenuate, outer surface sparsely to densely stellate-pubescent. Corolla 10–15mm long, outside of tube pale lilac, glabrous, inside of tube white, lilac spotted, glabrous except for scattered villous hairs extending down from medial lobe of lower lip. Stamens four, glabrous. Style glabrous. Ovary glabrous, ovoid, four-locular with one ovule per locule. Fruit 3–4 mm x 2–2.5mm, dry, ovoid-conical (see photos Appendix 2).</p>
<b>2.3. Distribution</b> <b>Describe the distribution of the species in Australia and, if possible, provide a map.</b>
<p>Found over a small area south of Lake Logue (see Appendix 1).</p>
<b>2.4. Habitat</b> <b>Describe the non-biological habitat (e.g. aspect, topography, substrate, climate) and biological habitat (e.g. vegetation type, associated species, sympatric species). If the species occurs in various habitats (e.g. for different activities such as breeding, feeding, roosting, dispersing, basking etc) then describe each habitat. Note if the habitat has a special defining characteristic. If possible estimate the area of habitat, or the relative abundance of the habitat, and note if a critical habitat requirement (eg breeding habitat) is restricted in its availability to the species.</b>
<b>Non-biological habitat</b>
<p>Grows in slightly saline, pale brown sandy-clay on the margins of winter-wet flats and lakes.</p>
<b>Biological habitat</b>
<p>Associated species include <i>Acacia saligna</i>, <i>Casuarina obesa</i> and <i>Melaleuca raphiophylla</i>.</p>
<b>Does the (fauna) species use refuge habitat e.g. in times of fire, drought or flood? Describe this habitat.</b>
<p>N/A</p>
<b>Is the species part of, or does it rely on, a listed threatened ecological community? Is it associated with any other listed threatened species?</b>
<p>None known</p>
<b>2.5. Reproduction</b> <b>Provide an overview of the breeding system.</b> <b>For <u>fauna</u>: Provide an overview of the breeding system and breeding success, including: when does it breed; what conditions are needed for breeding; are there any breeding behaviours that may make it vulnerable to a threatening process?</b> <b>For <u>flora</u>: When does the species flower and set fruit? Is the seed produced viable? What conditions are needed for this? What is the pollinating mechanism? If the species is capable of vegetative reproduction, a description of how this occurs, the conditions needed and when. Does the species require a disturbance regime (e.g. fire, ground disturbance) in order to reproduce?</b>
<p>Flowers July–September. Flowers are insect pollinated with seed held in fleshy fruits that dry out,</p>

becoming hard and woody. Vegetative reproduction is unknown. The taxon is thought to be a disturbance opportunist, germinating from soil-stored seed following fire or light soil disturbance.
<b>2.6. Population dynamics</b> Provide details on ages of sexual maturity, extent of breeding success, life expectancy and natural mortality. Describe population structure (presence of juveniles/seedlings, mature and senescing individuals). Estimate generation length.
N/A
<b>Questions 2.7 and 2.8 apply to <u>fauna</u> nominations only</b>
<b>2.7. Feeding</b> Summarise food items or sources and timing/availability.
N/A
<b>Briefly describe feeding behaviours, including those that may make the species vulnerable to threatening processes.</b>
N/A
<b>2.8. Movements</b> Describe any relevant daily or seasonal pattern of movement for the species, including relevant arrival/departure dates if migratory. Provide details of home range/territories.
N/A
<b>SECTION 3. INTERNATIONAL CONTEXT</b>
<b>For species that are distributed both in <u>Australia</u> and in <u>other countries</u>.</b>
<b>3.1. Distribution</b> Describe the global distribution.
N/A
<b>Provide an overview of the global population size, trends, threats and security of the species outside of Australia.</b>
N/A
<b>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?</b>
N/A
<b>SECTION 4. CONSERVATION STATUS AND MANAGEMENT</b>
Conservation status and management information is required for the national extent of the species, however, greater detail is expected for the WA occurrences. If the taxon is considered to be endemic to Western Australia, please provide supporting evidence.
<b>4.1. Population</b> What is the total national/State population size in terms of number of mature individuals? Has the number of individuals been counted, or is this an estimate? Provide details of the method of determining the number of individuals. Are there other useful measures of population size and what are they? Or if these are unavailable, provide an estimate of abundance (e.g. scarce, locally abundant etc).
Note: The term 'population' is used in a specific sense in the Red List Criteria that is different to its common biological usage. Population is here defined as the total number of mature individuals of the taxon. In the case of

taxa obligately dependent on other taxa for all or part of their life cycles, biologically appropriate values for the host taxon should be used. (IUCN 2001)

The current number of mature individuals is 81. Plants were individually counted.

