

INTERIM RECOVERY PLAN NO. 151

BEAKED EREMOPHILA **(*EREMOPHILA ROSTRATA* MS)**

INTERIM RECOVERY PLAN

2003-2008

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Photograph: Andrew Brown

July 2003

Department of Conservation and Land Management
Western Australian Threatened Species and Communities Unit (WATSCU)
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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This Interim Recovery Plan will operate from July 2003 to June 2008 but will remain in force until withdrawn or replaced.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 five years and the need for a full Recovery Plan will be assessed.

This IRP was approved by the Director of Nature Conservation on 21 September, 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 July 2003.

SUMMARY

Scientific Name:	<i>Eremophila rostrata</i> ms	Common Name:	Beaked Eremophila
Family:	Scrophulariaceae	Flowering Period:	July-October
Dept Region:	Midwest	Dept District:	Geraldton
Shires:	Cue, Perenjori	Recovery Team:	Geraldton District Threatened Flora Recovery Team (GDTFRT)

Illustrations and/or further information: S.J. Patrick (2001) *Declared Rare and Poorly Known Flora in the Geraldton District*.

Current status: *Eremophila rostrata* ms was declared as Rare Flora in April 2002. It currently meets World Conservation Union (IUCN 2000) Red List Category 'CR' under criteria C2a(i) and D due to the very small population sizes, and extremely low number of mature individuals. The main threats are mining, grazing, road maintenance, inappropriate fire regimes and poor recruitment.

Critical habitat: The critical habitat for *Eremophila rostrata* ms comprises the area of occupancy of the known populations; similar habitat within 200 metres of known 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 requirements: *Eremophila rostrata* ms is currently known from three small populations over a range of 280 km. Two are south east of Perenjori, on red-brown clayey loam in open mallee woodland with *Melaleuca uncinata*, *Acacia coolgardiensis*, and *Ptilotus exaltatus*. The other is north of Cue, on dry white clay at the base of a quartzite hill in open shrubland of *Acacia* and *Eremophila* species and *Ptilotus polakii*. There are currently 46 plants known.

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 near Population 2.
3. Approximately 22 seeds were collected from Population 1 in April 2000 and are stored in the Department's Threatened Flora Seed Centre at -18°C.
4. Road and rail reserves near known populations have been searched for additional populations, without success.
5. Staff from the Department's Geraldton District regularly monitor populations of the species.
6. Staff from the Department's Geraldton District are 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 ten percent or more.

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

Recovery actions

1. Coordinate recovery actions
2. Place markers at Population 3
3. Seek to have Populations 1 and 2 fenced
4. Seek rehabilitation trials
5. Seek long-term protection of habitat
6. Conduct further surveys
7. Collect seed and cutting material
7. Stimulate germination of soil-stored seed
8. Monitor populations
9. Develop and implement a fire management strategy
10. Obtain biological and ecological information
11. Promote awareness
12. Review the need for a full Recovery Plan

1. BACKGROUND

History

C.A. Gardner¹ made the first collection of *Eremophila rostrata* ms from an area near Cue in 1927. Bob Chinnock² has prepared a taxonomic description of this species, which will be published in the near future.

Populations of this species are extremely fragmented and exist in areas which have been extensively cleared for agriculture (Perenjori) or subject to mining (Cue). Population 1 is in an isolated remnant on farming land. With 17 plants, it is the second largest of the populations, but the plants appear to be old and in decline, and possibly senescent. No seedlings have been observed in Population 1. Population 2 consists of 18 plants amongst minesite workings and tracks used by heavy equipment. Population 3 is within a few kilometres of Population 1, but there is no vegetation that links the two populations. The 11 plants in Population 3 occur on road verges from 1 m to 3 m wide that are in a highly cleared area.

Description

Eremophila rostrata ms is an erect, rounded shrub 1.5 to 3 m tall. The leaves are a glossy dark green, glabrous and terete, approximately 1 mm in diameter. The flowers are pendulous and have small calyx lobes. The corolla is scarlet, light pink inside, without spots, and bulbous at the base. The upper lip of the corolla is 2-lobed, the lower lip 3-lobed. The stamens extend beyond the corolla throat. The fruit are prominently laterally compressed, convex, keeled above, beak-like, with both margins membranously winged (Patrick 2001).

Eremophila rostrata ms is related to *E. laanii* and *E. longifolia*. It superficially resembles *E. oppositifolia* which occurs in the habitat of Population 2, but *E. rostrata* ms has a smaller calyx and scarlet flowers, unlike *E. oppositifolia* which has cream to pale pink (rarely bright pink) flowers.

