INTERIM RECOVERY PLAN NO. 112

LAKE KING EREMOPHILA

(*EREMOPHILA SUBTERETIFOLIA* MS)

INTERIM RECOVERY PLAN

2002-2005

Robyn Phillimore, Gillian Stack and Andrew Brown

Photograph: J. Start

January 2002

Department of Conservation and Land Management
Western Australian Threatened Species and Communities Unit (WATSCU)
PO Box 51, Wanneroo, WA 6946

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This Interim Recovery Plan will operate from January 2002 to December 2004 but will remain in force until withdrawn or replaced.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 replaced by a full Recovery Plan after three years.

This IRP was approved by the Acting Director Nature Conservation on 24 September, 2002. 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 January 2002.

SUMMARY

Scientific Name: *Eremophila subteretifolia* ms **Common Name:** Lake King Eremophila
Family: Myoporaceae **Flowering Period:** Mainly October to February
Departmental Region: Wheatbelt **Departmental District:** Katanning
Shire: Lake Grace **Recovery Team:** Katanning District Threatened Flora Recovery Team (KDTFRT)

Illustrations and/or further information: Brown, A., Thomson-Dans, C. and Marchant, N. (Eds.) (1998). *Western Australia's Threatened Flora*. Department of Conservation and Land Management, Western Australia; *FloraBase*. Western Australian Herbarium (1998).

Current status *Eremophila subteretifolia* ms was declared as Rare Flora in July 1989 and ranked as Critically Endangered (CR) in March 1998. The species currently meets World Conservation Union (IUCN 2000) Red List Category 'CR' under criteria B1ab(iii,v)+2ab(iii,v); C2a(i) due to it being known from just five locations, and a continuing decline in quality of habitat and number of mature individuals. The main threats are poor recruitment, salinity, prolonged waterlogging, recreational activities, road and track maintenance, vehicle damage, grazing, extraction of gypsum and inappropriate fire regimes.

Habitat requirements: *Eremophila subteretifolia* ms is endemic to Western Australia where it is confined to the Lake King area. The species grows in areas of white sandy-loam over clay amongst open scrub and low sedges on the edges of samphire flats and salt lakes, generally in open woodland areas of *Eucalyptus kondininensis* and *E. decipiens* (Brown *et al*. 1998).

Critical habitat: The critical habitat for *Eremophila subteretifolia* ms comprises the habitat of known populations, similar habitat within 200 metres of known populations, and corridors of remnant vegetation that link populations with other nearby areas of apparently suitable habitat that are not currently known to contain the species but may have in the past.

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

1. The Shire of Lake Grace and the Water Corporation have been notified of the location and threatened status of *Eremophila subteretifolia* ms .
2. DRF markers have been installed at Populations 1, 2 and 3.
3. Dashboard stickers and posters have been produced and distributed.
4. An A4 sized poster has been produced which provides a description of the species, information about threats and recovery actions.
5. Rabbit proof fencing was erected around Population 2 in July 2001.
6. Jarrah bollards have been placed along the edge of a rehabilitated section at Population 3 to prevent vehicle damage and illegal clearing.
7. In January 1999, approximately 73 fruits were collected from Population 1 and had an initial germination rate of 100%. Also in January 1999, 455 fruits were collected from Population 3. These had an initial germination rate of 83% and, after one year in storage, 62%. All fruits are stored in the Department's Threatened Flora Seed Centre (TFSC) at –18°C. In March 2001, a further collection was made from Population 3 but has yet to be processed.
8. The Botanic Garden and Parks Authority (BGPA) currently have fourteen cultivated plants of *Eremophila subteretifolia* ms. These are from 160 cuttings taken in 1989.
9. The Katanning District Threatened Flora Recovery Team (KDTFRT) 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.
10. Staff from the Department's Katanning District office regularly monitor populations.

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

Recovery criteria

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

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

Recovery actions

1. Coordinate recovery actions.
2. Install bollards.
3. Undertake rabbit control.
4. Stimulate germination and monitor seedlings.
5. Conduct further surveys.
6. Monitor populations.
7. Collect germplasm material.
8. Develop and implement a fire management strategy.
9. Liaise with relevant land managers.
10. Promote awareness.
11. Obtain biological and ecological information.
12. Write a full Recovery Plan.

1. BACKGROUND

History

A. Orchard made the first collection of *Eremophila subteretifolia* ms from the Oldfield River area, east of Ravensthorpe in 1968. Despite several intensive surveys since, plants have not been found at this site and all other collections have been made from further north-west in the Lake King area.

The species is currently known from six populations and a total of 119 mature plants.

Description

Eremophila subteretifolia ms is a ground-hugging, mat-like plant to 10 cm high and 1.5 m wide. Distinctive orange coloured flowers are held erect and emerge through the glossy, green leaves (Brown *et al*. 1998).

