Department of
Parks and Wildlife

Interim Recovery Plan No. **347**

(*Kunzea acicularis*)

Interim Recovery Plan
2014–2019

Department of Parks and Wildlife, Western Australia

June 2014

List of Acronyms

The following acronyms are used in this plan:

ADTFRT	Albany District Threatened Flora Recovery Team
BGPA	Botanic Gardens and Parks Authority
CALM	Department of Conservation and Land Management
CITES	Convention on International Trade in Endangered Species
CR	Critically Endangered
DEC	Department of Environment and Conservation
DAA	Department of Aboriginal Affairs
DMP	Department of Mines and Petroleum
DPaW	Department of Parks and Wildlife (also shown as Parks and Wildlife)
DRF	Declared Rare Flora
EPBC	Environment Protection and Biodiversity Conservation
IBRA	Interim Biogeographic Regionalization for Australia
IRP	Interim Recovery Plan
IUCN	International Union for Conservation of Nature
LGA	Local Government Authority
NRM	Natural Resource Management
PEC	Priority Ecological Community
PICA	Public Information and Corporate Affairs
RP	Recovery Plan
SCB	Species and Communities Branch (Parks and Wildlife)
SCD	Science and Conservation Division
SWALSC	South West Aboriginal Land and Sea Council
TEC	Threatened Ecological Community
TFSC	Threatened Flora Seed Centre
TSSC	Threatened Species Scientific Committee
UCL	Unallocated Crown Land
UNEP-WCMC	United Nations Environment Program World Conservation Monitoring Centre
VU	Vulnerable
WA	Western Australia
WAPC	Western Australia Planning Commission

Foreword

Interim Recovery Plans (IRPs) are developed within the framework laid down in Department of Parks and Wildlife Policy Statements Nos. 44 and 50 (CALM 1992; CALM 1994). Note: The Department of Conservation and Land Management (CALM) formally became the Department of Environment and Conservation (DEC) in July 2006 and the Department of Parks and Wildlife in July 2013. Plans outline the recovery actions that are required to urgently address those threatening processes most affecting the ongoing survival of threatened taxa or ecological communities, and begin the recovery process.

Parks and Wildlife is committed to ensuring that Threatened taxa are conserved through the preparation and implementation of Recovery Plans (RPs) or IRPs, and by ensuring that conservation action commences as soon as possible and, in the case of Critically Endangered (CR) taxa, always within one year of endorsement of that rank by the Minister.

This plan will operate from June 2014 to May 2019 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked as Vulnerable (VU), this plan will be reviewed after five years and the need for further recovery actions assessed.

This plan was given regional approval on 6 June 2014 and was approved by the Director of Science and Conservation on 13 June 2014 The provision of funds identified in this plan is dependent on budgetary and other constraints affecting Parks and Wildlife, as well as the need to address other priorities.

Information in this plan was accurate at June 2014.

Plan preparation: This plan was prepared by:

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Andrew Crawford	Principal Technical Officer, Threatened Flora Seed Centre, Science and Conservation Division
Mia Podesta	Ecologist - Threatened Ecological Communities (TECs) database, Parks and Wildlife Species and Communities Branch
Amanda Shade	Assistant Curator (Nursery) Botanic Gardens and Parks Authority

Thanks also to the staff of the Western Australia Herbarium for providing access to Herbarium databases and specimen information.

Cover photograph by Mike Fitzgerald.

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Summary

Scientific name:	***Kunzea acicularis***	**Common name:**	none
Family:	Myrtaceae	**Flowering period:**	October–November
DPaW region:	South Coast	**DPaW district:**	Albany
Shire:	Ravensthorpe	**NRM region:**	South Coast Regional Initiative Planning Team
IBRA region:	Esperance Plains		
IBRA subregion:	Fitzgerald ESP01	**Recovery team:**	ADTFRT

Distribution and habitat: *Kunzea acicularis* is known from one location north-east of Ravensthorpe where it grows in pale orange clay-loam soil in open mallee woodland and heath with *Eucalyptus pleurocarpa*, *E. tetraptera*, *Banksia cirsioides*, *Hakea laurina*, *Andersonia parvifolia*, *Beaufortia schaueri*, *Melaleuca societatis* and *M. hamata* (Toelken and Craig 2007).

