INTERIM RECOVERY PLAN NO. 124

PINNATE-LEAVED EREMOPHILA

(*EREMOPHILA PINNATIFIDA* MS)

INTERIM RECOVERY PLAN

2002-2007

Gillian Stack and Andrew Brown

Photograph: A. Brown

October 2002

Department of Conservation and Land Management
Western Australian Threatened Species and Communities Unit (WATSCU)
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Natural Heritage Trust
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Government of Western Australia

DEPARTMENT OF Conservation AND LAND MANAGEMENT
Conserving the nature of WA

FOREWORD

Interim Recovery Plans (IRPs) are developed within the framework laid down in Department of Conservation and Land Management (the Department) Policy Statements Nos. 44 and 50.

IRPs 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.

The Department is committed to ensuring that Critically Endangered taxa are conserved through the preparation and implementation of Recovery Plans or Interim Recovery Plans and by ensuring that conservation action commences as soon as possible and always within one year of endorsement of that rank by the Minister.

This Interim Recovery Plan will operate from October 2002 to September 2007 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked Critically Endangered, this IRP will be reviewed after four years and the need for a full Recovery Plan assessed.

This IRP was approved by the Director of Nature Conservation 20 June 2003. The provision of funds identified in this Interim Recovery Plan is dependent on budgetary and other constraints affecting the Department, as well as the need to address other priorities.

Information in this IRP was accurate at October 2002.

SUMMARY

Scientific Name:	*Eremophila pinnatifida*	**Common Name:**	Pinnate-leaved Eremophila
Family:	Myoporaceae	**Flowering Period:**	September – late January
Dept Region:	Wheatbelt	**Dept District:**	Merredin
Shire:	Dalwallinu	**Recovery Team:**	Merredin Threatened Flora Recovery Team (MDTFRT)

Illustrations and/or further information: A. Brown, C. Thomson-Dans and N. Marchant (Eds) (1998) *Western Australia's Threatened Flora*

Current status: *Eremophila pinnatifida* ms was Declared as Rare Flora in November 1997, and ranked as Critically Endangered (CR) in November 1998. It currently meets World Conservation Union (IUCN, 2000) Red List Category 'CR' under criteria B1ab(iii)+2ab(iii) due to the severe fragmentation of populations and continuing decline in the quality of its habitat. The main threats are housing development, road maintenance, erosion, weeds, degraded habitat and inappropriate fire regimes.

Critical habitat: The critical habitat for *Eremophila pinnatifida* ms comprises the area of occupancy of the known populations; similar habitat within 200 metres of known populations; remnant vegetation that links populations and additional nearby occurrences of similar habitat that do not currently contain the species but may have done so and may be suitable for translocations.

Habitat critical to the survival of the species, and important populations: Given that this species is listed as Critically Endangered it is considered that all known habitat for wild and translocated populations is habitat critical.

Benefits to other species/ecological communities: There are no ecological communities or other threatened species in the immediate vicinity of *Eremophila pinnatifida* ms. However, recovery actions implemented to improve the quality or security of the habitat of the species, such as weed control and rehabilitation, will benefit the habitat in which it occurs.

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. However, as *Eremophila pinnatifida* ms is not listed under any international agreement, the implementation of other international environmental responsibilities is not affected by this plan.

Role and interests of indigenous people: There are no known indigenous communities interested or involved in the management of areas affected by this plan. Therefore no role has been identified for indigenous communities in the recovery of this species.

Social and economic impacts: The implementation of this recovery plan is unlikely to cause significant adverse social and economic impacts. One population of *Eremophila pinnatifida* ms occurs in an area of Shire land that had been set aside for possible future housing development However, negotiations between relevant parties have ensured that the area directly supporting this species will be set aside as Public Open Space, and subsequently vested in the Conservation Commission for the purpose of Conservation.

Evaluation of the Plans Performance: The Department of Conservation and Land Management, in conjunction with the Recovery Team will evaluate the performance of this IRP. In addition to annual reporting on progress with listed actions and comparison against the criteria for success and failure, the plan is to be reviewed within five years of its implementation.