**How many subpopulations or locations do you consider the species occurs in and why?**

Note: 'Subpopulations' are defined as geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange (typically one successful migrant individual or gamete per year or less). 'Locations' are defined as a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present. The size of the location depends on the area covered by the threatening event and may include part of one or many subpopulations. Where a taxon is affected by more than one threatening event, location should be defined by considering the most serious plausible threat. (IUCN 2001) Refer to Red List Guidelines 9.0

One subpopulation/location.

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

The DPaW Threatened Flora Seed Centre has 3475 fruits in storage. No reintroductions have taken place.

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

Date of survey	Location Description (include coordinates of the site)	Land status	Number of mature individuals at location	Area of occupancy at location	Condition of site
13.11. 2013	Subpopulation 1*. West of Lake Indoon turnoff on both sides of Coolimba-Eneabba Road (-29.8693217 115.1428397).	LGA Road reserve and Lake Logue Nature Reserve	65	620 x 20m maximum area	Average to Poor
20.01.2014	Subpopulation 2*. 910m south of the Coolimba-Eneabba Road. (-29.880466 115.139773)	Private Property	16	0.5 ha	Poor

\*Under IUCN guidelines these two subpopulations are considered to be one location/subpopulation.

**What is the total area of occupancy (in km<sup>2</sup>) for the species; explain how it was calculated and datasets used. If an accurate estimate is unavailable, provide a range of values or a minimum or maximum area estimate. Where separate breeding habitat is applicable, if possible, also provide**

<b>area of breeding habitat.</b>
The maximum total area of occupancy is 0.0.174 km <sup>2</sup> (or 1.74 hectares), which is the sum of the areas occupied by each subpopulation. The estimate for private property was made by Bree Phillips (Moora District Flora Conservation Officer) in January 2014. The estimate for the roadside subpopulation was made by Tanya Llorens on 13 November 2013. Both were determined from GPS values recording the extremities of each subpopulation – this is a maximum estimate and overestimates the current area of occupancy.
<b>What is the extent of occurrence (in km<sup>2</sup>) 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.</b>
The extent of occurrence for the species is 0.60 km <sup>2</sup> . This is the area bounded by the northern, southern, eastern and western extents of all occurrences, and is a maximum area estimate.
<b>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.</b>
Both known occurrences are important occurrences.
<b>Is the distribution of the species severely fragmented? Why?</b>
Known from two subpopulations. These are close together and may have represented a single continuous subpopulation prior to clearing.
<b>Is the taxon subject to extreme fluctuations? If so, provide evidence.</b>
Unknown but potentially possible as the taxon is thought to be a relatively short-lived disturbance opportunist, appearing following fire or soil disturbance and senescing sometime following maturity.
<b>Has there been any known decline in the species within WA or nationally, or is this likely in the future? – provide details in relation to the elements detailed below, including how the decline has been measured or inferred. Is there a presumption of continuing decline? If so, provide details of the decline and how it relates to the specific Red List Categories and Criteria version 3.1.</b>
Note: A continuing decline is a recent, current or projected future decline (which may be smooth, irregular or sporadic) which is liable to continue unless remedial measures are taken. Fluctuations will not normally count as continuing declines, but an observed decline should not be considered as a fluctuation unless there is evidence for this. (IUCN 2001) Refer to Red List Guidelines 9.0
The taxon meets IUCN Criteria for Critically Endangered under B1ab(ii,iii,v)+2ab(ii,iii,v) due to an observed reduction in population size of over 80% over three generations and a decline in the quality of habitat; an extent of occurrence of less than 100km <sup>2</sup> and area of occupancy of less than 10km <sup>2</sup> , subpopulations being severely fragmented or known to exist at a single location and there being a continuing decline in the area of occupancy, quality of habitat and number of mature individuals. Note, as the taxon is thought to be a relatively short-lived disturbance opportunist, appearing following fire or soil disturbance and senescing sometime following maturity, the meaningful extent of decline in plant numbers is difficult to quantify – hence criterion A has not been applied.
<b>Has there been a decline in the size of the population (number of mature individuals)?</b>
Declined from 10,000+ plants in 1992 to 81 plants in 2014.
<b>- can the rate of population size reduction be determined over the last 10 years or 3 generations</b>