Habitat critical to the survival of the species, and important populations: Given that there is just one known population of *Kunzea acicularis*, all known habitat is habitat critical to the survival of the species and the wild population is an important population. Habitat critical to the survival of *K. acicularis* includes the area of occupancy of the population, areas of similar habitat surrounding and linking subpopulations (these providing potential habitat for population expansion and for pollinators), additional occurrences of similar habitat that may contain undiscovered populations of the species or be suitable for future translocations, and the local catchment for the surface and/or groundwater that maintains the habitat of the species.

Conservation status: *Kunzea acicularis* is specially protected under the Western Australian *Wildlife Conservation Act 1950* and is ranked as Vulnerable (VU) in Western Australia under International Union for Nature Conservation (IUCN 2001) criteria D2 due to its very restricted area of occupancy. The species is known from a single location. The current extent of occurrence is estimated to be 940.7m^2 and the area of occupancy is estimated to be 0.147km^2. The species is not listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Threats: The main threats to the species are narrow distribution, road maintenance, altered fire regimes, *Phytophthora* dieback and potential future mining operations.

Existing recovery actions: The following recovery actions have been or are currently being implemented and have been considered in the preparation of this plan:

1. Relevant land managers have been made aware of this species and its locations.
2. Declared Rare Flora (DRF) markers have been installed at Population 1a.
3. Surveys have been undertaken in the Ravensthorpe area.
4. 14,870 seeds collected from Population 1 in November 2004 and 2,958 seeds also collected from Population 1, in December 2009 are currently stored in Parks and Wildlife's TFSC at –18°C.

Plan objective: The objective of this plan is to abate identified threats and maintain or enhance *in situ* populations to ensure the long-term conservation of the species in the wild.

Recovery criteria

Criteria for recovery success:

- The number of extant populations has increased from one to two or more over the term of the plan and/or
- The number of mature individuals has increased by 10% or more over the term of the plan from 17,500 to 19,250 or more.

Criteria for recovery failure:

- The number of mature individuals has decreased by 10% or more over the term of the plan from 17,500 to 15,750 or less.

Recovery actions

1. Coordinate recovery actions
2. Monitor population
3. Ensure long-term protection of habitat
4. Determine the susceptibility of *Kunzea acicularis* to *Phytophthora cinnamomi*
5. Undertake regeneration trials
6. Develop and implement a fire management strategy
7. Collect and store seed
8. Undertake surveys
9. Obtain biological and ecological information
10. Undertake and monitor translocations
11. Liaise with land managers and Aboriginal communities
12. Map habitat critical to the survival of *Kunzea acicularis*
13. Promote awareness
14. Review this plan and assess the need for further recovery actions

1. Background

History

Kunzea acicularis was first collected north-east of Ravensthorpe by G. Cockerton in 2003 and was formally described by Toelken and Craig in 2007. One population comprising 17,500 mature plants is currently known.

Description

Kunzea acicularis is a medium shrub to two metres tall with few erect stems, each of which is irregularly branched. Young branches are densely covered with fine spreading hairs. The leaf petiole is 0.3 to 0.7 millimetres long and more or less appressed. The lamina is oblanceolate to elliptic-oblanceolate. The inflorescence is a botryum with three to five flowers, and the corolla is pink to mauve. The name *acicularis* is Latin for 'needle-like' and refers to the long needle-like acumen of the perules and bracts (Toelken and Craig 2007).

Kunzea acicularis is similar to the southern form of *K. preissiana* with both having bracts longer than half the hypanthium. However, *K. acicularis* differs from *K. preissiana* by the combination of being usually taller, having broader leaves and lanceolate-triangular long-pointed perules and bracts on the inflorescence, as well as longer, acute, triangular calyx lobes (Toelken and Craig 2007).

Illustrations and/or further information

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; Western Australian Herbarium (1998–) *FloraBase – the Western Australian Flora*. Department of Parks and Wildlife. http://florabase.dpaw.wa.gov.au/.

Distribution and habitat

Kunzea acicularis is known from one location north-east of Ravensthorpe where it grows on pale orange clay-loam with *Eucalyptus pleurocarpa*, *E. tetraptera*, *Banksia cirsioides*, *Hakea laurina*, *Andersonia parvifolia*, *Beaufortia schaueri, Melaleuca societatis* and *M. hamata* (Toelken and Craig 2007).

