Abridged Threatened Species Nomination Form

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

Cover Page *(Office use only for Assessment)*

Species name (scientific and common name)**:**	***Kunzea similis* subsp. *similis***
Nomination for (addition, deletion, change)**:**	**Addition**
Nominated conservation category and criteria:	**CR: B1ab(iii,v)+B2ab(iii,v)**

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

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

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

Current conservation status				
Scientific name:	*Kunzea similis* subsp. *similis*			
Common name:	None			
Family name:	Myrtaceae	Fauna ☐	Flora ☒	
Nomination for:	Listing ☒	Change of status/criteria ☐	Delisting ☐	

1. *Is the species currently on any conservation list, either in a State or Territory, Australia or Internationally?* 2. *Is it present in an Australian jurisdiction, but not listed?*	*Provide details of the occurrence and listing status for each jurisdiction in the following table*

Jurisdiction	**State / Territory in which the species occurs**	**Date listed or assessed (or N/A)**	**Listing category i.e. critically endangered or 'none'**	**Listing criteria i.e. B1ab(iii)+2ab(iii)**
International (IUCN Red List)				
National (EPBC Act)				
State / Territory	1. WA	2006	Vulnerable	D2 (as *Kunzea similis*)
		2007	Vulnerable	D2 (as *Kunzea similis* subsp. *similis*)
		5/4/2017	Critically Endangered	B1ab(iii,v)+B2ab(iii,v)

Consistent with Schedule 1, item 2.7 (h) and 2.8 of the Common Assessment Method Memorandum of Understanding, it is confirmed that:	
• this assessment meets the standard of evidence required by the Common Assessment Method to document the eligibility of the species under the IUCN criteria;	Yes ☒ No ☐
Comments:	
• surveys of the species were adequate to inform the assessment;	Yes ☒ No ☐
Comments:	Further survey showed an increase in the number of mature individuals from approximately 2,300 in 2001, to 2,900 individuals in 2016.
• the conclusion of the assessment remains current and that any further information that may have become available since the assessment was completed supports or is consistent with the conclusion of the assessment.	Yes ☒ No ☐
Comments:	Since the assessment in 2001, the number of mature individuals has increased from 2,300 in 2001, to 2,900 in 2016, most likely a result of more intensive survey. However the habitat of the subpopulations is highly threatened by aerial canker, *Phytophthora cinnamomi*, drought and altered fire regimes. Limb death was observed in 25-50% of the subpopulation in 2014 to 2016 and is likely a result of aerial canker and extreme drought stress. Without ongoing management a projected decline is expected. Meets criteria Critically Endangered B1ab(iii,v)+B2ab(iii,v). Will be considered at

	the 2017 WA TSSC meeting.	
Nominated national conservation status: category and criteria		
Presumed extinct (EX) ☐	Critically endangered (CR) ☒	Endangered (EN) ☐ Vulnerable (VU) ☐
None (least concern) ☐	Data Deficient ☐	Conservation Dependent ☐
What are the IUCN Red List criteria that support the recommended conservation status category?	**CR: B1ab(iii,v)+B2ab(iii,v)**	
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)	• Overall there has been an increase in subpopulation size from approximately 2,300 in 2001, to approximately 2,900 in 2016, most likely a result of more intensive survey. However there has been a decline in subpopulation health due to aerial canker, *Phytophthora cinnamomi*, drought and altered fire regimes, and monitoring data from some quadrats showed a 38% decline in the number of mature individuals from 2010 to 2014. • **Unable to assess**
B.	Geographic range (EOO and AOO, number of locations and evidence of decline)	• (B1) EOO <100 km^2. Using Minimum Convex Polygon (MCP) the EOO is estimated as 0.11 km^2, but recalculated to 4 km^2 to be no less than the estimated AOO. • (B2) AOO 4 km^2 (<10 km^2) using the 2km x 2km grid method. The mapped area of the single subpopulation is 0.11 km^2 or 11 hectares. • (a) Known from one location within the Fitzgerald River National Park. • (b) Continuing decline observed and projected: • (ii) A slight increase in the area of occupied habitat from 10 ha when surveyed in 2001, to 11 ha in 2016, is most likely due to more accurate survey methods. A projected decline in the area of occupied habitat is expected due to the impact of disease and fire, however, this will not result in a decline in the AOO in the foreseeable future as determined by the use of the 2x2km grid method. • (iii) The habitat within which the subspecies occurs is highly threatened by aerial canker, *Phytophthora cinnamomi*, drought (shallow montane soils) and altered fire regimes. It is suspected that these impacts may directly and indirectly contribute to a decline in the area, extent and/or quality of habitat in the subpopulation. • (v) Limb death was observed in 25 to 50% of the subpopulation in 2014 to 2016. This is likely a result of aerial canker and extreme drought stress. Although it appears that fire is needed to stimulate recruitment, the subspecies recovery time post-fire is very long and therefore it is likely that inappropriate (too frequent) fire regimes will lead to further reduction in the total population size. Road upgrading in 2010 to 2012 resulted in the removal of 14 individuals. Monitoring