Distribution and habitat

Eremophila rostrata ms is currently known from two areas 280 km apart. Two small populations occur south east of Perenjori, on decomposed granite in red brown clayey loam, in open mallee woodland to 6m of mallee Eucalypts, *Acacia coolgardiensis*, *Melaleuca uncinata* and *Ptilotus exaltatus*. The other is north of Cue, on dry white clay with quartzite on the west-facing lower slopes of a quartzite hill, in open shrubland to 2.5 m of *Acacia* and *Eremophila* species over open low shrubs of *Ptilotus polakii*. The total number of plants is 46.

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 rostrata* ms comprises:

- the area of occupancy of known populations;
- areas of similar habitat within 200 metres of known populations, ie heavy clay soils in open vegetation (these provide potential habitat for natural range extension);
- 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).

Biology and ecology

¹ C.A. Gardner, Government Botanist and Curator of the W.A. Herbarium 1929-1961

² Bob Chinnock, *Eremophila* specialist, S.A. Herbarium

Eremophila rostrata ms appears to be a relatively long-lived shrub, with some individuals known to be at least 10 years old (A. Brown³ personal communication).

The response of *Eremophila rostrata* ms to fire is unknown, but many *eremophilas* germinate in response to fire or soil disturbance. Research is currently being undertaken on several other *Eremophila* species to ascertain their response to fire, smokewater and soil disturbance (L. Monks⁴, personal communication). The results of this research will be utilized in trials carried out to ascertain the response of *E. rostrata* ms.

The fruit of *Eremophila rostrata* ms is a 4-loculed drupe. When seed was collected from Population 1 in 2000, only 32% of fruits had seed (Cochrane *et al.* 2002). Most of those had only one seed, but several had two, three or four seeds per fruit. At that time, there were some dead branches on plants and some resprouting occurring. Many plants appeared quite old with stems cracking.

Threats

Eremophila rostrata ms was declared as Rare Flora in April 2002. It currently meets World Conservation Union (IUCN 2000) Red List Category 'CR' under criteria C2a(i) and D due to the very small population sizes, and extremely low number of mature individuals. The main threats are mining, road maintenance, grazing, inappropriate fire regimes and poor recruitment.

- **Mining** is a threat to Population 2. The plants exist in close proximity to access tracks, bulldozer workings and mine pits and heaps. Although the mine is not currently active, many areas are re-worked and it is possible this site will be redug in future.
- **Road maintenance** threatens Population 3. Threats include grading, chemical spraying, vegetation slashing and construction of drainage channels. Several of these actions also encourage weed invasion.
- **Grazing** threatens Population 1. Stock has occasional access to this site, and probably remove any seedlings that may be present. Grazing also exacerbates the introduction and impact of weeds.
- **Inappropriate fire regimes** may affect the viability of populations. The fire response of this species is not known, but fire that is too frequent is likely to kill plants before they reach maturity, as well as degrade the surrounding habitat. Conversely, a certain fire frequency is likely to be required to stimulate recruitment.
- **Poor recruitment** threatens populations with few young plants being observed.
- **Lack of supporting habitat** may have resulted in a reduction in the availability of pollinators, of mammals to disturb soil (leading to germination) and other ecosystem processes that would otherwise support Populations 1 and 3.

Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants	Condition	Threats
1. SE of Perenjori	Private property	1981 20 1999 11 2002 17	Moderate	Inappropriate fire, poor recruitment, grazing
2. N of Cue	Other Crown reserve (mining lease)	1990 2 1999 3 2000 5 (2) 2002 18	Healthy, in highly disturbed habitat	Mining, road maintenance, inappropriate fire, poor recruitment, lack of supporting habitat
3. SE of Perenjori	Shire road reserve	2002 11	Healthy, in highly disturbed habitat	Road maintenance, inappropriate fire, poor recruitment, lack of supporting habitat

Numbers in brackets = number of seedlings.

³ Andrew Brown, Threatened Flora Coordinator, the Department's Western Australian Threatened Species and Communities Unit

⁴ Leonie Monks, Research Scientist, the Department's Western Australian Herbarium

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 *Eremophila rostrata* 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 ten percent or more.

