Department of Parks and Wildlife

Interim Recovery Plan No. **349**

Diel's daviesia (*Daviesia dielsii*)

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:

BGPA	Botanic Gardens and Parks Authority
CALM	Department of Conservation and Land Management
CFF	Conservation of Flora and Fauna
CCWA	Conservation Commission of Western Australia
CITES	Convention on International Trade in Endangered Species
CR	Critically Endangered
CWDTFRT	Central Wheatbelt District Threatened Flora Recovery Team
DAA	Department of Aboriginal Affairs
DEC	Department of Environment and Conservation
DPaW	Department of Parks and Wildlife (also shown as Parks and Wildlife)
DRF	Declared Rare Flora
EN	Endangered
EPBC	Environment Protection and Biodiversity Conservation
IBRA	Interim Biogeographic Regionalisation for Australia
IRP	Interim Recovery Plan
IUCN	International Union for Conservation of Nature
LGA	Local Government Authority
MDTFRT	Moora District Threatened Flora and Recovery Team
MRWA	Main Roads WA
NACC	Northern Agricultural Catchment Council
NRM	Natural Resource Management
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
UCL	Unallocated Crown Land
UNEP-WCMC	United Nations Environment Program World Conservation Monitoring Centre
VU	Vulnerable
WA	Western Australia

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 (Parks and Wildlife). 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 Interim Recovery Plans (IRPs), and by ensuring that conservation action commences as soon as possible and, in the case of 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 Endangered (EN), this plan will be reviewed after five years and the need for further recovery actions assessed.

This plan was given regional approval on 16 June 2014 and was approved by the Director of Science and Conservation on 27 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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Cover photograph by Lorraine Duffy.

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Summary

Scientific name:	***Daviesia dielsii***	**NRM region:**	Northern Agricultural Catchment Council
Family:	Fabaceae		
Common name:	Diels' daviesia	**IBRA regions:**	Avon Wheatbelt, Swan Coastal Plain, Geraldton Sandplains
Flowering period:	July–August		
Shires:	Coorow, Moora, Dalwallinu	**IBRA subregions:**	Avon Wheatbelt, Dandaragan Plateau Lesueur Sandplain
DPaW regions:	Wheatbelt, Midwest		
DPaW districts:	Moora, Central Wheatbelt	**Recovery teams:**	MDTFRT, CWDTFR

Distribution and habitat: *Daviesia dielsii* is restricted to the Moora, Watheroo and Dalwallinu areas, growing in brown-grey sandy-loam over laterite and yellow sand with *Callitris arenaria*, *Allocasuarina campestris*, *Calothamnus quadrifidus*, *Leptospermum erubescens* and *Hakea scoparia* (Collins 2009).

Habitat critical to the survival of the species, and important populations: It is considered that all known habitat for wild populations is critical to the survival of the species and that the wild populations are important populations. Habitat critical to the survival of *D. dielsii* includes the area of occupancy of populations, areas of similar habitat surrounding and linking populations (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: *Daviesia dielsii* is specially protected under the Western Australian *Wildlife Conservation Act 1950* and is ranked as Endangered (EN) in Western Australia under International Union for Conservation of Nature (IUCN) 2001 criterion C1 due to less than 2,500 mature individuals being known in the wild and there being an estimated continuing decline of at least 20% within three years or one generation. The species is listed as Endangered (EN) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Threats: The main threats to the species are poor recruitment, road, track and firebreak maintenance, altered fire regimes, weeds, rabbits, grazing and mining.

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. All land managers have been made aware of this species and its locations.
2. Extensive surveying has occurred over the last 20 years.
3. DRF markers have been installed at Populations 1, 6, 7, 8, 10, 12, 13 and 15.
4. Private property containing Populations 3 and 9 was gazetted as a Nature Reserve in 2004.
5. 268 seeds collected from *Daviesia dielsii* are 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 14 to 15 or more over the term of the plan and/or
- The number of mature individuals has increased by 20% or more over the term of the plan from 538 to 645 or more.