		of the batter area since 2011 has shown a 38% decline in the number of mature individuals in 2 quadrats near the road. This decline is likely due to increased drought effects. • **Meets criteria for CR: B1ab(iii,v) +B2ab(iii,v)**
C.	Small population size and decline (population size, distribution and evidence of decline)	• Known from approximately 2,900 mature individuals. • Overall, the number of recorded individuals has varied with an overall increase from approximately 2,300 in 2001 to approximately 2,900 in 2016, potentially due to improved survey techniques. While there is insufficient data to determine likely overall percentage population decline (C1), there is evidence of some decline in the number of mature individuals occurring (C2). Post road upgrade monitoring has recorded a 38% decline in individuals in 2 quadrats adjacent to the road, compared to a smaller decline occurring away from the road. • C2a(ii) 100% of individuals occur in one subpopulation. • **Meets criteria for VU: C2a(ii)**
D.	Very small or restricted population (population size)	• (D) The subspecies is known from approximately 2,900 mature individuals in total. • **Does not meet criterion**
E.	Quantitative analysis (statistical probability of extinction)	• No information to assess.

Summary of assessment information

EOO	0.11 km^2 (MCP), recalculated to 4 km^2 so as not to be less than the AOO.	AOO	4 km^2 (2 km x 2 km grid). Extrapolated area of subpopulation 0.11 km^2	Generation length	Unknown (>1.5 years from juvenile to appearance of first flowers)

No. locations	1	Severely fragmented	Yes ☐ No ☒ Unknown ☐
No. subpopulations	1	No. mature individuals	2,900 (estimate)
Percentage global population within Australia		100	
Percentage population decline over 10 years or 3 generations		Unknown	

Threats *(detail how the species is being impacted)*

Threat *(describe the threat and how it impacts on the species. Specify if the threat is past, current or potential)*	Extent *(give details of impact on whole species or specific subpopulations)*	Impact *(what is the level of threat to the conservation of the species)*
Disease • Aerial canker is prevalent within the habitat and may be causing limb death to 25-50% of plants (in combination with drought). *Phytophthora cinnamomi* and *P. megasperma* is also present at the subpopulation and although it is not known if the subspecies is susceptible, the habitat which	Whole population	Catastrophic

contains a number of species in the Proteaceae family, is highly susceptible and is being impacted by the disease. Past, current and future		
Drought • The habitat consists of areas of exposed quartzite bedrock with shallow loamy sand soils on a wave cut bench which is highly susceptible to drought effects. Severe drought stress in the habitat was evident from 2014 to 2016 and possibly resulted in limb death in 25 to 50% of the subspecies. • Climate change modelling for the south west region predicts a decline in rainfall, and some seasonal shift to summer rainfall events, which is likely to increase the potential impact of drought on the subspecies. Past, current, future	Whole population	Severe
Road maintenance and construction • Threats include grading, chemical spraying, construction of drainage channels, and slashing of road vegetation. 14 plants were removed for the road upgrade in 2010 to 2012. Such activities also encourage the spread of disease, and appear to have enhance drought effects in adjacent areas. Past, current, future	Whole population	Severe
Small population size • The subspecies is only known from one subpopulation, subject to threatening processes, placing it under serious threat from those processes. Current, future	Whole population	Catastrophic
Altered fire regimes • Increased fire intervals may cause a decline in the number of individuals with fires in short succession capable of killing live plants before canopy-stored seed has been replenished. Recovery time post-fire is long with juveniles first appearing seven years following a burn in 2006, which then flowered for the first time 1.5 years later. Past, current and future	Whole population	Severe