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

3. RECOVERY ACTIONS

Existing recovery actions

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

DRF markers were installed near plants at Population 2 in January 1999. These serve to alert people working in the area to the need to avoid disturbing the vegetation between the markers. The Shire of Cue Works Foreman was informally notified of the presence of plants and markers at that time. The Mine Supervisor was similarly notified of the plants and markers in September 2001.

Approximately 22 seeds (from 70 fruits) were collected from Population 1 in April 2000 and are stored in the Department's Threatened Flora Seed Centre (TFSC) at -18°C . Staff of the TFSC generally test the viability of seed soon after collection and again after one year in storage. The initial germination rate of *Eremophila rostrata* ms seed was 65% (unpublished data A. Cochrane⁵). It was not retested due to the very small quantity of seed.

Road and rail reserves near known populations have been searched for additional populations, without success.

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

The Geraldton District Threatened Flora Recovery Team (GDTFRT) will be 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

⁵ Anne Cochrane, Manager, the Department's Threatened Flora Seed Centre

The GDTFRT will continue to oversee the implementation of the recovery actions for *E. rostrata* ms and will include information on progress in its annual report to the Department's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: The Department (Geraldton District) through the GDTFRT
Cost: \$700 per year

2. Place markers at Population 3

Population 3 is located on a road reserve. The road reserve at the site will be marked with DRF markers to help prevent accidental damage from road or drain maintenance.

Action: Place markers at Population 3
Responsibility: The Department (Geraldton District) through the GDTFRT
Cost: \$500 in the first year

3. Seek to have Populations 1 and 2 fenced

The area of remnant vegetation that supports Population 1 is not fenced from stock. The adjacent paddock is currently under crop, but stock are likely to have access again in a future rotation. While sheep do not currently graze adult *Eremophila rostrata* ms plants, they are likely to remove any seedlings, introduce weeds, and trample associated vegetation. Staff from the Department's Geraldton District will liaise with the land owners to seek the erection of a fence to protect this area of remnant vegetation.

Population 2 occurs on crown land subject to a mining lease, but the mine is not currently active. Plants have been found scattered over a 1 km x 1km area. Staff from the Department's Geraldton District will mark the boundaries of the population with rare flora markers, and liaise with land managers to seek the erection of a fence to encompass this area.

Action: Seek to have Populations 1 and 2 fenced
Responsibility: The Department (Geraldton District) through the GDTFRT
Cost: \$9,000 in second year

4. Seek long-term protection of habitat

Staff from the Department's Geraldton District will continue liaison with land managers and land owners to ensure that populations are not accidentally damaged or destroyed. In addition, ways and means of improving the security of populations and their habitat will be investigated. On private land, this may include conservation covenants with a range of agencies, the Land for Wildlife scheme, and possibly acquisition. Departmental staff will seek to ensure conservation management of the public land on which Population 2 occurs.

Action: Seek long-term protection of habitat
Responsibility: The Department (Geraldton District) through the GDTFRT
Cost: \$1,000 per year

5. Conduct further surveys

Community volunteers will be encouraged to be involved in further surveys coordinated by Departmental staff in appropriate habitat during the peak flowering period of the species (August to September). Areas surveyed will include pastoral stations where possible, as large expanses of rangelands exist between the two populations. The area south of Bunjil will be surveyed, as 2 plants were reported from a road reserve there, but have not been relocated.

Action: Conduct further surveys
Responsibility: The Department (Geraldton District) through the GDTFRT
Cost: \$3,000 per year

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. A very small quantity of seed has been collected from Population 1 but further collections are required from all populations. At this time cuttings will also be obtained to establish a living collection at the Botanic Garden and Parks Authority (BGPA).

Action: Collect seed and cutting material
Responsibility: The Department (TFSC, Geraldton District), BGPA through the GDTFRT
Cost: \$4,100 in year one and two, and \$1,000 in subsequent years.

7. Stimulate germination of soil-stored seed

Burning and smokewater may be effective in stimulating the germination of soil-stored seed. These trials will be conducted at Populations 1 and 2, preferably around dead *Eremophila rostrata* ms plants if any are located. Weed control will be undertaken as necessary to prevent invasion into the disturbed areas.

A proposal that will include deep ripping will be presented to the Mining Company that has a lease over the habitat of Population 2. This will determine if soil disturbance helps to stimulate germination of *Eremophila rostrata* ms and other associated native species that occur in the habitat.

Sites will be closely monitored following any germination trials.