Habitat requirements: *E. pinnatifida* ms occurs in tall open *Eucalyptus salmonophloia* and *E. loxophleba* woodland over sparse mixed shrubland of *Santalum acuminatum*, *Eremophila drummondii* and *Acacia* species over mixed chenopods and perennial grass on brown clay loams. Plants occur in highly disturbed situations on road verges and on a Shire Reserve. *E. pinnatifida* ms is endemic to the Dalwallinu area of Western Australia.

Existing Recovery Actions: The following recovery actions have been or are currently being implemented –

1. Land managers have been made aware of the location and threatened status of the species.
2. Declared Rare Flora markers have been installed at Populations 2 and 3.
3. Approximately 1300 seeds from Populations 1a and 3 are stored in the Department's Threatened Flora Seed Centre.
4. The Botanic Garden and Parks Authority (BGPA) currently hold 13 living plants of *E. pinnatifida* ms from five clones.

5. BGPA also hold several clones as tissue cultured material.
6. Weed control has commenced at Populations 1 and 2.
7. Roadwork completed near Population 2 without damage.
8. Assessment of erosion at Population 3.
9. An information sheet describing and illustrating this species has been produced.
10. Staff from the Department's Merredin District regularly monitor populations of the species.
11. The Merredin District Threatened Flora Recovery Team is overseeing the implementation of this IRP and will include information on progress in an annual report to the Department's Corporate Executive and funding bodies.

IRP Objective: The objective of this Interim Recovery Plan is to abate identified threats and maintain or enhance *in situ* populations to ensure the long-term preservation of the species in the wild.

Recovery criteria

Criteria for success: The number of individuals within populations and/or the number of populations have increased by 10% or more.

Criteria for failure: The number of individuals within populations and/or the number of populations have decreased by 10% or more.

Recovery actions

1. Coordinate recovery actions
2. Undertake weed control
3. Stimulate germination of soil-stored seed
4. Achieve long-term protection of habitat
5. Establish nature reserve
6. Collect seed and cutting material
7. Conduct further surveys
8. Monitor populations
9. Develop and implement a fire management strategy
10. Obtain biological and ecological information
11. Start translocation process
12. Promote awareness
13. Review the need for a full Recovery Plan

1. BACKGROUND

History

R. Chinnock discovered this species near Dalwallinu in 1990 and counted a total of 35 plants. Despite further searches over several years no more plants were found until 1996, when G. Richmond conducted a survey in the Dalwallinu townsite on behalf of Main Roads Western Australia (MRWA), with reference to a proposed Dalwallinu by-pass. He found an additional population of two plants within the Dalwallinu townsite, in an area where roadworks were proposed. In January 1997, Merredin District staff and G. Richmond surveyed existing populations and all similar habitat on road and other reserves within a 15 km radius of Dalwallinu. They did not find any more plants, but established that the original population had declined from 35 to six plants (no plants remained in 2000 and this population is now considered extinct). A third population was found in October 1998 by A. Brown of the Western Australian Threatened Species and Communities Unit (WATSCU). This road reserve population contains 14 plants in very degraded habitat that is being eroded by water running off the adjacent road.

Fortunately, further populations have since been found which contain a much larger numbers of plants, but both occur at sites vulnerable to a range of threats. In 2001, Subpopulation 1b was discovered and comprises some 200 mature plants and 170 juveniles (all 355 are mature in 2002 and 15 have died). This population is in an area subject to a housing development proposal and is extremely degraded and weedy. Population 4 (discovered by A. Brown) contained 78 plants in 2001 and occurs on a narrow, weedy road verge.

Description

Eremophila pinnatifida ms is an erect rounded shrub to approximately one metre tall. Leaves are in whorls of three and are deeply lobed - the source of the specific name. The flower tube is pale to deep purple and pubescent outside, and white with pale purple spots inside. The species is allied to *E. ternifolia* and *E. koobabbiensis* ms. Like these species it has leaves in whorls of three and a similarly structured fruit, but differs from *E. ternifolia* and other related species such as *E. sargentii* and *E. verticillata* by its diagnostic lobed leaves and the prominent pubescence on its branches and leaves. It differs from *E. koobabbiensis* in its larger flowers and more prominently lobes leaves.

Distribution and habitat

E. pinnatifida ms appears to be endemic to the Dalwallinu area where it is known from four populations with a combined total of 464 mature plants. The species occurs in areas of tall open *Eucalyptus salmonophloia* and *E. loxophleba* woodland over sparse mixed shrubland of *Santalum acuminatum*, *Eremophila drummondii* and *Acacia* species over mixed chenopods and perennial grass on brown clay loams.