Criteria for recovery failure:

- The number of extant populations has decreased from 14 to 13 or less over the term of the plan and/or
- The number of mature individuals has decreased by 20% or more over the term of the plan from 538 to 431 or less.

Recovery actions

1. Coordinate recovery actions
2. Monitor populations
3. Fence Population 5
4. Undertake regeneration trials
5. Undertake weed control
6. Protect plants from herbivory
7. Undertake surveys
8. Develop and implement a fire management strategy
9. Collect and store seed
10. Ensure long-term protection of habitat
11. Obtain biological and ecological information
12. Develop and implement translocations
13. Liaise with land managers and Aboriginal communities
14. Map habitat critical to the survival of *Daviesia dielsii*
15. Promote awareness
16. Review this plan and assess the need for further recovery actions

1. Background

History

Daviesia dielsii was named by Ernst Pritzel in 1904 from specimens he collected near Moora, the specific name being in honour of Friedrich Diels who collected widely in Western Australia between 1900 and 1901 (Collins 2009). As the type specimen which had been stored in the Berlin herbarium was thought to have been destroyed during the Second World War, Crisp designated a replacement specimen in 1995.

Daviesia dielsii has in the past been collected north of Marchagee. However, extensive surveys have failed to relocate plants in that area, suggesting a decline in the extent of occurrence.

Daviesia dielsii is currently known from 19 populations, 13 of which are located on road reserves that have little or no natural habitat and are infested with weeds. Many mature plants are senescing with little natural recruitment occurring and five of the 19 populations no longer have extant plants. Total mature plant numbers have nearly halved since 1991, with numbers declining from 835 to 466 individuals over that time.

Prior to its gazettal as a Nature Reserve in 2004, Populations 3 and 9 were subject to mining and a number of *Daviesia dielsii* plants were removed during operations. No mining has occurred since the area was made into a Nature Reserve. This area also contains the Coomberdale Chert Hills Threatened Ecological Community (TEC).

Description

Daviesia dielsii is a medium shrub to 90cm high by 1.8m wide. The branches are somewhat spiny and have densely hairy branchlets and phyllodes. The phyllodes are flattened and obliquely oval, have a sharp point, are small, 2 to 4mm by 1 to 3mm, and have one or two prominent nerves. The flowers are also small and are borne singly in the axils of the upper phyllodes. Each flower has calyx lobes that are much shorter than the tube. The floral whorl is 5 to 6mm long. The outer part of the standard petal is orange or orange red, and the inner part and the wings and keel are a dark red. The fruit is a triangular pod, about 1mm long and has convex valves (Brown *et al*. 1998).

Illustrations and/or further information

Brown, A., Thompson-Dans, C. and Marchant, N. (eds) (1998) *Western Australia's Threatened Flora*. Department of Conservation and Land Management, Western Australia; Collins, J. (2009) Threatened Flora of the Western Central Wheatbelt. Department of Environment and Conservation, WA; Western Australian Herbarium (1998–) *FloraBase – The Western Australian Flora*. Department of Parks and Wildlife. http://florabase.dec.wa.gov.au/.

Distribution and habitat

Daviesia dielsii is endemic to Western Australia where it is restricted to the Moora, Watheroo and Dalwallinu areas. It grows in brown and gray sandy loam with chert over laterite and yellow sand with *Callitris arenaria*, *Allocasuarina campestris*, *Calothamnus quadrifidus*, *Leptospermum erubescens* and *Hakea scoparia* (Collins 2009).