Table 1. Summary of population land vesting, purpose and manager

Population number & location	Parks and Wildlife district	Shire	Vesting	Purpose	Manager
1a. NE of Ravensthorpe	Albany	Ravensthorpe	LGA	Road reserve	Shire of Ravensthorpe
1b. NE of Ravensthorpe	Albany	Ravensthorpe	Non vested	UCL	WAPC
1c.NE of Ravensthorpe	Albany	Ravensthorpe	Non vested	UCL	WAPC

Biology and ecology

Kunzea acicularis appears to be an obligate seeder, regenerating prolifically following disturbance. When observed in 2008 part of Population 1b comprised of immature plants that had recruited following the Three Star Lakes fire in 2003.

The susceptibility of *Kunzea acicularis* to *Phytophthora* dieback is not known. Other members of the genus that have been tested have low to moderate susceptibility.

Conservation status

Kunzea acicularis is specially protected under the Western Australian *Wildlife Conservation Act 1950* and is ranked as Vulnerable (VU) under International Union for Nature Conservation (IUCN 2001) criteria D2 due to its very restricted area of occupancy. The species is known from a single location with an extent of occurrence estimated to be 940.7m^2 and area of occupancy estimated to be 0.147km^2. The species is not listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Threats

- **Narrow distribution.** As the species is known from one population, its genetic diversity is limited and the likelihood of it falling victim to chance demographic or environmental events such as wildfire is much increased.
- **Road maintenance** including grading, chemical spraying, construction of drainage channels and the mowing of roadside vegetation is a threat to Population 1a.
- **Altered fire regimes.** Fire should if possible be prevented from occurring in the area of the population, except where used as a recovery action. Species confined to single populations are vulnerable to stochastic events such as poor seasons in early years after fire. Fire may also facilitate weed invasion and when it occurs should be followed up with appropriate weed control.
- ***Phytophthora* dieback.** • *Phytophthora cinnamomi* is a potential threat to *Kunzea acicularis*. Although other *Kunzea* species tested have low to moderate susceptibility, the susceptibility of *K. acicularis* is unknown. Other susceptible plant species with which it grows may also be greatly impacted resulting in habitat change.
- **Future mining operations.** If mining occurs in tenement (E74/419), held by BHP Billiton Nickel West Pty Ltd., it will have the potential to severely impact or destroy the habitat of the species.

Table 2. Summary of population information and threats

Population number & location	Land status	Year / no. of plants		Current condition	Threats
1a. NE of Ravensthorpe	Road reserve	2004 2007	2000* 2000	Healthy	Narrow distribution, road maintenance, altered fire regimes, disease, mining
1b. NE of Ravensthorpe	UCL	2004 2008	2000* 13,500 (1,550)	Healthy	Narrow distribution, altered fire regimes, disease, mining
1c.NE of Ravensthorpe	UCL	2004 2007	2000* 2000	Healthy	Narrow distribution, altered fire regimes, disease, mining

Note: Populations in **bold text** are considered to be important populations; * = total for both subpopulations; and ( ) = number of seedlings.

The intent of this plan is to provide actions that will mitigate immediate threats to *Kunzea acicularis*. Although climate change and drought may have a long-term effect on the species, actions taken directly to prevent their impact are beyond the scope of this plan.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Development and/or land clearing in the immediate vicinity of *Kunzea acicularis* will require assessment. On-ground works should not be approved unless the proponents can demonstrate that their actions will have no significant negative impact on the species, its habitat or potential habitat or on the local surface hydrology, such that drainage in the habitat of the species would be altered.

Habitat critical to the survival of the species, and important populations

Given that *Kunzea acicularis* is ranked as VU and there is only one population, it is considered that all known habitat for the wild population is critical to the survival of the species and that the wild population is an important population. Habitat critical to the survival of *K. acicularis* includes the area of occupancy of the population, areas of similar habitat surrounding and linking subpopulations (these providing potential habitat for population expansion and for pollinators), additional occurrences of similar habitat that may contain undiscovered populations of the species or be suitable for future translocations, and the local catchment for the surface and/or groundwater that maintains the habitat of the species.