<b>(whichever is the longer)? If so, state whether the determination is based on quantitative data (observed), estimated (provide data and calculations), inferred or suspected.</b>
Observed.
<b>- can the rate of population size reduction be estimated for the next 10 years or 3 generations and in any 10 year or 3 generation period (up to a maximum of 100 years into the future)? If so, state how the reduction is estimated (provide data and calculations), inferred or suspected.</b>
Unknown.
<b>Has there been a decline in the number of locations, extent of occurrence or area of occupancy?</b>
No.
<b>Has there been a decline in the area or quality of habitat?</b>
Habitat of Subpopulation 1 was flooded in 1999 and has not fully recovered. It is also subject to other threatening processes including continuing degradation and road works. The habitat of Subpopulation 2 was subject to scrub rolling and grazing prior to a small area being fenced. This fence has fallen into disrepair allowing stock entry and subsequent grazing. The area is now highly degraded and comprises mostly of dense introduced grasses (see Appendix 3)
<b>4.2. Survey effort</b> <b>Describe the methods to conduct surveys. For example, season, time of day, weather conditions; length, intensity and pattern of search effort (including where species not encountered); any limitations and expert requirements.</b>
The taxon should be surveyed during its flowering period between July - September
<b>Provide details on the distinctiveness and detectability of the species, or the distinctiveness of its habitat, that would assist survey success.</b>
An erect heath-like shrub 70cm–1.6m high with distinctive pale lilac, glabrous flowers. Grows in slightly saline, pale brown sandy-clay on the margins of winter-wet flats and lakes.
<b>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.</b>
<p>The southern form of <i>Eremophila microtheca</i> (now known as subsp. narrow leaves (J.D. Start D12-150) was surveyed for widely between 1984 and 2000 by departmental staff. This included B. Haberley, D. Coughran and L. Anderson in 1984, D. Coates in 1985, L. Anderson in 1986, P. Roberts in 1990, S. Patrick in 1991, S. Patrick and A. Brown in 1992 and Wayne Stalder in 1999. The taxon was also searched for by L. Sweedman (BGPA) in 1994.</p> <p>During the preparation of Wildlife Management Programs No. 26 “<i>Declared Rare and Poorly Known Flora in the Geraldton District</i>” and Wildlife Management Program No. 28 “<i>Declared Rare and Poorly Known Flora in the Moora District</i>” S. Patrick and A. Brown surveyed widely throughout these two districts. Although not specifically looking for <i>Eremophila microtheca</i> they knew the species and would have recognised it during the surveys if present. During all of these surveys no new subpopulations were located.</p> <p>Subsequent to the Wildlife Management Programs being published, known subpopulations were surveyed by departmental staff Sue Patrick in 2000, 2001 and 2002, Gina Broun in 2003, Tanya Llorens and Leonie Monks in November 2013 and Bree Phillips in 2014. Joff Start (volunteer) conducted surveys in September 2013.</p>

**4.3. Threats**

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

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

**Flooding** following substantial summer rainfall led to the death of most plants in Subpopulation 1 in 1999.

**Senescence** and **grazing** has resulted in the death of most plants in Subpopulation 2. The fence surrounding Subpopulation 2 has fallen into disrepair allowing stock entry.

**Weeds/degraded habitat** is a major threat to Subpopulation 2 (see Appendix 3).

There has been **little recruitment** in either subpopulation with just 81 plants now known. This may be due to a combination of factors (i.e. lack of suitable habitat, changed fire regimes, grazing).

Most plants in Subpopulation 1 are on road reserve and are threatened by future **road works**.

**Clearing** was a past threat on Private property containing Subpopulation 2. Clearing of the road reserve containing Subpopulation 1 is a possible future threat.