Critical habitat

Critical habitat is habitat identified as being critical to the survival of a listed threatened species or listed threatened ecological community. Habitat is defined as the biophysical medium or media occupied (continuously, periodically or occasionally) by an organism or group of organisms or once occupied (continuously, periodically or occasionally) by an organism, or group of organisms, and into which organisms of that kind have the potential to be reintroduced. (*Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)).

The critical habitat for *Eremophila pinnatifida* ms comprises:

- the area of occupancy of known populations;
- areas of similar habitat within 200 metres of known populations, i.e. tall open woodland over sparse mixed shrubland on brown clay loams (these provide potential habitat for natural recruitment);
- corridors of remnant vegetation that link populations (these are necessary to allow pollinators to move between populations and are usually road and rail reserves);
- additional occurrences of similar habitat that do not currently contain the species but may have done so in the past (these represent possible translocation sites).

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

Given that this species is listed as Critically Endangered it is considered that all known habitat for wild and any translocated populations is habitat critical.

Benefits to other species/ecological communities

There are no threatened ecological communities or other threatened species in the immediate vicinity of *Eremophila pinnatifida* ms. However, recovery actions implemented to improve the quality or security of the habitat of the species, such as weed control and rehabilitation, will benefit the remnant bushland habitat in which it occurs.

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. However, as *Eremophila pinnatifida* ms is not listed under any international agreement, the implementation of other international environmental responsibilities is not affected by this plan.

Role and interests of indigenous people

There are no known indigenous communities interested or involved in the management of areas affected by this plan. Therefore no role has been identified for indigenous communities in the recovery of this species.

Social and economic impacts

The implementation of this recovery plan is unlikely to cause significant adverse social and economic impacts. One population of *Eremophila pinnatifida* ms occurs in an area of Shire land that had been set aside for possible future housing development However, negotiations between relevant parties have ensured that the area directly supporting this species will be set aside as Public Open Space, and subsequently vested in the Conservation Commission for the purpose of Conservation..

Evaluation of the Plans Performance

The Department of Conservation and Land Management, in conjunction with the Recovery Team will evaluate the performance of this IRP. In addition to annual reporting on progress with listed actions and comparison against the criteria for success and failure, the plan is to be reviewed within five years of its implementation.

Biology and ecology

Very little is known about the biology and ecology of the species .G. Richmond[1] (personal communication) has suggested that it may have a short life cycle of approximately 10 years. It appears to be a disturbance opportunist, with germination stimulated by fire or earth movement. A resident of Dalwallinu does not recall a fire occurring in the reserve containing Population 1 within the last 10 years. It seems likely that the decline of Population 1 since its discovery is a result of the existing plants reaching the end of their life cycle and not being replaced due to a lack of appropriate disturbance.

Seed was collected from Population 1 by A. Cochrane of the Department's Threatened Flora Seed Centre (TFSC) in July 1997, and this had an extremely low seed to fruit ratio. In 100 fruits four seeds were found, none of which germinated under laboratory conditions before going mouldy. It has been suggested this was possibly because they were not taken completely out of an extremely hard coating (personal communication A. Cochrane[2]). This low rate of seed production may be at least partly due to the low genetic diversity of the

[1] Guy Richmond, formerly at Curtin University
[2] Anne Cochrane, Manager, the Department's Threatened Flora Seed Centre

population and the age of the plants. Fruit produced earlier when there were more plants in the population may have had a higher seed to fruit ratio.

Threats

Eremophila pinnatifida ms was Declared as Rare Flora on 28 November 1997, and ranked as Critically Endangered (CR) in November 1998. It currently meets World Conservation Union (IUCN, 2000) Red List Category 'CR' under criteria B1ab(iii)+2ab(iii) due to the severe fragmentation of populations and continuing decline in the quality of its habitat. The main threats are housing development, road maintenance, erosion, weeds, degraded habitat and inappropriate fire regimes.