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

Population number & location	Parks and Wildlife district	Shire	Vesting	Purpose	Manager
1. W of Dalwallinu	Central Wheatbelt	Dalwallinu	LGA	Road reserve	Shire of Dalwallinu
2. E of Watheroo	Moora	Moora	LGA	Road reserve	Shire of Moora
3. NE of Moora	Moora	Moora	CCWA	CFF	Parks and Wildlife
4. NE of Watheroo	Moora	Moora	CCWA	CFF	Parks and Wildlife
5. NE of Watheroo	Moora	Moora	Private property		Landowners
6. S of Marchagee	Moora	Coorow	LGA	Road reserve	Shire of Coorow
7. S of Marchagee	Moora	Coorow	MRWA	Road reserve	MRWA
8. NE of Watheroo	Moora	Moora	LGA	Road reserve	Shire of Moora
9. NE of Moora	Moora	Moora	CCWA	CFF	Parks and Wildlife
10. SW of Coomberdale	Moora	Moora	LGA	Road reserve	Shire of Moora
11. NW of Coomberdale	Moora	Moora	LGA	Road reserve	Shire of Moora
12. NW of Coomberdale	Moora	Moora	LGA	Road reserve	Shire of Moora
13. SE of Watheroo	Moora	Moora	LGA	Road reserve	Shire of Moora
14. NE of Moora	Moora	Moora	Private property		Landowners
15. W of Dalwallinu	Moora	Moora	LGA	Road reserve	Shire of Moora
16. NE of Moora	Moora	Moora	Private property	Quarry	Landowners
17. SE of Marchagee	Moora	Coorow	LGA	Road reserve	Shire of Coorow
18. N of Lake Edawa	Moora	Moora	LGA	Road Reserve	Shire of Moora
19. SE of Lake Edawa	Moora	Moora	LGA	Road Reserve	Shire of Moora

Biology and ecology

The biology and ecology of the species is little known and recovery actions refer to a need for research.

Germination of *Daviesia dielsii* is thought to be triggered by disturbance events (physical or fire). It is often found growing along road verges and recruitment at Population 5 followed a fire in 1993.

Conservation status

Daviesia dielsii is specially protected under the Western Australian *Wildlife Conservation Act 1950* and is ranked as Endangered (EN) in Western Australia under International Union for the Conservation of Nature (IUCN) 2001 criterion C1 due to less than 2,500 mature individuals being known in the wild and there being an estimated continuing decline of at least 20% within three years or one generation. The species is listed as EN under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Threats

- **A reduction of factors positively influencing reproduction.** These include a lack of natural fire and disturbance in the habitat of the species.
- **Road, track and firebreak maintenance.** Threats to populations 2, 5, 6, 10, 11, 12, 13, 15 and 17 include grading, chemical spraying, construction of drainage channels and mowing of roadside vegetation.
- **Altered fire regimes.** Frequent fire may deplete the soil seed store and a lack of fire may result in little or no natural recruitment.
- **Habitat degradation and weeds.** The majority of road verge areas that contain populations of *Daviesia dielsii* have little or no remaining natural habitat and are infested with weeds.
- **Rabbits.** These are a threat to populations 3, 5, 6, 9, 10, 12 and 13.
- **Grazing.** The remnant vegetation in which Population 5 occurs is not fenced and is possibly being grazed.
- **Mining.** A waste dump extension is proposed for the private property area containing Population 16 and may result in the loss of habitat.

The intent of this plan is to provide actions that will mitigate immediate threats to *Daviesia dielsii*. 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.