Management and Recovery	
Is there a Recovery Plan (RP) or Conservation Management Plan operational for the species?	Yes ☐ No ☒
List all relevant recovery or management plans (including draft, in-preparation, out-of-date, national and State/Territory recovery plans, recovery plans for other species or ecological communities, or other management plans that may benefit or be relevant to the nominated species).	

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

- Monitoring and surveys have been carried out to determine plant numbers and impact of threats;
- Threatened Flora markers have been installed at the subpopulation;
- Seed has been collected and stored at Parks and Wildlife 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

- Monitor subpopulation for evidence of changes in plant or site health;
- Ensure the subspecies is not accidentally damaged or destroyed during road maintenance, and the habitat is maintained in a suitable condition for the conservation of the subspecies;
- Develop and implement a fire management strategy, including the need for, and method of, the construction and maintenance of firebreaks;
- Undertake surveys in areas of potentially suitable habitat;
- Continue to follow dieback hygiene measures;
- Apply phosphite to assist in managing *Phytophthora* impacts and monitor the effects of treatment;
- Undertake fungicide trials to determine its effectiveness in limiting aerial canker impact;
- Establish new subpopulations through translocation into disease-free areas.

Research

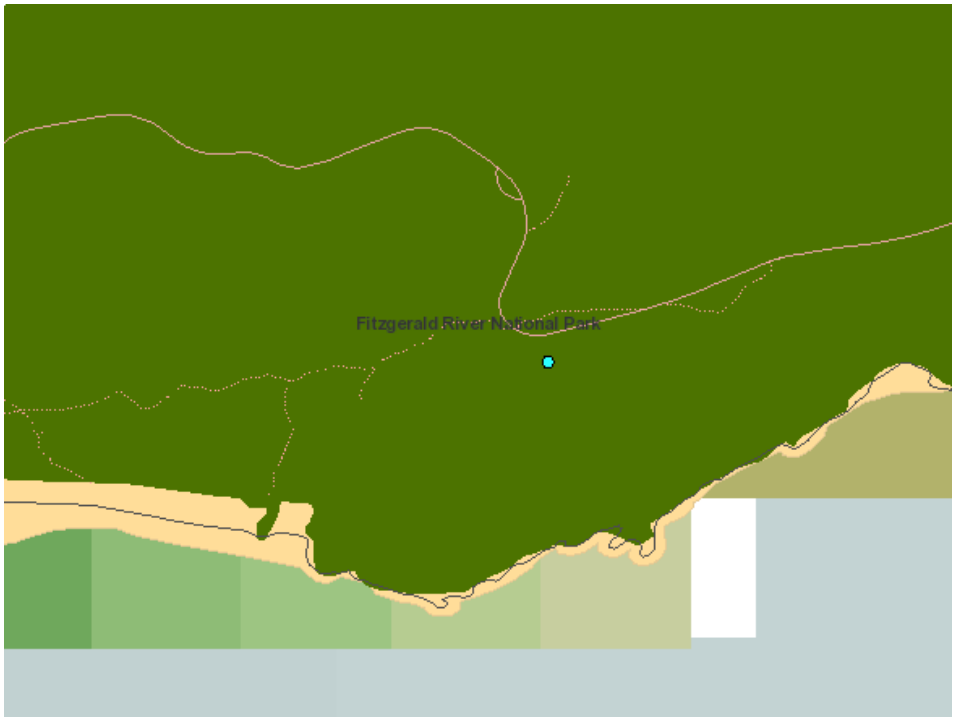
Research biology and ecology of the subspecies including:

- a study of the soil seed bank dynamics and the role of various factors including disturbance, competition, drought and inundation in recruitment and seedling survival;
- determination of reproductive strategies, phenology and seasonal growth;
- investigation of the mating system and pollination biology;
- investigation of population genetic structure, levels of genetic diversity and minimum viable population size;
- impacts of dieback disease and aerial canker, and phosphite application on the subspecies and its habitat; and
- the impact of changes in hydrology in the habitat.