- **Housing development** is proposed to occur within the reserve that Population 1b inhabits. Negotiations between relevant parties have ensured that the area directly supporting this species will be set aside as Public Open Space, and subsequently vested in the Conservation Commission for the purpose of Conservation. However, clearing of nearby vegetation is likely to further reduce populations of pollinators, and an influx of people is likely to increase the recreational usage of the conservation reserve. In addition, the habitat may be affected by the addition of fertilisers to gardens and the water table affected by water usage.

- **Road maintenance** such as grading, construction of drainage channels, mechanical slashing of vegetation and weed spraying pose a threat to Populations 2, 3 and 4. Several of these actions also encourage weed invasion. Populations 2, 3 and 4 occur on road reserves and are subject to modified hydrology.

- **Erosion** is a threat to Population 3 as the drainage channel along which it occurs is becoming increasingly eroded by water running off the road surface. Two plants have died, and a third has some roots exposed.

- **Weeds** are a major threat to the long-term viability of Populations 1, 2 and 4 where wild oats (*Avena fatua*) constitute the dominant understorey. Although weeds do not appear to pose a threat to existing plants they are vigorous and inhibit natural recruitment. Population 2 has been invaded by a range of grass and broadleaf weeds, including soursob (*Oxalis pes-caprae*) and several species of medic (*Medicago* spp).

- **Degraded habitat** represents a threat to all four populations. The lack of associated native vegetation makes it more likely that pollinators will be infrequent or absent. In addition, the lack of available habitat for recruitment is of concern. Three of the four populations occur on narrow road reserves with cleared land beyond.

- **Inappropriate fire regimes** may affect the viability of populations. Seeds of *E. pinnatifida* ms probably germinate following fire. If this is the case, the soil seed bank would rapidly be depleted if fires recurred before regenerating or juvenile plants reached maturity and replenished the soil seed bank. However, it is likely that occasional fires are needed for reproduction of this species. A resident of Dalwallinu does not recall a fire occurring in the reserve containing Population 1a within the last 10 years.

- **Poor recruitment** threatens most populations with few seedling plants being observed. This is most acute at Population 1a, where the plants appeared to have grown in response to a single disturbance event prior to 1990. The plants are now dead and disturbance is necessary to stimulate germination of any soil-stored seed.

Summary of population information and threats

Pop. No. and Location	Land Status	Year/No. plants	Condition	Threats
1a. Dalwallinu	Shire Reserve	1990 35 1997 6 1998 2 2000 0	Extinct	Lack of disturbance, weeds, degraded habitat, inappropriate fire regimes
1b. Dalwallinu	Shire Reserve	2000 3 (367) 2001 200 (170) 2002 355 [15 dead]	Healthy	Housing development, installation of pipeline, weeds, degraded habitat, inappropriate fire regimes
2. Dalwallinu	Shire Road Verge	1997 2 1998 3 2001 2	Poor	Road maintenance, weeds, degraded habitat, inappropriate fire regimes
3. Dalwallinu	MRWA Road Verge	1998 16 1999 16 2001 14	Moderate	Road and drain maintenance, erosion, weeds, degraded habitat, inappropriate fire regimes, lack of habitat
4. Dalwallinu	Shire Road Verge	2001 78	Healthy	Road maintenance, weeds, degraded habitat, inappropriate fire regimes

Number in brackets ( ) = number of juveniles. Numbers in [ ] = number of dead plants.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Any on-ground works (clearing, firebreaks, roadworks etc) in the immediate vicinity of *E. pinnatifida* ms will require assessment. On-ground works should not be approved unless the proponents can demonstrate that they will not have an impact on the species, its habitat or potential habitat.

2. RECOVERY OBJECTIVE AND CRITERIA

Objectives

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

Criteria for success: The number of individuals within populations and/or the number of populations have increased by 10% or more.
Criteria for failure: The number of individuals within populations and/or the number of populations have decreased by 10% or more.

3. RECOVERY ACTIONS

Existing recovery actions

All land managers have been notified of the location and threatened status of the species. The notification details the Declared Threatened status of *Eremophila pinnatifida* ms and the legal responsibility to protect it.

Declared Rare Flora (DRF) markers were installed at Populations 2, 3 and 4. These serve to alert people working in the vicinity to the presence of DRF, and the need to avoid work that may damage it in that area. Awareness of the significance of these markers is being promoted to relevant bodies such as Shires, MRWA and the Bush Fires Board by the distribution of dashboard stickers and posters that illustrate DRF markers, inform of their purpose and provide a contact telephone number if such a marker is encountered.