Table 2. Summary of population information and threats

Population number & location	Land status	Year / no. of plants		Current condition	Threats
1. W of Dalwallinu	Road reserve	1980 2003 2005	Not recorded 1 1	Disturbed	Road maintenance, weeds, rabbits, altered fire regimes
2. E of Watheroo	Road reserve	1980 1997 2008	Not recorded 15 0	Disturbed	Road maintenance, weeds, altered fire regimes
3. NE of Moora	Nature reserve	1990 1991 2008	Not recorded 700 350	Healthy	Weeds, rabbits, altered fire regimes
4. NE of Watheroo	Nature reserve	1991 2008	<100 0		
5. NE of Watheroo	Private property	1993 2005 2008	20+ 50+ 82	Healthy	Road and firebreak maintenance, grazing (sheep), weeds, rabbits, altered fire regimes
6. S of Marchagee	Road reserve	1996 2008	10+ 3	Disturbed	Road maintenance, weeds, rabbits, altered fire regimes
7. S of Marchagee	MRWA road reserve	1996 2008	8 0	Moderate	Road maintenance, weeds, altered fire regimes
8. NE of Watheroo	Road reserve	1996 2005 2008	4 1 0	Moderate	Road maintenance, weeds, altered fire regimes
9. NE of Moora	Nature reserve	1997 2008	3 3	Disturbed	Weeds, rabbits, altered fire regimes
10. SW of Coomberdale	Road reserve	1997 2000 2008	14 21 9	Disturbed	Road maintenance, weeds (wild raddish), rabbits, altered fire regimes
11. NW of Coomberdale	Road reserve	1997 2008	2 0	Poor	Weeds (wild raddish), road maintenance, altered fire regimes
12. NW of	Road reserve	1997	12	Poor	Road maintenance, weeds (wild

Coomberdale		2007 2008	11 8		raddish), rabbits, altered fire regimes
13. SE of Watheroo	Road reserve	1997 2008	3 1	Poor	Road and firebreak maintenance, weeds, rabbits, altered fire regimes
14. NE of Moora	Private property	1999	2	Healthy	
15. W of Dalwallinu	Road reserve	2008	9	Disturbed	Road maintenance, weeds, altered fire regimes
16. NE of Moora	Private property	2000	unknown		Mining, altered fire regimes
17. SE of Marchagee	Road reserve	2007	1	Disturbed	Road maintenance, weeds, altered fire regimes
18. N of Lake Edawa	Road reserve	2012	70	Disturbed	Road maintenance, weeds, altered fire regimes
19. SE of Lake Edawa	Road reserve	2012	2	Disturbed	Road maintenance, weeds, altered fire regimes

Note: Populations in **bold text** are considered to be important populations.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Actions for development and/or land clearing in the immediate vicinity of *Daviesia dielsii* may require assessment.

Actions that could result in any of the following may potentially result in a significant impact on the species:

- Damage or destruction of occupied or potential habitat
- Alteration of the local surface hydrology or drainage
- Reduction in population size
- A major increase in disturbance in the vicinity of a population.

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

It is considered that all known habitat for wild populations is critical to the survival of the species and that the wild populations are important populations. Habitat critical to the survival of *Daviesia dielsii* includes the area of occupancy of populations, areas of similar habitat surrounding and linking populations (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 *Daviesia dielsii* will also improve the status of associated native vegetation. Nine DRF species and 12 priority flora taxa occur within 500 m of *D. dielsii* (see table below).

Table 3. Conservation listed flora species found within 500m of *Daviesia dielsii*

Species name	Conservation status (WA)	Conservation status (EPBC Act)
Acacia vassalii	DRF (CR)	EN
Jacksonia pungens	DRF (CR)	EN
Acacia aristulata	DRF (EN)	EN
Eucalyptus pruiniramis	DRF (EN)	EN
Gastrolobium appressum	DRF (EN)	VU
Goodenia arthrotricha	DRF (EN)	
Grevillea christineae	DRF (EN)	EN
Synaphea quartzitica	DRF (EN)	EN
Eucalyptus rhodantha var. *rhodantha*	DRF (VU)	VU
Acacia congesta subsp. *cliftoniana*	Priority 1	
Gompholobium roseum	Priority 2	
Scholtzia sp. Gunyidi (J.D. Briggs 1721)	Priority 2	
Stylidium sp. Moora (J.A. Wege 713)	Priority 2	
Tricoryne sp. Wongan Hills (B.H. Smith 794)	Priority 2	
Acacia lirellata subsp. *lirellata*	Priority 3	
Austrostipa sp. Cairn Hill (M.E. Trudgen 21176)	Priority 3	
Baeckea sp. Moora (R. Bone 1993/1)	Priority 3	
Banksia dallanneyi subsp. *pollosta*	Priority 3	
Lechenaultia juncea	Priority 3	
Eucalyptus rhodantha var. *petiolaris*	Priority 4	
Regelia megacephala	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