Benefits to other species or ecological communities

Recovery actions implemented to improve the quality or security of the habitat of *Kunzea acicularis* will also improve the status of associated native vegetation. One Declared Rare Flora (DRF) species and one Priority flora taxon occur within 1.5km of *K. acicularis*. These taxa are listed in the table below:

Table 3. Conservation-listed flora species occurring within 1.5km of *Kunzea acicularis*

Species name	Conservation status (WA)	Conservation status (EPBC Act)
Marianthus mollis	Priority 4	EN
Allocasuarina hystricosa	Priority 4	

For a description of conservation codes for Western Australian flora see http://www.dpaw.wa.gov.au/images/documents/plants-animals/threatened-species/Listings/Conservation_code_definitions_18092013.pdf

Kunzea acicularis does not occur within or adjacent to any Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs).

International obligations

This plan is fully consistent with the aims and recommendations of the Convention on Biological Diversity, ratified by Australia in June 1993, and will assist in implementing Australia's responsibilities under that Convention. The species is not listed under Appendix II in the United Nations Environment Program World Conservation Monitoring Centre (UNEP-WCMC) Convention on International Trade in Endangered Species (CITES), and this plan does not affect Australia's obligations under any other international agreements.

Aboriginal consultation

A search of the Department of Aboriginal Affairs (DAA) Aboriginal Heritage Sites Register revealed no sites of Aboriginal significance adjacent to the population of *Kunzea acicularis*. However, input and involvement has been sought through the South West Aboriginal Land and Sea Council (SWALSC) and DAA to determine if there are any issues or interests with respect to management for this species in the vicinity of these sites. Indigenous opportunity for future involvement in the implementation of the plan is included as an action in the plan. Aboriginal involvement in management of land covered by an agreement under the *Conservation and Land Management Act 1984* is also provided for under the joint management arrangements in that Act, and will apply if an agreement is established over any reserved lands on which this species occurs.

Social and economic impacts

For land under the management of the Shire of Ravensthorpe (Subpopulation 1a) and unallocated Crown land (UCL) (Subpopulations 1b and 1c) some impacts may occur through restrictions imposed on the management of the land, such as maintenance of the road infrastructure. A mineral exploration lease also covers the area where *K. acicularis* is known to occur and there is potential for economic impact should mining operations begin.

Affected interests

Affected interests include the Western Australian Planning Commission (WAPC) and the Shire of Ravensthorpe. Mining tenement holder, First Quantum, may also be affected by actions referred to in this plan. Recovery actions refer to continued liaison with affected stakeholders.

Evaluation of the plan's performance

Parks and Wildlife, with assistance from the Albany District Threatened Flora Recovery Team (ADTFRT), will evaluate the performance of this plan. In addition to annual reporting on progress and evaluation against the criteria for success and failure, the plan will be reviewed following four years of implementation.

2. Recovery objective and criteria

Plan objective

The objective of this plan is to abate identified threats and maintain or enhance *in situ* populations to ensure the long-term conservation of the species in the wild.

Recovery criteria

Criteria for recovery success:
- The number of extant populations has increased from one to two or more over the term of the plan and/or
- The number of mature individuals has increased by 10% or more over the term of the plan from 17,500 to 19,250 or more.

Criteria for recovery failure:
- The number of mature individuals has decreased by 10% or more over the term of the plan from 17,500 to 15,750 or less.

3. Recovery actions

Existing recovery actions

Relevant land managers have been made aware of the current DRF status of the species and their legal obligations in regards to its protection.

DRF markers have been installed at Subpopulation 1a to alert people of the presence of the DRF and the need to avoid activities that may damage the species or its habitat. Dashboard stickers and posters describing the significance of DRF markers have been produced and distributed.

Surveys have been undertaken, both directly through targeted surveys and indirectly as part of other survey programs in the Ravensthorpe area. These include:

- Surveys of East Mount Barren and the Ravensthorpe Range by Andy Chapman in 1998;
- Survey of Whoogarup Range and Mount Drummond areas in December 1998;
- Survey of the Shoemaker-Levy tenements north of Bandalup Hill by G. Craig in 1999;
- Helicopter survey of the northern part of the Ravensthorpe Range by G. Cockerton in 1999;
- Helicopter survey of Bandalup Hill by G. Cockerton and R. Pepper in October 2000;
- A series of surveys at East Mount Barren, and between there and Quoin Head, by G. Craig and M. Jones in October 2000;
- Extensive roadside survey of the eastern section of Fitzgerald River National Park in 2000;
- Survey of Bandalup gravel pits in October 2000;

- Traversing of large areas of Ravensthorpe Range during regional vegetation mapping projects between 2007 to 2008;
- Survey of habitat in the vicinity of known populations and other areas identified as having similar soil landscapes by the Ravensthorpe Regional Flora Survey Team in 2007 to 2009;
- Establishment of 264 permanent quadrats across the Ravensthorpe Range as part of the Banded Ironstone Formation Survey in 2008;
- Survey of remote hills between Kundip and Bandalup Hill and Kundip Nature Reserve by the Ravensthorpe Regional Flora Survey Team in 2008 and 2009.