Action: Stimulate germination of soil-stored seed
Responsibility: The Department (Geraldton District) through the GDTFRT
Cost: \$4,400 in first year, \$4,000 in second year, \$1,000 per year thereafter

8. Monitor populations

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

Action: Monitor populations
Responsibility: The Department (Geraldton District) through the GDTFRT
Cost: \$2,500 per year

9. Develop and implement a fire management strategy

The fire response of this species is unknown. It is likely that frequent fire would prevent the accumulation of sufficient soil-stored seed for recruitment to occur, but occasional fire may be required to stimulate germination. 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 recommended fire frequency and intensity.

Action: Develop and implement a fire management strategy
Responsibility: The Department (Geraldton District) through the GDTFRT
Cost: \$2,300 in second year and \$1,000 in subsequent years

10. Obtain biological and ecological information

Improved knowledge of the biology and ecology of *Eremophila rostrata* 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), competition, rainfall and grazing in germination and recruitment.
2. The pollination biology of the species and the requirements of pollinators.
3. The reproductive strategies, phenology and seasonal growth of the species.
4. The population genetic structure, levels of genetic diversity and minimum viable population size.

In particular, examination of pollination biology and the requirements of pollinators will be determined if low recruitment is due to low pollen viability, pollinator absence, or is 'normal'. The results will determine if remedial actions such as artificial hand pollination to stimulate seed set are necessary.

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

11. 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. An information sheet will be produced, and will include a description of the plant, its habitat, threats, recovery actions and photos.

A reply paid postal drop illustrating *Eremophila rostrata* and describing its distinctive features and habitat will be produced and distributed by the Department's Geraldton District office to residents in 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 located by members of the community.

Action: Promote awareness
Responsibility: The Department (Geraldton District) through the GDTFRT
Cost: \$1,900 in first and second years, \$900 in subsequent years

12. Review the need for a full Recovery Plan

At the end of the fourth year of its five-year term this Interim Recovery Plan will be reviewed and the need for further recovery actions will be assessed. If the species is still ranked as Critically Endangered at that time a full Recovery Plan may be required.

Action: Review the need for a full Recovery Plan
Responsibility: The Department (WATSCU, Geraldton District) through the GDTFRT
Cost: \$20,300 in the fifth year (if full Recovery Plan required)

4. TERM OF PLAN

This Interim Recovery Plan will operate from July 2003 to June 2008 but will remain in force until withdrawn or replaced. If the taxon is ranked Critically Endangered after five years, the need to review 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:

Andrew Brown	Coordinator, the Department's W.A. Threatened Species and Communities Unit
Anne Cochrane	Manager, the Department's Threatened Flora Seed Centre
Andrew Crawford	Seed Collector, the Department's Threatened Flora Seed Centre
Leonie Monks	Research Scientist, the Department's W.A. Herbarium
Sue Patrick	Senior Research Scientist, the Department's W.A. Herbarium

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.

5. REFERENCES

- Cochrane, A. Brown. K. and Kelly, A. (2002). Temperature and low moisture content of seed of the endemic Australian genus *Eremophila* R Br (Myoporaceae). *Journal of the Royal Society*. 85: 31-35.
- 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*. Perth, Western Australia.
- Department of Conservation and Land Management (1995) Policy Statement No. 29 *Translocation of Threatened Flora and Fauna*. Perth, Western Australia.
- Department of Conservation and Land Management (1998) Western Australian Herbarium FloraBase – Information on the Western Australian Flora. Perth, Western Australia. <http://www.calm.wa.gov.au/science/>
- IUCN (2000) *IUCN red list categories prepared by the IUCN Species Survival Commission, as approved by the 51st meeting of the IUCN Council*. Gland, Switzerland.
- Patrick, S.J. (2001) *Declared Rare and Poorly Known Flora in the Geraldton District*. Department of Conservation and Land Management, Western Australia.

7. TAXONOMIC DESCRIPTION

Patrick, S.J. (2001) *Declared Rare and Poorly Known Flora in the Geraldton District*. Department of Conservation and Land Management, Western Australia.

Eremophila rostrata ms is an erect, rounded shrub 1.5 to 3 m tall. The leaves are a glossy dark green, glabrous and terete, approximately 1 mm in diameter. The flowers are pendulous and have small calyx lobes. The corolla is scarlet, light pink inside, without spots, and bulbous at the base. The upper lip of the corolla is 2-lobed, the lower lip 3-lobed. The stamens extend beyond the corolla throat. The fruit are prominently laterally compressed, convex, keeled above, beak-like, with both margins membranously winged.