Nomination prepared by:	
Contact details:	
Date submitted:	9/1/2017

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

Location of *Kunzea similis* subsp. *similis* with remnant vegetation and major roads



Summary of subpopulation information *(detailed information to be provided in the relevant sections of the form)*						
Location or Subpopulation *(include coordinates)*	Land tenure	Survey information: Date of survey and No. mature individuals	Area of Subpopulation	Site / habitat Condition	Threats *(note if past, present or future)*	Specific management actions
Subpopulation 1: East Mount Barren, wave cut bench (mainly below road), Fitzgerald River National Park	National Park	2001: 2,300+/- [2-5% dead] 2006: 1,100+/- [50% dead- burnt] 2008: 1,000+/- 2009: 3,600+/- 2010: 3,600+/- 2013: 2,650+/- (100 juveniles) 2014: 2,000+/- (200 juveniles) 2015: 2,000+/- (3,800 juveniles) 2016: 2,900+/- (1,775 juveniles)	11 ha	Moderate. Severe drought stress evident in habitat. Decline in plant health where road upgraded. Aerial canker present (limb death apparent), *Phytophthora* dieback activity (habitat highly susceptible).	Road maintenance and construction (past, present, future) Aerial canker/ *Phytophthora* dieback (past, present, future) Fire (past, present, future) Small population size (past, present, future) Drought (past, present, future)	Install threatened flora markers Apply phosphite Trial fungicide application Develop a fire management plan Collect seed and test viability, conduct regeneration trials Implement disease hygiene measures Implement translocations

FLORA NOMINATION FORM: TO BE CONSIDERED AT THE 2005 TSSC MEETING (Updated 2016)

DEPARTMENT OF Conservation AND LAND MANAGEMENT
Conserving the nature of WA

Proposed **addition, deletion or other change** to the schedule of Declared Rare Flora pursuant to the *Wildlife Conservation Act 1*950; and/or, amendments to the CALM Priority Flora List.
See CALM Policy Statement No. 9 for criteria, definitions. Please complete all sections. Attach additional information, if space is insufficient.

1. TAXON: *Kunzea similis* subsp. *similis* **Author Toelken and Craig (2007)**

Description

Kunzea similis subsp. *similis* is an upright shrub to 1.5 m tall with bracteoles 3.2 to 3.5 (−3.7) mm long hidden between flowers and usually shorter than the hypanthium. Inflorescences are deep pink carried on short lateral stems. Flower heads are globular and terminal. The fruit is a dehiscent capsule. The subspecies tends to be tall and spindly in long unburnt vegetation but has a more bushy form in younger vegetation. Leaves usually have an obtuse to rounded apex compared to subsp. *mediterranea*, but acute apices can also be found (Toelken and Craig 2007).

Distribution

Known only from East Mt Barren where it is is restricted to areas of shallow sand over outcropping quartzite (Kybulup Schist) on the wave cut bench between 30 m and 110 in altitude.

Biology and ecology

Observations indicate that a shallow sandy soil over a less permeable material (massive siliceous schists at East Mt Barren), is probably a determining factor in the distribution of the subspecies. A key feature of sites supporting the subspecies is a perennial supply of adequate non-saline soil moisture provided by local stratigraphy and soil types. The impact on this from a drying climate needs further investigation.

Genetic studies by S. Krauss (2002) showed *Kunzea similis* subsp. *similis* was able to be differentiated from subsp. *mediterranea* using genetic markers.