**Low genetic diversity** is placing the subspecies at risk of inbreeding.

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

Location	Past threats	Current threats	Potential threats	Management requirements (see section 4.4)
West of Lake Indoon turnoff on both sides of Coolimba-Eneabba Road (-29.8693217 115.1428397).	Flooding, poor recruitment, road works	Small area of habitat, lack of suitable disturbance regimes to promote germination of soil-stored seed	Flooding, road works, senescence, low genetic diversity	Liaise with Shire to protect from road works. Collect additional seed and store in DPaW's Threatened Flora Seed Centre. Prepare translocation proposal and undertake translocation.
910m south of the Coolimba-Eneabba Road.	Clearing, flooding, grazing	Grazing, highly degraded habitat, weeds, lack of suitable disturbance regimes to promote	Senescence, further degradation of habitat, flooding, low genetic diversity, continued grazing	Liaise with property owner to ensure protective fencing is repaired. Undertake regeneration

		germination of soil-stored seed		trials to promote germination of soil-stored seed. Collect additional seed and store in DPaW's Threatened Flora Seed Centre. Undertake weed control. Prepare translocation proposal and undertake translocation.
<b>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.</b>				
The subspecies has relatively low genetic diversity – much of the pre-existing diversity was probably lost through land clearing. This places the subspecies at risk of inbreeding and its associated effects, and demographic failure if there is a lack of compatible mates. It is important that the diversity that remains is not further eroded.				
<b>4.4. Management</b> <b>Identify key management documentation for the species e.g. recovery plans, conservation plans, threat abatement plans etc.</b>				
The taxon is included in Wildlife Management Program No 28 (flora).				
<b>Does this species benefit from the management of another species or community? Explain.</b>				
No.				
<b>How well is the species represented in conservation reserves or covenanted land? Which of these are actively managed for this species? Provide details.</b>				
Just one plant is known from Lake Logue Nature Reserve. All other plants are on road reserve and private property.				
<b>Are there any management or research recommendations that will assist in the conservation of the species? Provide details.</b>				
Given the lack of suitable habitat and the threats that exist for the private property and road reserve subpopulations, conservation outcomes may be improved by establishing new subpopulations in suitable habitat, or augmenting the existing roadside subpopulation to extend it further into Lake Logue Nature Reserve.				
Genetic diversity is relatively low within the road reserve subpopulation (unbiased expected heterozygosity = 0.376), so genetic material used in translocations should be collected from as many of the existing plants as possible so as to maximise the genetic diversity of any new or augmented subpopulation.				
All genetic material should be sourced from within the existing subpopulations and should not be				

supplemented with material from the typical subspecies, which is substantially different genetically.

Further management recommendations should include:

- Liaison with land managers to ensure protection of subpopulations from farming practices;
- Ongoing monitoring and observations of subpopulations and threats;
- Develop and implement a fire management strategy, including associated weed control measures and the need for and method of the construction and maintenance of firebreak;
- Install fencing at subpopulations to reduce grazing and trampling by stock and allow recruitment within a larger area of habitat;
- Revegetate areas on private property affected by flooding and clearing;
- Collect and store additional seeds to guard against the extinction of natural subpopulations. Collections should aim to sample and preserve the maximum range of genetic diversity possible;
- Map habitat critical to the survival of the subspecies to facilitate its protection and appropriate management;
- Improve security through placement of conservation covenants;
- Promote awareness of the subspecies with general public;
- Research biology and ecology of the subspecies, with a focus on pollination effectiveness, seed viability, conditions required for natural germination, response to threats and disturbances and reproductive biology.

#### 4.5. Other

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

No

#### SECTION 5. NOMINATOR

**Nominator(s) name(s)**

**Organisation(s)**

**Address(s)**

**Telephone number(s)**

**Email(s)**

**Date**

30 January 2014

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

#### SECTION 6. REFERENCES

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

Brown, A.P. (2011) A Field Guide to the Eremophilas of Western Australia. Simon Nevill Publications, Fremantle, Western Australia.

Brown, A., Thompson-Dans, C. and Marchant, N. (eds) (1998) Western Australia's Threatened Flora. Department of Conservation and Land Management, Western Australia.

Chinnock, R.J. (2007) *Eremophila and Allied Genera: A Monograph of the Myoporaceae*, Rosenberg Publications, Kenthurst, New South Wales.