Distribution and habitat

Eremophila subteretifolia ms is endemic to Western Australia where it is confined to the Lake King - Oldfield River area. Plants are found in white, slightly saline, sandy-loam soil over clay on the edges of samphire flats, generally in areas of open *Eucalyptus kondininensis* and *E. decipiens* over open scrub and low sedges (Brown *et al*. 1998). Associated species include *Acacia erinacea*, *Adenanthos glabrescens* subsp. *glabrescens*, *Astroloma epacridis*, *Dodonaea bursariifolia*, *Melaleuca lateriflora*, *M. urceolaris*, *Templetonia sulcata* and *Santalum acuminatum*. *Eremophila subteretifolia* ms also occurs with the Priority 4 species *E. serpens* at Populations 4 and 5.

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 subteretifolia* ms comprises:

- the area of occupancy of known populations;
- areas of similar habitat within 200 metres of known populations (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 verges);
- the local catchment that provides the correct water table for the species (the species occurs adjacent to winter-wet flats and is dependent on maintenance of local surface hydrology);
- additional occurrences of similar habitat within 20 km of the population that do not currently contain extant populations of the species (these represent possible translocation sites or may contain the species as a seed store).

Biology and ecology

The genus *Eremophila*, which is endemic to Australia and is found on all mainland states, comprises some two hundred named taxa and many unnamed taxa. Commonly known as emu bushes or poverty bushes, most occur in the semi-arid and arid regions of Western and South Australia.

Eremophila subteretifolia ms appears to be relatively easy to propagate from cuttings and is sold as an ornamental garden plant in South Australia (personal communication B. Chinnock[1]).

[1] Bob Chinnock, Senior Botanist, Botanic Gardens of Adelaide and State Herbarium

Threats

Eremophila subteretifolia ms was declared as Rare Flora in July 1989 and ranked as Critically Endangered (CR) in March 1998. The species currently meets World Conservation Union (IUCN 2000) Red List Category 'CR' under criteria B1ab(iii,v)+2ab(iii,v); C2a(i) due to there being just five known populations, and a continuing decline in quality of habitat and number of mature individuals. The main threats are poor recruitment, salinity, prolonged waterlogging, recreational activities, road and track maintenance, vehicle damage, grazing, extraction of gypsum and inappropriate fire regimes.

- **Poor recruitment**, due to lack of appropriate disturbance such as fire, threatens most populations of *Eremophila subteretifolia* ms.

- **Salinity and prolonged waterlogging** may threaten populations as they occur adjacent to winter-wet semi saline and saline flats in areas that are showing signs of increasing salinity. A dramatic increase in the water depth at Lake Bennett and Lake Ronnerup has resulted in the death of surrounding remnant fringe vegetation, including several plants of *Eremophila subteretifolia* ms at Population 3.

- **Recreational activities**. The expansion of a carpark resulted in the death of several plants at Population 3. Bollards and Declared Rare Flora (DRF) markers have been placed at the site to prevent more damage.

- **Road and track maintenance** threatens Populations 1 and 3. Relevant land managers have been informed of the location of both populations and the threatened status of the species.

- **Vehicle damage** to a plant of *Eremophila subteretifolia* ms and its associated habitat at Population 4 occurred as vehicles entered and exited the area. A barrier (bollards) is required to prevent further damage to the plant and disturbance to the habitat.

Grazing by rabbits (*Oryctolagus cuniculus*) may affect the establishment of seedlings in Populations 1, 2 and 6, thereby limiting natural recruitment. In addition, soil disturbance during rabbit warren construction, increased nutrient levels from rabbit droppings and the introduction of weeds will result in the degradation of the habitat.

- **Extraction of gypsum** is a possible future threat to Population 5. However, there are currently no mining leases in the area.

- **Inappropriate fire regimes** may affect the long-term viability of populations. Overly frequent fire would kill plants before they are able to reach maturity and replenish the soil seed-bank. This will be addressed in Recovery Action 11.

Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants	Condition	Threats
1. SSE of Lake Pallarup	Nature Reserve (A Class)	1980 15 2001 8	Healthy	Grazing, poor recruitment, road maintenance, inappropriate fire regimes
2. SSW of Lake Pallarup	Nature Reserve (A Class)	1998 16 2001 8	Healthy	Grazing, poor recruitment, inappropriate fire regimes
3. West of Lake Bennett	Nature Reserve (C Class)	1997 40 (3) 2000 37 (1) [4 dead]	Healthy	Salinity, prolonged waterlogging, recreational activities, track maintenance, poor recruitment, inappropriate fire regimes
4. NE of Lake Ace	Nature Reserve (A Class)	1990 3 2001 1	Poor	Vehicle damage, poor recruitment, inappropriate fire regimes
5. E of Lake Milarup	Nature Reserve (A Class)	1994 1 2001 1	Moderate/ Poor	Salinity, future gypsum extraction, poor recruitment, inappropriate fire regimes
6. S of Lake Ronnerup	Nature Reserve (A Class)	1998 65 (3)	Moderate	Salinity, prolonged waterlogging, grazing, poor recruitment, inappropriate fire regimes

Numbers in ( ) = seedlings.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Any on-ground works (firebreaks, roadworks etc) in the immediate vicinity of *Eremophila subteretifolia* 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, or on the local surface hydrology such that drainage in the habitat of the species would be altered.

2. RECOVERY OBJECTIVE AND CRITERIA

Objectives

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

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

3. RECOVERY ACTIONS

Existing recovery actions

The Shire of Lake Grace and the Water Corporation have been notified about populations of *Eremophila subteretifolia* ms growing on and adjacent to their land. Notification details include the Declared Rare status of the taxon and the associated legal responsibilities.

DRF markers have been installed at Populations 1, 2 and 3. These alert people who are conducting road and other maintenance work along road verges to the presence of the threatened flora and prevent damage during such operations. Dashboard stickers, posters and 'stubby holders' that illustrate DRF markers have been sent to Shires and their workers to inform them of the purpose of DRF markers and provide a contact telephone number if such a marker is encountered.

In March 2000, Jarrah bollards were placed near a parking area at Population 3 to prevent further vehicle damage and illegal clearing.

Rabbit proof fencing was erected around Population 2 in July 2001. Plants are resprouting and looking healthy.

Approximately 73 fruits collected from Population 1 in January 1999 had an initial germination rate of 100%. A further 455 fruits collected from Population 3 on the same date had an initial germination rate of 83%. Following one year in storage the germination rate dropped to 62%. All fruits are stored in the Department's Threatened Flora Seed Centre (TFSC) at –18°C. In March 2001, a further collection was made from Population 3 but has yet to be processed. (unpublished data, A. Cochrane[2]).

The Botanic Garden and Parks Authority (BGPA) currently have fourteen plants of *Eremophila subteretifolia* ms in cultivation. These originated from 160 cuttings taken in 1989. Seedlings received from the TFSC in 1999 have since died. The strike rate of *E. subteretifolia* ms cuttings is variable and ranges from 12 to 66% (personal communication A. Shade[3]).

The Katanning District Threatened Flora Recovery Team (KDTFRT) 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.

Staff from the Department's Katanning District office regularly monitor populations.

[2] Anne Cochrane, Manager of the Department's Threatened Flora Seed Centre
[3] Amanda Shade, Horticulturalist, Botanic Garden and Parks Authority

Future recovery actions

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

1. Coordinate recovery actions

The KDTFRT is coordinating the implementation of recovery actions for *Eremophila subteretifolia* ms and will include information on progress in annual reports to the Department's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: the KDTFRT
Estimated Cost: $600 per year.

2. Install bollards

Bollards or fencing will be installed at Population 4 to protect *Eremophila subteretifolia* ms and associated habitat from vehicle damage and grazing.

Action: Install bollards or fence population
Responsibility: the Department (Katanning District) through the KDTFRT
Estimated Cost: $1,500 in first year.

3. Undertake rabbit control

Rabbits have the potential to cause damage to plants at Populations 1, 2 and 6. Where identified as a threat the Department will, in cooperation with land owners and managers, initiate control using the most appropriate methods. There are legislative restrictions on the use of 1080 Poison by Department staff on land not under direct Departmental control.

Action: Undertake rabbit control
Responsibility: the Department (Katanning District) through the KDTFRT
Estimated Cost: $900 per year.

4. Stimulate germination and monitor seedlings

Fire, smokewater and other disturbance methods may be effective in stimulating germination of soil-stored seed and will be trialed in the area of several populations. Annual monitoring will provide information on how many years it takes for seedlings to reach maturity, flower and produce seed and what age they senesce. This will enable the ideal interval time between disturbances to be estimated. Soil seed bank monitoring will be addressed under Recovery Action 11.

Action: Stimulate germination and monitor seedlings
Responsibility: the Department (Katanning District) through the KDTFRT
Estimated Cost: $3,900 in first and second years, $1,300 in third year.

5. Conduct further surveys

Further surveys by Departmental staff, with assistance of local volunteers and wildflower society members, will be conducted during the main flowering period of the species (October to February). The location of an old (1968) Herbarium record of *E. subteretifolia* ms from the Oldfield River area will be followed up and the area surveyed.

Action: Conduct further surveys
Responsibility: the Department (Katanning District) through the KDTFRT
Estimated Cost: $2,200 per year.