Susceptibility to *Phytophthora cinnamomi* and *P. megasperma* is unknown but habitat is highly susceptible.

The subspecies appears susceptible to aerial canker with 25 to 50% of the subpopulation suffering limb death in 2014 to 2016.

Kunzea similis subsp. *similis* is killed by fire and relies on seed for regeneration. Recovery time post-fire appears to be very long with juvenile plants appearing around seven years later. Longevity of soil-stored seed bank is unknown, seed is smoke responsive, substantial natural regeneration on grid lines is apparent.

2. CURRENT LIST/SCHEDULE: Declared Rare: Threatened (extant) [**WA: VU D2**] or
Presumed Extinct [ ] Priority [ ] None [ ]

3. PROPOSED LIST/SCHEDULE: **Threatened [WA and EPBC Act as Critically Endangered]**
Presumed Extinct [ ] Priority [ ] None [ ]

4. PROPOSED IUCN THREAT CATEGORY (see page 4): Extinct (EX) [ ] Extinct in the Wild (EW) [ ]
Critically Endangered (CR) [**B1ab(iii,v)+B2ab(iii,v)**] Endangered (EN) [ ] Vulnerable (VU) [ ]
Lower Risk (LR) [ ]

5. SUMMARY REASON FOR CHANGE:

Addition: Believed to be rare, but needs further survey [ ] Confirmed to be rare [**X**]
Populations not adequately reserved [ ] Subject to threatening processes **[x]**
Deletion: More common than previously thought [ ] Populations adequately reserved [ ]
Taxonomic uncertainty [ ] Does not comply with guidelines for hybrids [ ]
Change: Name Change [ ] Now presumed extinct [ ] Presumed extinct to extant [ ]
Date found / / Other [ ]

6. TAXONOMIC HISTORY/AFFINITY:

- *Kunzea similis* is an upright shrub to 2.0 m, inflorescences are deep pink carried on short lateral stems, flower heads are globular and terminal, its fruit is a dehiscent capsule. *K. similis* tends to be

tall and spindly in long unburnt vegetation on Bandalup Hill but has a more bushy form in younger vegetation (burnt 1989) near East Mt Barren. On East Mt Barren the species is restricted to areas of shallow sand over outcropping quartzite (Kybulup Schist) on the wave cut bench between 30 m and 110 in altitude. On Bandalup Hill it grows on sandy silcrete soils. The subspecies is endemic to the '*Regelia velutina*/*Melaleuca lutea* shrubland of the Fitzgerald River National Park' community, which has been listed as a Priority Ecological Community.

- *K. similis* is in the section *Zeanuk* subsection *Floridea* characterised by a low number of flowers in the inflorescence (< 12 usually). Toelken (1996) notes that three species in this group occur in the region (*K. similis*, *K. pauciflora* P4 Cape Riche, *K. acuminata* Israelite Bay) which may be regarded as relics each with a very restricted distribution and are not now closely related to one another or the main group of species in the sub-section. They may be considered early evolutionary divergents as they often have larger flower heads on longer shoots. The subsection Floridae is characterised by a relatively large corolla indicative of a different pollination mechanism and does not follow the broad spectrum pollination agent syndrome reported for much of the Myrtaceae.
- Location and collection number of voucher specimen: Perth 05116457.
- DNA fingerprinting undertaken by Krauss (2002) showed five subpopulations from the Bandalup area to be polymorphic with markers of plants from East Mt Barren demonstrating significant differences from the Bandalup area. The species was split into subspecies *mediterranea* (Bandalup area) and subspecies *similis* (East Mt Barren) and described by Toelken and Craig (2007).
- *Kunzea similis* subsp. *similis* is a shrub 1.5m tall with bracteoles 3.2 to 3.5 (−3.7) mm long and are hidden between flowers and usually shorter than the hypanthium. Leaves usually have an obtuse to rounded apex compared to subsp. *mediterranea*, but acute apices can also be found (Toelken and Craig 2007).