Daviesia dielsii populations 3, 9, 14 and 16 occur within the Coomberdale Chert Hills Threatened Ecological Community (TEC) which is listed as EN in Western Australia (for a description of TEC categories see DEC 2010). This plan will be implemented in conjunction with the TEC plan for 'Heath dominated by one or more of *Regelia megacephala*, *Kunzea praestans* and *Allocasuarina campestris* on ridges and slopes of the chert hills of the Coomberdale Floristic Region' (Hamilton-Brown 2000).

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 Convention on International Trade in Endangered Species 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 two sites of Aboriginal significance that are adjacent to Population 16 of *Daviesia dielsii*. These include site #4658 (Kiaka Brook 1; artefacts; open site) and #4659 (Kiaka Brook 2; artefacts, open). 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. Indigenous 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

The implementation of this recovery plan may result in some social and economic impact. For populations occurring on private property (populations 5, 14 and 16) this may be through the loss of land available for agriculture, mining and gravel extraction, and the cost of implementing recovery actions (maintaining fencing, undertaking weed control). For land under the management of the Shires of Moora, Coorow and Dalwallinu (populations 1, 2, 6, 8, 10, 11, 12, 13, 15 and 17), and Main Roads Western Australia (MRWA) (Population 7) social and economic impact may be through the implementation of recovery actions (controlling weeds) and restrictions imposed on the management of the land, including maintenance of the road infrastructure.

Affected interests

The implementation of this plan has some implications for private landholders, the Shires of Dalwallinu, Moora and Coorow, and MRWA, particularly where populations occur on lands not specifically managed for conservation.

Evaluation of the plan's performance

Parks and Wildlife, with assistance from the Moora District Threatened Flora Recovery Team (MDTFRT) and the Central Wheatbelt District Threatened Flora Recovery Team (CWDTFRT), 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 five 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 14 to 15 or more over the term of the plan and/or
- The number of mature individuals has increased by 20% or more over the term of the plan from 538 to 645 or more.

Criteria for recovery failure:
- The number of extant populations has decreased from 14 to 13 or less over the term of the plan and/or
- The number of mature individuals has decreased by 20% or more over the term of the plan from 538 to 431 or less.

3. Recovery actions

Existing recovery actions

Land managers have been made aware of the existence of this species and its locations. These notifications detail the current status of the species as DRF and the associated legal obligations in regards to their protection.

There has been extensive survey for the taxon over the last 20 years including:

- Survey by Parks and Wildlife Moora District staff in the late 1980's.
- Survey between 1975 and 1980 by National Botanic Gardens during the revision of the genus *Daviesia*.
- Surveying by Parks and Wildlife from 1990 to 1994 during preparation of the Moora District Wildlife Management Program (Patrick and Brown 2001).
- In 1991, a floristic survey of remnant vegetation in the Bindoon to Moora area by Parks and Wildlife.
- From 1996 to 1997, five days surveying for the taxon by Parks and Wildlife.
- In October 1997, survey of a large area of remnant vegetation on private property by Parks and Wildlife.
- Survey of seven Nature Reserves and National Parks in 1997 in the region of known populations.
- Survey of the mining lease at Population 3 by a consultant botanist in the 2001 and 2003/2004 flowering seasons.

- Survey of remnant vegetation in the Marchagee Catchment for the Marchagee Catchment Group of the Coorow Land Conservation District in 2000 (Davies and Ladd).