6. Monitor populations

Monitoring of factors such as weed invasion, habitat degradation, rising salinity levels and population stability (expansion or decline), pollinator activity, seed production, recruitment, and longevity is essential. Populations will be inspected annually with special attention given to salinity levels and it's impact on the species. Soil salinity and pH readings will be taken during the winter and summer months.

Action: Monitor populations
Responsibility: the Department (Katanning District) through the KDTFRT
Estimated Cost: $1,800 per year.

7. Collect germplasm material

Preservation of germplasm is essential to guard against the possible extinction of wild populations. If it is not feasible to collect viable seed, other germplasm storage methodologies may need to be used. These can involve the establishment of nursery stock from cuttings or storage of tissue culture material.

Action: Collect germplasm material
Responsibility: the Department (Katanning District, TFSC) through the KDTFRT
Estimated Cost: $2,800 in first and second years.

8. Develop and implement a fire management strategy

The response of *Eremophila subteretifolia* ms to fire is not known but it is suspected that occasional fire is required for the germination of soil-stored seed. A fire management strategy will be developed and implemented for the species.

Action: Develop and implement a fire management strategy
Responsibility: the Department (Katanning District) through the KDTFRT
Estimated Cost: $2,700 in first year and $1,000 in subsequent years.

9. Liaise with relevant land managers

Staff from the Department's Katanning District will continue to liaise with land managers and adjacent landowners to ensure populations are not damaged or destroyed accidentally.

Action: Liaise with relevant land managers
Responsibility: the Department (Katanning District) through the KDTFRT
Estimated Cost: $900 per year.

10. Promote awareness

The importance of biodiversity conservation and the need to protect *Eremophila subteretifolia* ms will be promoted to the public. Awareness will be encouraged in the community by a publicity campaign through the local print and electronic media and poster displays. Formal links with local naturalist groups and interested individuals will also be encouraged.

Action: Promote awareness
Responsibility: the Department (Katanning District, Corporate Relations) through the KDTFRT
Estimated Cost: $1,600 in first year and $900 in subsequent years.

11. Obtain biological and ecological information

A better knowledge of the biology and ecology of the species will provide a scientific basis for its management and long term recovery in the wild. Information sought will include:

1. levels of seed production and the effect of disturbance (fire, grading), competition, rainfall and grazing on recruitment and seedling survival.
2. reproductive strategies use d by the species, its phenology and its seasonal growth rate.
3. population genetic structures, levels of genetic diversity and minimum viable population size.
4. the impact of rising salinity on the species and its habitat.

Action: Obtain biological and ecological information
Responsibility: the Department (Science Division, Katanning District) through the KDTFRT
Estimated Cost: $19,200 per year.

12. Write a full Recovery Plan

During the third year of this IRP, the need for further recovery will be assessed. If *Eremophila subteretifolia* ms is still ranked Critically Endangered at that time a full Recovery Plan will be developed that prescribes actions required for the long-term recovery of the species.

Action: Write a full Recovery Plan
Responsibility: the Department (WATSCU, Katanning District) through the KDTFRT
Estimated Cost: $20,800 once at the end of the third year.

4. TERM OF PLAN

This Interim Recovery Plan will operate from January 2002 to December 2004 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 replaced by a full Recovery Plan after three years.

5. ACKNOWLEDGMENTS

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

Brett Beecham	Regional Ecologist, Department's Wheatbelt Region
Bruce Bone	Manager, Department's Katanning District
Bob Chinnock	Senior Botanist, Botanic Gardens of Adelaide and State Herbarium
Anne Cochrane	Manager, Department's Threatened Flora Seed Centre
Mal Graham	Former District Operations Officer, Department's Katanning District
Bethea Loudon	Conservation Officer, Department's Katanning District
Amanda Shade	Horticulturist, Botanic Garden and Parks Authority

We would like to thank the staff of the W.A. Herbarium for providing access to Herbarium databases and specimen information, and the Department's Wildlife Branch for their extensive assistance.

6. REFERENCES

Brown, A., Thomson-Dans, C. and Marchant, N. (Eds). (1998) *Western Australia's Threatened Flora*. Department of Conservation and Land Management, Western Australia.

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

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

Western Australian Herbarium (1998) *FloraBase*. Department of Conservation and Land Management, Western Australia. http://www.calm.wa.gov.au/science/

World Conservation Union (2000) *IUCN red list categories prepared by the IUCN Species Survival Commission*, as approved by the 51st meeting of the IUCN Council. Gland, Switzerland.

7. TAXONOMIC DESCRIPTION

A ground-hugging, mat-like plant up to 10 cm high and 1.5 m in diameter with erect, orange flowers that emerge above the subterete glossy green leaves.