7. RECENT SURVEY EFFORT (refer to the CALM guidelines for survey requirements):

- In October 2000, Dr Gil Craig and Matt Jones (Ravensthorpe Nickel Operation) surveyed on foot an area in a 1-2 km radius to the west, northwest and north of East Mt Barren Fitzgerald River National Park (near the known subpopulation). Extensive searches were also made by vehicle between East Mt Barren and Quoin head (17 km to the west) where Kybulup Schist occurred, more intensive surveys were made on foot. Surveys were also made on tracks in the eastern sector of the FRNP including Hamersley Drive, Telegraph Track, Moir Track, Quoin Head Track, western sector of Whalebone Track, Hamersley Inlet Track, Old Ongerup Rd.
- In August 2000 and October 2000, helicopter surveys were undertaken over the north-eastern part of the FRNP and the whole East Mt Barren area. Close in helicopter survey, including setting down to allow on-ground survey, can be used successfully as the species is readily recognisably in spring on account of its vivid pink inflorescences.
- Extensive survey of broad areas and intensive survey including targeted foot and aerial (helicopter) survey was conducted in October-November 2001 by G Cockerton and G. Craig. In preparation for these surveys, Landsat TM imagery was consulted and Beard vegetation mapping to determine the regional distribution of Barrens Thicket association (in which *K. similis* subsp. *similis* occurs naturally). Extensive local knowledge of soils, vegetation and flora was contributed by local CALM officers, Mr Andy Chapman, Mr Ric Pepper and Dr Gil Craig of Ravensthorpe.
- The wider region of East Mt Barren was investigated on foot where access was possible and by helicopter where road access was not available.
- Survey of Fitzgerald River National Park from Hamersley Inlet to Culham Inlet between the verge and up to 25m into undisturbed vegetation by Craig and Hickman in 2009 for Main Roads WA for the upgrade of Hamersley Drive.
- Opportunistic surveys have been undertaken by Parks and Wildlife South Coast District staff.

8. THREATS:

The main threats are fire, disease and drought:

- Killed outright by fire, regenerating from seed. Increased fire intervals may cause a decline in the number of individuals if they occur in short succession.
- The subspecies is highly susceptible to aerial canker and drought and suffered extensive limb death in 25 to 50% of plants in 2014 to 2016. The habitat also appeared to be suffering extreme drought stress.
- *Phytophthora cinnamomi* and *P. megasperma* is also present at the subpopulation and although it is not known if the subspecies is susceptible, the habitat which contains a number of Proteaceae, is highly susceptible and is being impacted by the disease.

- Plants occur along a road reserve and are threatened by vehicles or during road maintenance activities which may potentially also introduce disease. The road was upgraded in 2010 to 2012 and resulted in the removal of 14 plants. Post road upgrade monitoring has recorded a 38% decline in individuals in 2 quadrats adjacent the road, compared to a smaller decline occurring away from the road. These plant deaths were attributed to drought impacts.

9. RESEARCH KNOWLEDGE/NEEDS:

- Distribution and subpopulation parameters and pollination vectors of *K. similis* are reported in Cockerton, Evelegh and Craig (2002). Observations indicate that a shallow sandy soil over a less permeable material (massive siliceous schists at East Mt Barren), is probably a determining factor in the distribution of this subspecies. The East Mt Barren subpopulation would receive significant run-off from the hill to the north. A key feature of sites supporting the subspecies is a perennial supply of adequate non-saline soil moisture provided by local stratigraphy and soil types. The impact on this from a drying climate needs further investigation.
- Genetic studies by S. Krauss (2002) (Botanic Gardens and Parks Authority Report No 12) showed *Kunzea similis* subsp. *similis* was able to be differentiated from subsp. *mediterranea* using genetic markers.
- In the light of Botanic Gardens and Parks Authority results, Dr Helmut Toelken (Adelaide Herbarium) re-investigated morphological differences and showed differences between the two areas. The species was split into subspecies *mediterranea* and subspecies *similis* (Toelken and Craig 2007).
- Susceptibility to *Phytophthora cinnamomi* and *P. megasperma* unknown but habitat is highly susceptible.
- Appears susceptible to aerial canker with 25 to 50% of the subpopulation suffering limb death in 2014 to 2016.
- *Kunzea similis* subsp. *similis* is killed by fire and relies on seed for regeneration. Recovery time post-fire appears to be very long with juvenile plants appearing around seven years later. Longevity of soil-stored seed bank is unknown, seed is smoke responsive, substantial natural regeneration on grid lines is apparent.