Declared Rare Flora (DRF) markers have been installed at populations 1, 6, 7, 8, 10, 12, 13 and 15. These alert people working in the vicinity to the presence of DRF and the need to avoid work that may damage the species or its habitat. Dashboard stickers and posters describing the significance of DRF markers have been produced and distributed to relevant Shires and other organisations.

Private property containing Populations 3 and 9 was gazetted as a Nature Reserve in 2004.

Two hundred and sixty eight seeds collected from *Daviesia dielsii* are stored in Parks and Wildlife's Threatened Flora Seed Centre (TFSC) at –18°C (see table 4). Some seed has been processed and the germination rate was 70%.

Table 4. Threatened Flora Seed Centre collection details for *Daviesia dielsii*

Accession number	Date collected	Population number	Collection type	Seeds/follicles in storage	Germination rate (%)
01319	11/12/2003, 20/01/2004	?	I/1,I2	21 seeds	n/a
01626	20/12/2004	?	I/14	102 seeds, 13 seeds	n/a
02050	1/12/2004	?	?	81 seeds	70
02560	27/11/2007, 17/12/2007	?	I/2,I/4	20 seeds	n/a
02665	17/12/2007	12	I/3	31 seeds	n/a

Note: 'I' = a collection of individuals and the number of plants collected; 'B' = a bulked collection and the number of plants sampled

Future recovery actions

Parks and Wildlife is overseeing the implementation of this plan and, with the assistance of the MDTFRT and CWDTFRT, 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 will coordinate recovery actions for *Daviesia dielsii* and, with assistance from the MDTFRT and CWDTFRT, will 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 (Moora and Central Wheatbelt Districts) with assistance from the MDTFRT and CWDTFRT
Cost:	$8,000 per year

2. Monitor populations

All populations will be inspected with accurate counts undertaken and locational information recorded. Monitoring of factors such as grazing, weed invasion, habitat degradation, hydrology (including salinity), population stability (expansion or decline), pollinator activity, seed production, recruitment, and longevity will also be undertaken.

Action:	Monitor populations
Responsibility:	Parks and Wildlife (Moora and Central Wheatbelt Districts), with assistance from the MDTFRT and CWDTFRT
Cost:	$8,000 per year

3. Fence Population 5

Agreement will be sought to fence Population 5 on private property to protect *Daviesia dielsii* from grazing by stock and farming practices. Agreement will be sought to install fencing and funding assistance may be obtained through Parks and Wildlife's covenanting program if the landowner is agreeable to the protection of the land under a conservation agreement.

Action:	Fence Population 5
Responsibility:	Parks and Wildlife (Moora District)
Cost:	$20,000 in year 1

4. Undertake regeneration trials

Natural disturbance events (physical or fire) may be the most effective means of germinating *Daviesia dielsii* in the wild. Different disturbance techniques should be investigated (i.e. soil disturbance and fire), to determine the most successful and appropriate method. As well as the known population sites, trials will also be carried out at historical locations. Records will need to be maintained for future research. Any disturbance trials will need to be undertaken in conjunction with weed control.

Action:	Undertake regeneration trials
Responsibility:	Parks and Wildlife (Science and Conservation Division (SCD), Moora and Central Wheatbelt Districts)
Cost:	$10,000 in years 1 and 3, $4,000 in years 2, 4 and 5

5. Undertake weed control

Weeds are a potential threat to all populations and control may be required. The following actions will be implemented:

1. Determine which weeds are present and map them.
2. Select appropriate control technique; herbicide, mowing or hand weeding.
3. Control invasive weeds by hand removal and/or spot spraying around the *Daviesia dielsii* plants when weeds first emerge.
4. Revegetation with site-specific species is required (in Autumn) to maintain low weed levels.
5. Monitor the success of the treatment on weed death, and the tolerance of *Daviesia dielsii* and associated native plant species to the weed control treatment.
6. Report on the method and success of the threatment, and effect on *Daviesia dielsii* plants and associated species.