Approximately 1300 seeds (from almost 3500 fruits) are stored in the Department's TFSC. Collections were made in 1997 from Population 1a, and in 1998 and 2000 from Population 3. Staff of the TFSC tested the viability of seed soon after collection and again after one year in storage. The initial germination rate of *E. pinnatifida* ms seed ranged from nil to 82%, and after one year in storage the germination rate ranged from nil to 62% (unpublished data A. Cochrane[3]).

[3] Anne Cochrane, Manager, the Department's Threatened Flora Seed Centre

The Botanic Garden and Parks Authority (BGPA) currently have 13 plants of *E. pinnatifida* ms from five clones, grown from material collected in 1998. The species has been difficult to propagate by striking cuttings, but they have had better success grafting onto Myoporum rootstock, although there has been limited work using cuttings (personal communication A. Shade[4]). Three plants were grown from cuttings taken in 1997, but these all died in 2002. This lifespan is not considered surprising, as Eremophilas do not tend to do well in containers, which these plants were restricted to. It is intended that some of the existing plants will be planted into either an Eremophila bed or a Declared Rare Flora garden being established at BGPA.

The BGPA also has several clones of *E. pinnatifida* ms stored as tissue culture.

Weed control was commenced at Populations 1 and 2 in September 1998.

Major road construction work has occurred near Population 2. Main Roads Western Australia (MRWA) installed a fence around the population before roadworks commenced. The road work was completed in 2002 without damage to the plants.

Staff from the Department's Merredin District met a representative of MRWA in 2000 to assess the extent of erosion at Population 3 and discuss possibilities for amelioration. One option considered was the filling of the gully with rubble, but it is considered that in addition to considerable ongoing expense, the risk of damaging the plants during this work is very high. These plants are estimated to be seven years old, and have an expected lifespan of approximately ten years. Most occur near the private property fenceline and, although threatened by erosion, are likely to survive long enough to produce seed for one or two more years before reaching senescence. Hence, rather than risk damaging mature fruiting plants, it is recommended that resources be focused towards disturbance trials, to take place 'downstream' from the eroded area in the hope of stimulating germination of seed that may have washed down.

A double-sided information sheet was produced in 2002, and includes a description of the plant, its habitat, threats, recovery actions and photos. This will be distributed to community members through local libraries, wildflower shows and Regional Herbaria.

Staff from the Department's Merredin District regularly monitor all populations of this species.

The Merredin District Threatened Flora Recovery Team (MDTFRT) is overseeing the implementation of this IRP and will include information on progress in its annual report to the Department's Corporate Executive and funding bodies.

Future recovery actions

Where populations occur on lands other than those managed by the Department, permission has been or will be sought from appropriate land managers prior to recovery actions being undertaken.

1. Coordinate recovery actions

The Merredin District Threatened Flora Recovery Team (MDTFRT) will coordinate recovery actions for *Eremophila pinnatifida* ms and other Declared Rare flora in the region. They will include information on progress in their annual report to the Department's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: The Department (Merredin District) through the MDTFRT
Cost: $400 per year

2. Undertake weed control

A weed control program is required as the habitat of Populations 1 and 2 are badly infested by weeds. They impact on *Eremophila pinnatifida* ms by competing for resources, degrading habitat, exacerbating grazing

[4] Amanda Shade, Botanic Gardens and Parks authority

pressure, and increasing the risk and severity of fire. Weed control will be undertaken in consultation with the land managers. This will be by hand weeding or localised application of herbicide during the appropriate season to minimise the effect of herbicide on the species and the surrounding native vegetation. All applications of weed control will be followed by a report on the method, timing and success of the treatment against weeds, and the effect on *E. pinnatifida* ms and associated native plant species.

Action: Undertake weed control
Responsibility: The Department (Merredin District) through the MDTFRT, relevant land managers
Cost: $1,200 per year

3. Stimulate germination of soil-stored seed

Eremophila pinnatifida ms appears to be a disturbance opportunist with a relatively short lifespan (approximately 10 years). Its seeds are contained in extremely hard fruits and it is likely that soil-stored seed is able to remain viable for a long period. An attempt to stimulate germination of soil-stored seed will be made in areas where plants previously occurred (Population 1a and in the near vicinity of Populations 2 and 3) by undertaking fire, smoke treatment and soil disturbance trials. This will be conducted in conjunction with weed control so that any *E. pinnatifida* ms germinants are not overwhelmed by competition. The results of trials will be monitored regularly and a report prepared on the method, timing and success of the treatment.

