INTERIM RECOVERY PLAN NO. 28

ROUGH EMU BUSH

(EREMOPHILA SCABERULA)

INTERIM RECOVERY PLAN

1999-2002

by

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Photograph : Andrew Brown

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FOREWORD

Interim Recovery Plans (IRPs) are developed within the framework laid down in Department of Conservation and Land Management (CALM) 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.

CALM 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This Interim Recovery Plan will operate from April 1999 to March 2002 but will remain in force until withdrawn or replaced.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 Director of Nature Conservation on 31 August 1999. The provision of funds identified in this Interim Recovery Plan is dependent on budgetary and other constraints affecting CALM, as well as the need to address other priorities.

Information in this IRP was accurate at April 1999.

SUMMARY

Scientific Name: ***Eremophila scaberula***
Common Name: Rough Emu Bush
Family: MYOPORACEAE
Flowering Period: September to October; opportunistically
CALM Region: Midwest
CALM District: Moora
Shire: Moora
Recovery Team: Moora District Threatened Flora Recovery Team (MDTFRT)

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; Fitzgerald, W.V. (1905). Some new species of West Australian plants. *Journal of the West Australian Natural History Society* 2: 29; Grieve, B.J. and Blackall, W.E. (1982). *How to Know Western Australian Wildflowers* IV, 2nd ed.: 637. University of Western Australia Press, Perth.

Current status: *Eremophila scaberula* was declared as Rare Flora in October 1996, and ranked as Critically Endangered (CR) in November 1998. It currently meets World Conservation Union (IUCN) Red List category 'CR' under criterion B1+2c (IUCN 1994). There are currently 455 adult plants known from three populations. All populations occur in highly disturbed situations on road and rail reserves, and the species is affected by loss and fragmentation of habitat. The main threats are road, rail and firebreak maintenance activities, weed competition, inappropriate fire regimes, lack of disturbance and degraded habitat.

Habitat requirements: *E. scaberula* is found on rich loam or clay flats that support open low *Eucalyptus salmonophloia* woodland over open low scrub of *Scaevola spinescens*, a variety of *Acacia* species, and grasses. The plants are generally healthy although the surrounding habitat is badly disturbed. *E. scaberula* is endemic to the area south of Moora, occurring over a range of less than 20 km.

Existing Recovery Actions: The following recovery actions have been or are currently being implemented:
1. Surveys for new populations conducted.
2. Land managers notified of presence of *E. scaberula.*
3. Declared Rare Flora (DRF) markers installed.
4. Seed collected and stored.
5. Live plants maintained in cultivation.
6. Weed control trials commenced.
7. All populations regularly monitored.

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

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

Recovery actions
1. Undertake weed control.
2. Attempt to stimulate germination.
3. Develop a fire management strategy.
4. Monitor populations.
5. Obtain biological and ecological information.
6. Conduct further surveys.
7. Disseminate information.
8. Write full Recovery Plan.

1. BACKGROUND

History

E. scaberula was first collected in 1903 at Moora. Despite further searches, no more plants were located until 1996 when K. Kershaw and R. Carter discovered a third population of approximately 200 plants. There are currently three populations known, all in close proximity to one another.

Description

Eremophila scaberula is a low growing shrub with solitary flowers on thick axillary pedicels. The branches have raised decurrent lines extending from each leaf stalk. Both branches and foliage are rough and a little sticky to the touch. The crowded leaves are 4-8 mm long and have a flat upper surface and a prominent midrib underneath. The pale to dark purple flower tube is approximately 10 to 12 mm long. This species is closely allied to *E. microtheca*, differing principally in the branches and foliage being scaberulous, not plumose-pubescent; the shape and arrangement of the leaves and the shape of the corolla; the calyx segments being glabrous, not plumose-pubescent; and also less rugose fruits. *E. scaberula* is also closely allied to *E. sargentii*, and differs in being non-aromatic; possessing stellate hairs on the branches and leaves; and the densely hairy corolla tube.

Distribution and habitat

E. scaberula is restricted to an area south of Moora over a range of less than 20 km. There are three known populations, and these contain a total of 455 adult plants. Generally the plants are healthy although the surrounding habitat is badly disturbed. *E. scaberula* is found on rich loam or clay flats that support open low *E. salmonophloia* woodland over open low scrub of *Scaevola spinescens*, a variety of *Acacia* species, and grasses.

Biology and ecology

Very little is known about the biology and ecology of this species. R. Chinnock has suggested that it may be pollinated by small native bees. Although bull ants have been seen on the flowers, he believes ant pollination in Eremophilas is largely accidental. *E. scaberula* appears to be a disturbance opportunist, with germination stimulated by fire or earth movement. *E. scaberula* is in cultivation in South Australia.

CALM Threatened Flora Seed Centre (TFSC) staff noted that there were many aborted and soft fruits on the plants while collecting seed from this species in December 1996.

Threats

This species is ranked as Critically Endangered under IUCN Red List Criterion B1+2c (IUCN 1994) due to its restricted distribution and fragmentation and continuing decline in the quality of the species' habitat. The main threats are road, rail and firebreak maintenance activities, weed competition, inappropriate fire regimes, lack of disturbance and degraded habitat.

- **Road, rail and firebreak maintenance activities** such as grading, construction of drainage channels and spraying weeds pose a threat to existing plants at all populations. Mowing of road verge vegetation could also affect the habitat of this species. These disturbance events also generally encourage weed proliferation.