Approximately 14,870 seeds collected from Population 1 in November 2004 and 2,958 seeds collected in December 2009 are stored in Parks and Wildlife's Threatened Flora Seed Centre (TFSC) at –18°C.

Future recovery actions

Parks and Wildlife is overseeing the implementation of this plan and, with the assistance of the ADTFRT, will include information on progress in annual reports to Parks and Wildlife's Corporate Executive and funding bodies. Where recovery actions are implemented on lands other than those managed by Parks and Wildlife, permission has been or will be sought from the appropriate land managers prior to actions being undertaken. The following recovery actions are roughly in order of descending priority, influenced by their timing over the term of the plan. However this should not constrain addressing any recovery action if funding is available and other opportunities arise.

1. Coordinate recovery actions

Parks and Wildlife with assistance from the ADTFRT will coordinate recovery actions for *Kunzea acicularis* and include information on progress in annual reports to Parks and Wildlife's Corporate Executive and funding bodies.

Action:	Coordinate recovery actions
Responsibility:	Parks and Wildlife (Albany District), with assistance from the ADTFRT
Cost:	$8,000 per year

2. Monitor population

Monitoring of grazing, weed invasion, habitat degradation, population stability (expansion or decline), disease, pollinator activity, seed production, recruitment, and longevity will be undertaken.

Action:	Monitor population
Responsibility:	Parks and Wildlife (Albany District), with assistance from the ADTFRT
Cost:	$10,000 per year

3. Ensure long-term protection of habitat

Parks and Wildlife will investigate the possibility of having land containing *Kunzea acicularis*, reserved for the conservation of flora.

Action:	Ensure long-term protection of habitat
Responsibility:	Parks and Wildlife (Albany District, Land Unit), WAPC, Department of Mines and Petroleum (DMP)
Cost:	$3,000 per year

4. Determine the susceptibility of *Kunzea acicularis* to *Phytophthora cinnamomi*

The level of susceptibility of *Kunzea acicularis* to *Phytophthora cinnamoni* is unknown. Plants grown from seed will be forwarded to Parks and Wildlife Science and Conservation Division for testing.

Action:	Determine the susceptibility of *Kunzea acicularis* to *Phytophthora cinnamomi*
Responsibility:	Parks and Wildlife (Albany District, Science and Conservation Division (SCD))
Cost:	$3,000 in year 1

5. Undertake regeneration trials

Different techniques should be investigated (i.e. soil disturbance, fire and smoke water), to determine the most appropriate method of germinating *Kunzea acicularis* seed in the wild. Any disturbance trials will need to be undertaken in conjunction with weed control.

Action:	Undertake regeneration trials
Responsibility:	Parks and Wildlife (SCD, Albany District)
Cost:	$10,000 in years 1 and 3, $4,000 in years 2, 4 and 5

6. Develop and implement a fire management strategy

A fire management strategy will be developed that recommends fire frequency, intensity, season, and control measures.

Action:	Develop and implement a fire management strategy
Responsibility:	Parks and Wildlife (Albany District)
Cost:	$10,000 in year 1, and $6,000 in years 2–5

7. Collect and store seed

Preservation of genetic material is essential to guard against extinction of the species if the wild population is lost. It is recommended that seed be collected and stored in the TFSC and BGPA.

Action:	Collect and store seed
Responsibility:	Parks and Wildlife (Albany District, TFSC), BGPA
Cost:	$10,000 per year

8. Undertake surveys

It is recommended that any potential habitat for *Kunzea acicularis* be surveyed during its flowering period. All surveyed areas will be recorded and the presence or absence of the species documented to increase survey efficiency and reduce unnecessary duplicate surveys. Where possible, volunteers will be involved.