Action: Stimulate germination of soil-stored seed
Responsibility: The Department (Merredin District) through the MDTFRT
Cost: $4,600 in second and fifth year and $1,000 in third and fourth years

4. Achieve long-term protection of habitat

Staff from the Department's Merredin District will continue liaison with land managers and landowners to ensure that populations are not accidentally damaged or destroyed. In addition, the existing negotiations to secure the area of Population 1b as a nature reserve will continue.

Action: Achieve long-term protection of habitat
Responsibility: The Department (Merredin District) through the MDTFRT
Cost: $1,000 per year

5. Establish nature reserve

If negotiations are successful (see 4 above) the nature reserve will need appropriate signage, rubbish removed and steps taken to restrict access to only a few tracks.

Action: Establish nature reserve
Responsibility: The Department (Merredin District) through the MDTFRT
Cost: $4 500 if land becomes a nature reserve

6. Collect seed and cutting material

Preservation of germplasm is essential to guard against extinction if wild populations are lost. Such collections are also needed to propagate plants for translocations. Some seed has been collected from Populations 1a and 3 but further collections are required from all populations. At this time cuttings will also be obtained to extend the genetic diversity available in the living collection at the BGPA.

Action: Collect seed and cutting material
Responsibility: The Department (TFSC, Merredin District) through the MDTFRT
Cost: $3,600 in first and second years and $1,000 in subsequent years

7. Conduct further surveys

Further surveys by Departmental staff and community volunteers will be conducted during the flowering period of the species (September-January).

Action: Conduct further surveys
Responsibility: The Department (Merredin District) through the MDTFRT
Cost: $1,800 per year

8. Monitor populations

Annual monitoring of factors such as habitat degradation (including weed invasion, plant diseases and salinity), population stability (expansion or decline), pollination activity, seed production, recruitment, longevity and predation is essential.

Action: Monitor populations
Responsibility: The Department (Merredin District) through the MDTFRT
Cost: $600 per year

9. Develop and implement a fire management strategy

Little is known about the effects of fire on this species. It is thought that it requires occasional fire for recruitment from soil-stored seed, but frequent fires may prevent the accumulation of sufficient soil-stored seed for recruitment to occur. Fire also promotes the introduction and proliferation of weed species. Fire should therefore be prevented from occurring in the area of populations, except where it is being used experimentally as a recovery tool. A fire management strategy will be developed to determine fire control measures and fire frequency.

Action: Develop and implement a fire management strategy
Responsibility: The Department (Merredin District), relevant land managers through the MDTFRT
Cost: $1,700 in second year and $600 in subsequent years

10. Obtain biological and ecological information

Improved knowledge of the biology and ecology of *Eremophila pinnatifida* ms will provide a better scientific basis for its management in the wild. An understanding of the following is particularly necessary for effective management:

1. Soil seed bank dynamics and the role of various disturbances (including fire), weed competition, rainfall and grazing in germination and recruitment.
2. The pollination biology of the species.
3. The requirements of pollinators.
4. The reproductive strategies, phenology and seasonal growth of the species.
5. The population genetic structure, levels of genetic diversity and minimum viable population size.

Action: Obtain biological and ecological information
Responsibility: The Department (Science Division, Merredin District) through the MDTFRT
Cost: $20,900 per year in second, third and fourth years

11. Start the translocation process

As the number of extant plants is low and populations are not secure from threats a translocation proposal will be developed and suitable translocation sites selected. This will be coordinated by the MDTFRT. Information on the translocation of threatened plants and animals in the wild is provided in the Department's Policy Statement No. 29 *Translocation of Threatened Flora and Fauna*. All translocation proposals require endorsement by the Department's Director of Nature Conservation.

Action: Start the translocation process
Responsibility: The Department (Science Division, Merredin District) through the MDTFRT

Cost: $4,000 in fourth year

12. Promote awareness

The importance of biodiversity conservation and the need for the long-term protection of wild populations of this species will be promoted to the community through poster displays and the local print and electronic media. Formal links with local naturalist groups and interested individuals will also be encouraged.