10. MANAGEMENT NEEDS & IMPLICATIONS (including susceptibility to disease, and presence of other threats):

- Monitor subpopulation, specifically for impact from aerial canker, *Phytophthora*, fire and drought;
- Mark and protect site from machine operations;
- Collect and store seed;
- Establish new subpopulations in disease free sites through translocation;
- Protect from uncontrolled fire and ensure applied fire is ecologically appropriate;
- Continue to follow dieback hygiene measures;
- Apply phosphite to assist in managing *Phytophthora* impacts;
- Undertake surveys in areas of potentially suitable habitat;
- Research biology and ecology of the subspecies, with a focus on pollination effectiveness, seed viability, conditions required for natural germination, response to threats (particularly aerial canker, dieback disease) and disturbances and reproductive biology.

11. DISTRIBUTION BY CALM REGION:

Kimberley [ ] Pilbara [ ] Midwest [ ] Goldfields [ ] Wheatbelt [ ]
Swan [ ] Central Forest [ ] Southern Forest [ ]
South Coast [**X**]

12. KNOWN POPULATIONS AND RANGE (attach WAHERB and/or population database printout):

CALM Region	Location	Land Status	Population size/area	Date of most Recent Survey	Condition of Population
A. Conservation Reserves (National Parks, Nature Reserves, State Forests)					
SC	East Mt Barren	NP	2,317, area: 10 ha+/-	2001	healthy
			2,900+/-, area: 11 ha+/- (habitat highly stressed from aerial canker and drought)	2016	moderate
B. Other Crown Lands					
Unconfirmed Locations					

13. TRENDS IN POPULATION SIZE & RANGE:

A. Previous:
2,300+/- 2001, 10 hectares
1,100+/- 2006
1,000+/- 2008
3,600+/- 2009
3,600+/- 2010
2,650+/- (100 juveniles) 2013
2,000+/- (200 juveniles) 2014
2,000+/- (3,800 juveniles) 2015

B. Current:
2,900+/- (1,775 juveniles) 2016, 11 hectares

14. SUMMARY STATUS ASSESSMENT:

Kunzea similis subsp. *similis* has a very restricted distribution, known from a single subpopulation consisting of approximately 2,900 mature individuals and 1,775 juveniles (in 2016). The subspecies is highly susceptible to aerial canker, drought and fire. With a predicted drying climate a projected decline is expected.

15. REFERENCES:

BHP Billiton (2004) Management plan for priority flora and significant vegetation communities.

Cockerton, G. and Evelegh, N. (2003) Habitats, vegetation and flora of the Ravensthorpe Nickel Operation Tenements. Report prepared for BHP Billiton Ltd.

Cockerton, G., Evelegh, N. and Craig, G.F. (2002) Flora and vegetation Surveys October – November 2001, Ravensthorpe Region. Report prepared for BHP Billiton Ltd.

Craig, G. and Chapman, A. (1998) Ravensthorpe Nickel Project, Comet Resources NL, vegetation, flora and fauna survey. Report prepared for ICF Kaiser Engineers & Constructors.

Krauss, S. (2002) Population genetic analysis of *Kunzea similis* Toelken (Myrtaceae). Botanic Gardens and Parks Authority Genetic Laboratory Report No. 12, Perth, Western Australia. Report commissioned by Landcare Services Pty Ltd for BHP Billiton Ltd, Ravensthorpe Nickel Operation Pty Ltd.

Toelken, H.R. (1996) A revision of the genus *Kunzea* (Myrtaceae). 1. The Western Australian section Zeanuk*. Journal of the Adelaide Botanic Garden* 17: 29–106.