Action:	Undertake surveys
Responsibility:	Parks and Wildlife (Albany District), with assistance from the ADTFRT and volunteers
Cost:	$10,000 per year

9. Obtain biological and ecological information

Improved knowledge of the biology and ecology of the species will provide a scientific basis for the management of *Kunzea acicularis* in the wild and and will include:

1. Reproductive strategies, phenology and seasonal growth;
2. Reproductive success and pollination biology;
3. Soil seed bank dynamics and the role of disturbance, competition, drought, inundation and grazing in recruitment and seedling survival;
4. Minimum viable population size; and
5. The impact of changes in hydrology.

Action:	Obtain biological and ecological information
Responsibility:	Parks and Wildlife (SCD, Albany District)
Cost:	$50,000 in years 1–3

10. Undertake and monitor translocations

If required, a translocation proposal will be developed and suitable translocation sites selected. Information on the translocation of threatened plants and animals in the wild is provided in Parks and Wildlife's Policy Statement No. 29 *Translocation of Threatened Flora and Fauna* (CALM 1995) and the Australian Network for Plant Conservation translocation guidelines (Vallee *et al*. 2004). All translocation proposals require endorsement by Parks and Wildlife's Director of Science and Conservation. Monitoring of translocations is essential and will be included in the timetable developed for the Translocation Proposal.

Action:	Undertake and monitor translocations
Responsibility:	Parks and Wildlife (SCD, Albany District), BGPA
Cost:	$42,000 in years 1 and 2; and $26,500 in years 3–5 as required

11. Liaise with land managers and Aboriginal communities

Staff from Parks and Wildlife's Albany District will liaise with land managers to ensure that *Kunzea acicularis* is not accidentaly damaged or destroyed and the habitat is maintained in a suitable condition for the conservation of the species. Aboriginal consultation will take place to determine if there are any issues or interests in areas that are habitat for the species.

Action:	Liaise with land managers and Aboriginal communities
Responsibility:	Parks and Wildlife (Albany District)
Cost:	$4,000 per year

12. Map habitat critical to the survival of *Kunzea acicularis*

Although habitat critical to the survival of the species is alluded to in Section 1, it has not yet been mapped. If additional populations are located, habitat critical to their survival will also be determined and mapped.

Action:	Map habitat critical to the survival of *Kunzea acicularis*
Responsibility:	Parks and Wildlife (Species and Communities Branch (SCB), Albany District)
Cost:	$6,000 in year 2

13. Promote awareness

The importance of biodiversity conservation and the protection of *Kunzea acicularis* will be promoted by setting up poster displays, developing and distributing an information sheet and by developing formal links with local naturalist groups and interested individuals.

Action:	Promote awareness
Responsibility:	Parks and Wildlife (Albany District, SCB, Public Information and Corporate Affairs (PICA)), with assistance from the ADTFRT
Cost:	$7,000 in years 1 and 2; $5,000 in years 3–5

14. Review this plan and assess the need for further recovery actions

If *Kunzea acicularis* is still ranked as VU at the end of the five-year term of this plan the need for further recovery actions, or a review of this plan will be assessed and a revised plan prepared if necessary.

Action:	Review this plan and assess the need for further recovery actions
Responsibility:	Parks and Wildlife (SCB, Albany District)
Cost:	$6,000 in year 5

Table 4. Summary of recovery actions

Recovery action	Priority	Responsibility	Completion date
Coordinate recovery actions	High	Parks and Wildlife (Albany District), with assistance from the ADTFRT	Ongoing
Monitor population	High	Parks and Wildlife (Albany District), with assistance from the ADTFRT	Ongoing
Ensure long-term protection of habitat	High	Parks and Wildlife (Albany District, Land Unit), DOP, DMP	Ongoing
Determine the susceptibility of *Kunzea acicularis* to *Phytophthora cinnamomi*	High	Parks and Wildlife (Albany District, SCD)	2015
Undertake regeneration trials	High	Parks and Wildlife (SCD, Albany District)	2019
Develop and implement a fire management strategy	High	Parks and Wildlife (Albany District)	Developed by 2015 with implementation ongoing
Collect and store seed	High	Parks and Wildlife (Albany District, TFSC), BGPA	2019
Undertake surveys	High	Parks and Wildlife (Albany District),with assistance from the ADTFRT and volunteers	Ongoing
Obtain biological and ecological information	High	Parks and Wildlife (SCD, Albany District)	2017
Undertake and monitor translocations	Medium	Parks and Wildlife (SCD, Albany District), BGPA	2019
Liaise with land managers and Aboriginal communities	Medium	Parks and Wildlife (Albany District)	Ongoing
Map habitat critical to the survival of *Kunzea acicularis*	Medium	Parks and Wildlife (SCB, Albany District)	2016
Promote awareness	Medium	Parks and Wildlife (Albany District, SCB, PICA), with assistance from the ADTFRT	2019
Review this plan and assess the need for further recovery actions	Medium	Parks and Wildlife (SCB, Albany District)	2019

4. Term of plan

This plan will operate from June 2014 to May 2019 but will remain in force until withdrawn or replaced. If the species is still ranked VU after five years, the need for further recovery actions will be determined.