Action:	Undertake weed control
Responsibility:	Parks and Wildlife (Moora and Central Wheatbelt Districts), Shires of Moora, Coorow and Dalwallinu
Cost:	$10,000 per year, as required

6. Protect plants from herbivory

The level of threat posed by rabbits may vary from year to year with conditions and numbers. When monitoring ascertains the threat is high, baiting for rabbits using 1080 oats should be undertaken in summer months when less green feed is available as an alternative food source. Protective cages or fencing should be considered if rabbit baiting is not sufficient protection for individual plants or grazing increases.

Action:	Protect plants from herbivory
Responsibility:	Parks and Wildlife (Moora District), Shires of Moora and Coorow
Cost:	$15,000 in years 1, 3 and 5

7. Undertake surveys

It is recommended that areas of potential suitable habitat be surveyed for the presence of *Daviesia dielsii* during the flowering period from July to August. 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 from the local community, Landcare groups, wildflower societies and naturalists clubs will be encouraged to be involved.

Action:	Undertake surveys
Responsibility:	Parks and Wildlife (Moora and Central Wheatbelt Districts) with assistance from the MDTFRT, CWDTFRT and volunteers
Cost:	$10,000 per year

8. Develop and implement a fire management strategy

Fire will be prevented from occurring in the habitat of the populations, except where it is being used experimentally as a recovery tool. 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 (Moora and Central Wheatbelt Districts)
Cost:	$10,000 in year 1,and $6,000 in years 2–5

9. Collect and store seed

Preservation of genetic material is essential to guard against extinction of the species if the wild populations are lost. It is recommended that seed be collected and stored in Parks and Wildlife's Threatened Flora Seed Centre (TFSC) and Botanic Gardens and Parks authority (BGPA).

Action:	Collect and store seed
Responsibility:	Parks and Wildlife (Moora and Central Wheatbelt Districts, TFSC), BGPA
Cost:	$10,000 per year

10. Ensure long-term protection of habitat

Parks and Wildlife will liaise with the landowners of Population 16 to seek to achieve long term protection of the habitat supporting *Daviesia dielsii*, such as through a conservation covenant placed on the area.

Action:	Ensure long-term protection of habitat
Responsibility:	Parks and Wildlife (Moora District, SCB Nature Conservation Covenant Program and Land Unit)
Cost:	$4,000 in year 1

11. Obtain biological and ecological information

Increased knowledge of the biology and ecology of the species will provide a scientific basis for management of *Daviesia dielsii* in the wild. Investigations will ideally include:

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

Action:	Obtain biological and ecological information
Responsibility:	Parks and Wildlife (SCD, Moora and Central Wheatbelt Districts)
Cost:	$50,000 in years 1–3

12. Develop and implement translocations

Translocation may be deemed desirable for the conservation of this species. 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:	Develop and implement translocations
Responsibility:	Parks and Wildlife (SCD, Moora and Central Wheatbelt Districts), BGPA
Cost:	$42,000 in years 1–2; and $26,500 in years 3–5 as required

13. Liaise with land managers and Aboriginal communities

Staff from Parks and Wildlife's Moora and Central Wheatbelt Districts will liaise with appropriate land managers to ensure that populations of *Daviesia dielsii* are not accidentaly damaged or destroyed, and the habitat is maintained in a suitable condition for the conservation of the species. Indigenous 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 (Moora and Central Wheatbelt Districts)
Cost:	$4,000 per year

14. Map habitat critical to the survival of *Daviesia dielsii*

It is a requirement of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) that spatial data relating to habitat critical to the survival of the species be determined. Although this habitat is alluded to in Section 1, it has not yet been mapped and will be addressed under this action. If additional populations are located, then habitat critical to the survival of the species will be determined and mapped for these locations also.