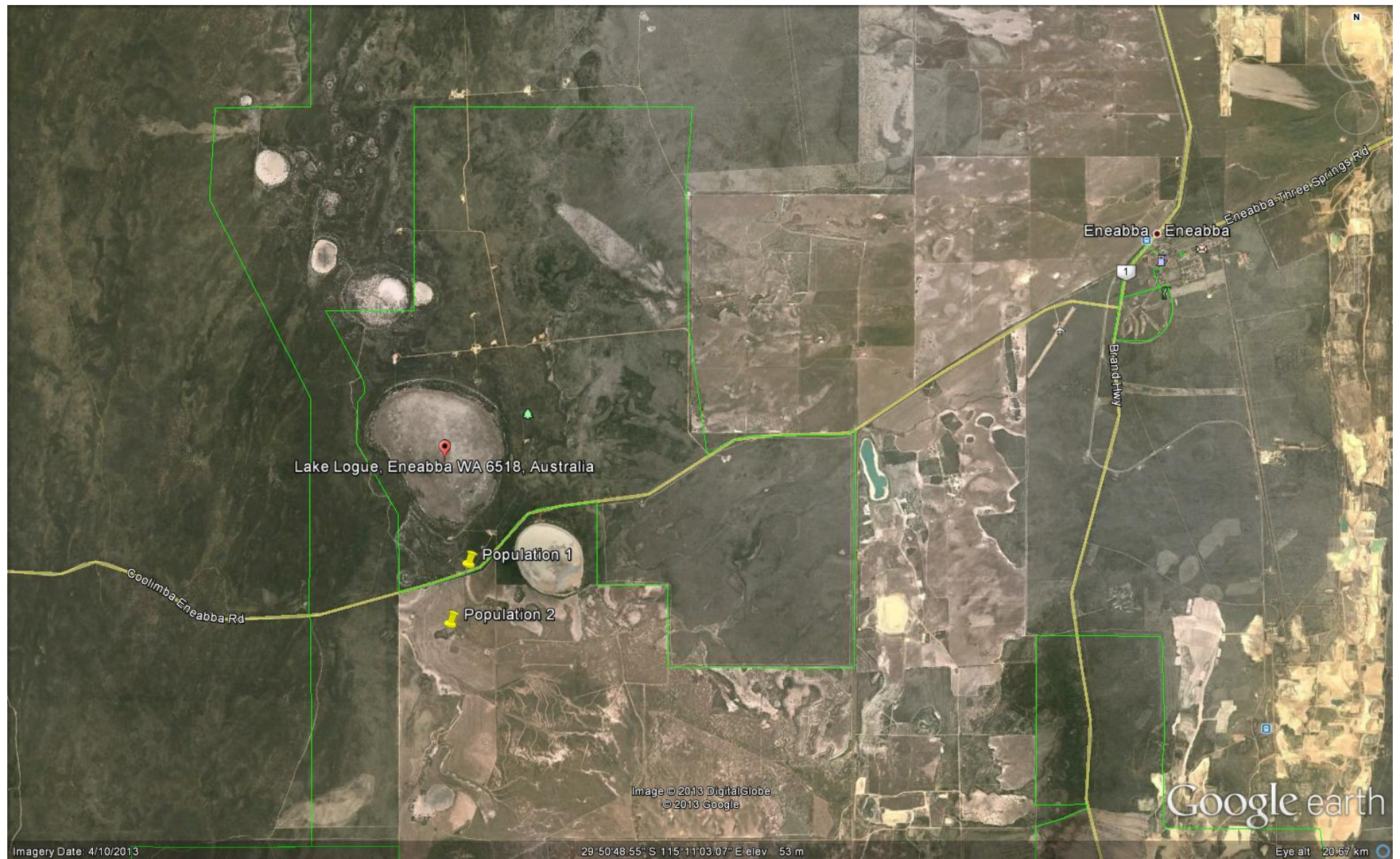
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Western Australian Herbarium (1998–) *FloraBase – The Western Australian Flora*. Department of Parks and Wildlife. <http://florabase.dec.wa.gov.au/>.

Threatened and Priority Database (TPFL). Department of Parks and Wildlife (accessed January 2014).

Llorens, T.M., Macdonald, B., McArthur, S., Coates, D.J. and Byrne, M. (2014) Disjunct, highly divergent genetic lineages within two rare species in a biodiversity hotspot: implications for taxonomy and conservation. *Manuscript in prep*

**Appendix 1** Location of *Eremophila microtheca* subsp. narrow leaves (J.D. Start D12-150)





**Appendix 2** *Eremophila microtheca* subsp. narrow leaves (J.D. Start D12-150). **Population 1** Photos – Joan and Joff Start.









**Appendix 2** *Eremophila microtheca* subsp. narrow leaves (J.D. Start D12-150). **Subpopulation 2** Note: poor condition of plants and degraded habitat with dense introduced grasses. Photos – Bree Phillips.