5. References

Department of Conservation and Land Management (1992) Policy Statement No. 44 *Wildlife Management Programs*. Department of Conservation and Land Management, Western Australia.

Department of Conservation and Land Management (1994) Policy Statement No. 50 *Setting Priorities for the Conservation of Western Australia's Threatened Flora and Fauna*. Department of Conservation and Land Management, Western Australia.

Department of Conservation and Land Management (1995) Policy Statement No. 29 *Translocation of Threatened Flora and Fauna*. Department of Conservation and Land Management, Western Australia.

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Vallee, L., Hogbin, T., Monks, L., Makinson, B., Matthes, M. and Rossetto, M. (2004) Guidelines for the Translocation of Threatened Australian Plants. Second Edition. *The Australian Network for Plant Conservation*. Canberra, Australia.

Western Australian Herbarium (1998–) *FloraBase – the Western Australian Flora*. Department of Parks and Wildlife. http://florabase.dpaw.wa.gov.au/.

6. Taxonomic description

Kunzea acicularis

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.

Shrub to 2m tall, with few erect stems each little- and irregularly- branched often with short branches; young branches with flanges indistinct and usually only along part of the internodes, densely covered with fine (long and short) spreading hairs; early bark longitudinally irregularly fissured, fibrous-peeling, grey. *Leaves*: *petiole* 0.3–0.7mm long, more or less appressed; *lamina* oblanceolate to elliptic-oblanceolate, (2.4–)3.5–6(–8.2) x (1.2–)1.5–2.2(–2.6)mm, obtuse to rounded, rarely acute when young, gradually constricted into petiole, concave with lateral margins more or less incurved or rarely flat above, slightly convex to ridged below, somewhat appressed on long shoots, spreading on short ones, densely covered with long fine hairs on both surfaces and spreading about right angles (60–90°) when mature. *Inflorescence* a botryum with (1–)3–5(–6) flowers, terminal on short or rarely on long shoots, with mainly terminal growth after flowering but sometimes especially on short shoots immediately branching above botryum; *perules* usually few and sometimes caducous, triangular often narrowly so, 1.8–2.5mm, pointed, with one central vein, densely covered outside with more or less spreading hairs; *bracts* narrowly triangular, 2.8–3.3(–3.5) x 0.9–1.3mm, pointed, usually with one vein from the base, more or less densely covered outside with spreading hairs but often wearing off towards the apex; *bracteoles* in pairs, linear-triangular to linear, 3.1–3.6 x 0.25–0.50mm, pointed, with one central vein, densely covered outside with long spreading hairs. *Hypanthium* 3.3–3.8mm long when flowering (free tube 1.4–2.2mm long), densely covered with spreading antrorse hairs. *Calyx lobes* triangular to triangular-lanceolate, 1.5–1.8 mm long, acute to pointed, margins slightly incurved, densely covered outside with long antrorse hairs, rarely becoming glabrous towards the apex. *Corolla lobes* orbicular, 3.3–4mm long, with claw almost absent, pink to mauve. *Stamens c.*26 in more than on whorl, usually longer than corolla lobes; *filaments* 4.9–6.8mm long; *anthers* 0.4–0.5mm long, with large subterminal gland. *Ovary* with 5 locules, surmounted by a style base partly sunk in to the upper surface; *placenta* a narrowly elliptic disc, little fleshy, with ascending attachment connected to middle, with lobes only connate on the outside margins each lobe with one row of ovules; *ovules* 9–12 per locule, spreading or lower ones pendulous and often slightly longer; *style* 5.8–6.6mm long, scarcely broadened towards the base; stigma capitate and little depressed at apex, often at a slight angle. *Fruit* an urceolate capsule, usually with 5 vertical ridges partly hidden in the tomentum, with calyx lobes spreading. *Seed* unknown.