Toelken, H.R. and Craig, G.F. (2007) *Kunzea acicularis*, *K*. *strigosa* and *K*. *similis* subsp. *mediterranea* (Myrtaceae)- new taxa from near Ravensthorpe, Western Australia. *Nuytsia* 17: 385−396.

16. PROPOSED BY: **DATE**: 16/6/2004

(Address) (Telephone)

Updated 9/1/2017

IUCN RED LIST CATEGORIES AND CRITERIA VERSION 3.1 (UPDATED 2016)

	CRITICALLY ENDANGERED	ENDANGERED	VULNERABLE
A) REDUCTION IN POPULATION SIZE BASED ON **ANY** OF **1)** An observed, estimated, inferred or suspected population reduction of _____, over the last 10 years or 3 generations, whichever is the longer, where the causes are clearly reversible AND understood AND ceased, based on a, b, c, d or e	≥90%	≥70%	≥50%
2) An observed, estimated, inferred or suspected population reduction of at least _____ over the last 10 years or 3 generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible based on a, b, c, d or e	≥80%	≥50%	≥30%
3) A population size reduction of _____, projected or suspected to be met within the next 10 years or 3 generations, whichever is the longer (up to a maximum of 100 years) based on (and specifying) any of (b) to (e) under A1	≥80%	≥50%.	≥30%
4) An observed, estimated, inferred or suspected population reduction of _____ over any 10 year or 3 generation period, whichever is the longer (up to a maximum of 100 years in the future) where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR be understood OR may not be reversible, based on a, b, c, d or e	≥80%	≥50%	≥30%
a) direct observation, b) an index of abundance appropriate for the taxon, c) a decline in area of occupancy, extent of occurrence and/or quality of habitat, d) actual or potential levels of exploitation, e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.			
B) GEOGRAPHIC RANGE IN THE FORM OF **EITHER** B1 **OR** B2			
1) Extent of occurrence **4 km²** and estimates indicating at least 2 of a-c	**<100 km²**	<5 000 km²	<20 000 km²
2) Area of occupancy **4 km²** and estimates indicating at least 2 of a-c	**<10 km²**	500 km²	<2 000 km²
(a) Severely fragmented or known to exist at no more than **one** location	**one**	five	ten
(b) Continuing decline, observed, inferred or projected, in **ANY** of the following: (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 the following: (i) extent of occurrence, (ii) area of occupancy, (iii) area, extent and/or quality of habitat, (iii) number of locations or sub-populations, (iv) number of mature individuals.			
C) POPULATION ESTIMATED TO NUMBER **2,900** MATURE INDIVIDUALS AND **EITHER**	<250	<2 500	<10 000
1) An estimated continuing decline of at least _____ within three years or one generation whichever is the longer (up to a maximum of 100 years in the future) **OR**	25%	20%	10%
2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of a-b			
(a) population structure in the form of one of (i) no subpopulation estimated to contain more than _____ mature individuals) **OR**	50	250	1 000
(ii) at least 90% of mature individuals in one subpopulation			**Applies**
(b) Extreme fluctuations in number of mature individuals			
D) (CR and EN) POPULATION SIZE ESTIMATED TO BE LESS THAN _____ MATURE INDIVIDUALS	50	250	not applicable
D) (VU ONLY) POPULATION VERY SMALL OR RESTRICTED IN THE FORM OF EITHER			
1) population estimated to number less than _____ mature individuals. **OR**	not applicable	not applicable	1000
2**)** population with a very restricted area of occupancy (typically less than 20 km²) OR number of locations (typically five or fewer) such that it is prone to the effects of human activities or stochastic events within a very short period of time in an uncertain future, and is thus capable of becoming Critically Endangered or even Extinct in a very short time period.	not applicable	not applicable	**No longer applies**
E) QUANTITATIVE ANALYSIS SHOWING PROBABILITY OF EXTINCTION IN THE WILD IS AT LEAST _____	50% within ten years or three generations, whichever is the longer (up to a maximum of 100 years)	20% within 20 years or five generations, whichever is the longer (up to a maximum of 100 years)	10% within 100 years