Action:	Map habitat critical to the survival of *Daviesia dielsii*
Responsibility:	Parks and Wildlife (SCB, Moora and Central Wheatbelt Districts)
Cost:	$6,000 in year 2

15. Promote awareness

The importance of biodiversity conservation and the protection of *Daviesia dielsii* will be promoted to the public. This will be achieved through an information campaign using local print and electronic media and by setting up poster displays. An information sheet, which includes a description of the plant, its habitat type, threats, management actions and photos will be produced. Formal links with local naturalist groups and interested individuals will also be encouraged.

Action:	Promote awareness
Responsibility:	Parks and Wildlife (Moora and Central Wheatbelt Districts, SCB and Public Information and Corporate Affairs (PICA), with assistance from the MDTFRT and CWDTFRT
Cost:	$7,000 in years 1–2; $5,000 in years 3–5

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

If *Daviesia dielsii* is still ranked EN 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, Moora and Central Wheatbelt Districts)
Cost:	$6,000 in year 5

Table 5. Summary of recovery actions

Recovery action	Priority	Responsibility	Completion date
Coordinate recovery actions	High	Parks and Wildlife (Moora and Central Wheatbelt Districts), with assistance from the MDTFRT and CWDTFRT	Ongoing
Monitor populations	High	Parks and Wildlife (Moora and Central Wheatbelt Districts), with assistance from the MDTFRT and CWDTFRT	Ongoing
Fence Population 5	High	Parks and Wildlife (Moora District)	2014
Undertake regeneration trials	High	Parks and Wildlife (SCD, Moora and Central Wheatbelt Districts)	2019
Undertake weed control	High	Parks and Wildlife (Moora and Central Wheatbelt Districts), Shires of Moora, Coorow and Dalwallinu	Ongoing
Protect plants from herbivory	High	Parks and Wildlife (Moora District), Shires of Moora and Coorow	Ongoing
Undertake surveys	High	Parks and Wildlife (Moora and Central Wheatbelt Districts), with assistance from the MDTFRT, CWDTFRT and volunteers	Ongoing
Develop and implement a fire management strategy	High	Parks and Wildlife (Moora and Central Wheatbelt Districts)	Developed by 2014, implementation ongoing
Collect and store seed	High	Parks and Wildlife (Moora and Central Wheatbelt Districts, TFSC), BGPA	2018
Ensure long-term protection of habitat	High	Parks and Wildlife (Moora District, SCB)	2014
Obtain biological and ecological information	High	Parks and Wildlife (SCD, Moora and Central Wheatbelt Districts)	2016
Develop and implement translocations	High	Parks and Wildlife (SCD, Moora and Central Wheatbelt Districts), BGPA	2019
Liaise with land managers and Aboriginal communities	High	Parks and Wildlife (Moora and Central Wheatbelt Districts)	Ongoing
Map habitat critical to the survival of *Daviesia dielsii*	Medium	Parks and Wildlife (SCB, Moora and Central Wheatbelt Districts)	2015
Promote awareness	Medium	Parks and Wildlife (Moora and Central Wheatbelt Districts, SCB and PICA), with assistance from the MDTFRT and CWDTFRT	Ongoing
Review this plan and assess the need for further recovery actions	Medium	Parks and Wildlife (SCB, Moora and Central Wheatbelt Districts)	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 EN after five years, the need for further recovery actions will be determined.

5. References

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6. Taxonomic description

***Daviesia dielsii* E.Pritz.**

From: Collins, J. (2009) Threatened Flora of the Western Central Wheatbelt. Department of Environment and Conservation, WA.

Erect and intricately branched shrub, 0.5 to 0.9m high. Stems are covered in dense hairs. Leaves are small, flattened, obliquely oval, usually densely hairy, 2 to 4mm long and 1 to 3mm wide, with 1 to 2 prominent nerves and a sharp point. Flowers are small, orange and red peas, and have a floral whorl 5 to 6mm long with the calyx lobes shorter than the tube. The flowers are borne singularly in the axils of the upper phyllodes. The fruit have triangular pods, are about 1mm long and have convex valves.