A reply paid postal drop illustrating *E. pinnatifida* ms and describing its distinctive features and habitat will be produced and distributed by the Department's Merredin District office to residents of Shires containing possible habitat of the species. Postal drops aim to stimulate interest, provide information about threatened species and provide a name and number to contact if new populations are found by members of the community.

Action: Promote awareness
Responsibility: The Department (Merredin District) through the MDTFRT
Cost: $1,100 in first year, $700 in subsequent years

13. Review the need for a full Recovery Plan

At the end of the fourth year of the five-year term of this Interim Recovery Plan, if the taxon is still ranked as Critically Endangered, the need for a full Recovery Plan or a review of this IRP will be assessed and a plan prepared if necessary.

Action: Review the need for further recovery actions and/or a full Recovery Plan
Responsibility: The Department (WATSCU, Merredin District) through the MDTFRT
Cost: $20,300 in the fifth year (if full Recovery Plan is required)

4. TERM OF PLAN

This Interim Recovery Plan will operate from August 2002 to July 2007 but will remain in force until withdrawn or replaced. If the taxon is still ranked Critically Endangered after four years, the need to update this IRP or to replace it with a full Recovery Plan will be determined.

5. ACKNOWLEDGMENTS

The following people have provided assistance and advice in the preparation of this Interim Recovery Plan:

Eric Bunn — Geneticist, Botanic Garden and Parks Authority
Anne Cochrane — Manager, the Department's Threatened Flora Seed Centre
Amanda Shade — Horticulturalist, Botanic Garden and Parks Authority

Thanks also to the staff of the W.A. Herbarium for providing access to Herbarium databases and specimen information, and the Department's Wildlife Branch for assistance.

6. REFERENCES

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The Department (1998) Western Australian Herbarium FloraBase – Information on the Western Australian Flora. Department of Conservation and Land Management, Western Australia. http://www.calm.wa.gov.au/science/

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7. TAXONOMIC DESCRIPTION

Although this description has not yet been published it is included with the kind permission of R.J. Chinnock of the Adelaide Herbarium.

Eremophila pinnatifida is an erect spreading rounded aromatic shrub 0.6-1 m rarely to 1.3 m tall. *Branches* terete, obscured by leaves, non-tuberculate, densely pubescent, hairs consisting of short yellow gland tipped and longer setose eglandular ones. *Leaves* in whorls of 3, erect, imbricate, obscuring branches, ovate to oblong, deeply pinnately lobed, lobes obtuse sometimes toothed at base, lamina irregularly undulate or flattened, 5.0-9.5 x 2.5-4.5 mm, densely glandular-pubescent on both surfaces with numerous long white hairs on adaxial surface but abaxial surface lacking these hairs or occurring scattered or restricted to lower part on midrib, resinous. *Flowers* 1 per axil, sessile. *Sepals* 5, valvate, equal, linear-lanceolate, acute, 5.0-8.0 x 1.0-1.8 mm, outer surface densely pubescent consisting of short glandular and longer setose eglandular hairs, inner surface glandular-pubescent towards apex and appressed setose hairs below occasionally with some scattered glandular hairs, green. *Corolla* 18-25 mm long, pale purple, inside of tube white, pale purple spotted, outside surface pubescent, hairs long, eglandular; inside surface of lobes glabrous, tube sparsely villous throughout; lobes obtuse. *Stamens* 4, included, glabrous. *Ovary* ovoid-conical, 4-locular with 1 ovule per locule, densely villous but glabrous towards the base; style glabrous. *Fruit* dry, woody, broadly ovoid, 3.5-4.0 x 2.4-3.2 mm; exocarp adhering to endocarp, densely villous. *Seed* ovoid-oblong, c. 2.5 x 0.7 mm, very pale buff. *Chromosome number* unknown.

Eremophila pinnatifida is allied to *E. ternifolia* and related species. Like *E. ternifolia* it has leaves in whorls of three and a similarly structured fruit but differs from this species and other allied ones like *E. sargentii* and *E. verticillata* by the diagnostic pinnate leaves and the prominent pubescence of the branches and leaves.

Derivation of epithet. Latin *pinnatifida*, lobed in a pinnate manner, the lobes cut half to about three-quarters of the way to the midrib.