- **Weed competition** is a threat to populations where introduced grasses dominate the understorey. Weed invasion does not seem to pose a major threat to existing plants, but the weeds are vigorous and inhibit recruitment by competing with seedlings for soil moisture, nutrients and light. Weeds also exacerbate the threat of fire by increasing the fuel load.

- **Inappropriate fire regimes** could adversely affect the long-term viability of populations, as seeds of *E. scaberula* probably germinate following fire. 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 recruitment of this species.

- **Lack of disturbance** is a threat to this species. At Population 1, most plants are senescent, and there is very little regeneration.

- **Degraded habitat** represents a threat to all three populations. The lack of associated native vegetation indicates that pollinators are likely to be infrequent or absent. In addition, any native digging and burrowing animals that may historically have disturbed the soil and thereby stimulated germination are unlikely to be supported by the habitat, and probably will not be present.

Summary of population information and threats

Pop. No. & Location	Land Status	Date / No. of Plants	Condition	Threats
1A. South of Moora	MRWA road reserve	08.95 90* 11.96 80 05.98 142* 06.98 37 (2)	Moderate	Road, rail and firebreak maintenance activities, weed competition, inappropriate fire regimes, lack of disturbance, degraded habitat
1B. South of Moora	Westrail rail reserve	08.95 * 11.96 52 05.98 * 06.98 90 (12)	Moderate	Road, rail and firebreak maintenance activities, weed competition, inappropriate fire regimes, lack of disturbance, degraded habitat
2A South of Moora	MRWA road reserve	08.95 80* 11.96 90 05.98 184* 06.98 58 (4)	Moderate	Road, rail and firebreak maintenance activities, weed competition, inappropriate fire regimes, degraded habitat
2B. South of Moora	Westrail rail reserve	08.95 * 11.96 111 05.98 * 06.98 24 (1)	Moderate	Road, rail and firebreak maintenance activities, weed competition, inappropriate fire regimes, degraded habitat
3A. South of Moora	MRWA road reserve	11.96 62 06.98 48 (5)	Moderate	Road, rail and firebreak maintenance activities, weed competition, inappropriate fire regimes, degraded habitat
3B. South of Moora	Westrail rail reserve	11.96 137 06.98 81 (3)	Moderate	Road, rail and firebreak maintenance activities, weed competition, inappropriate fire regimes, degraded habitat

Note: * Number includes both subpopulations; No. of plants = No. of adult plants (No. of seedlings); MRWA = Main Roads Western Australia

2. RECOVERY OBJECTIVE AND CRITERIA

Objective

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

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

3. RECOVERY ACTIONS

Existing recovery actions

All appropriate people have been made aware of the existence of this species and its locations. Main Roads Western Australia and Westrail have been notified about populations of *E. scaberula* that occur on lands that

they manage, and adjacent landowners have also been informed of the locations of the populations. These notifications detailed the Declared Rare Flora status of the species and the associated legal obligations.

Fifty seeds were collected by Kings Park and Botanic Garden (KPBG) in August 1996. Cutting material was taken at the same time, and resulted in 335 cuttings from 5 clones. The success of cuttings varied between clones, but was generally limited. More seed was collected in November and December 1996 for storage in CALM's TFSC. This was gathered from ten plants or more in each of the three populations. There are now 5 376 fruits in storage there, representing approximately 2 136 seeds. The TFSC tests the viability of the seed initially, after one year in storage and again after five years. The initial germination rate of this seed was found to vary from 39% to 70%. In May 1997, KPBG held approximately 80 plants in their Nursery Collection Frames.

Declared Rare Flora markers (DRF) are installed at all populations on both the road and rail reserves. These alert people working in the area to the presence of significant flora, helping to prevent accidental damage during maintenance operations. Awareness of the significance of these markers is being promoted to relevant bodies such as Shires, MRWA and Westrail. To this end, dashboard stickers and posters have been produced and distributed. These illustrate DRF markers, inform of their purpose and provide a contact telephone number to use if such a marker is encountered.

Weed control research is being conducted at Population 2 by CALMScience. Two experimental treatments will be examined - weed control in isolation, and weed control combined with disturbance.

Staff from CALM's Moora District regularly monitor all populations.

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

Future recovery actions

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

1. Undertake weed control

All populations occur amongst dense infestations of grassy weeds. Adult *E. scaberula* plants are coping with the competition from weeds, but the effect on recruitment is a greater threat. Weed control with the use of herbicides will be undertaken at all populations. The tolerance of native plant species to herbicides at *E. scaberula* sites is unknown, so caution is necessary. A weed control program for these populations will involve (adapted from Panetta and Hopkins 1991):

1. Accurately mapping the boundaries of the weed populations.
2. Selection of an appropriate herbicide or alternative method of weed control after determining which weeds are present.
3. Controlling invasive weeds by hand removal and spot spraying around individual *E. scaberula* plants when weeds first emerge.
4. Scheduling to include weed spraying of other Declared Rare Flora populations requiring weed control within Moora District.

All roadside populations occur on lands managed by MRWA, and all rail reserve populations are on lands managed by Westrail. A weed control program will be developed in consultation with these agencies.

Action:	Undertake weed control
Responsibility:	CALM (Moora District, CALMScience) through the MDTFRT, relevant land managers
Cost:	$500 per year.

2. Attempt to stimulate germination

E. scaberula is believed to be a disturbance opportunist, with a relatively short lifespan (approximately 10 to 15 years). Smoke treatment and disturbance trials will be undertaken in an attempt to stimulate germination of soil-stored seed in areas adjacent to extant *E. scaberula* plants. This may result in improved habitat through encouraging regeneration of associated native species as well as *E. scaberula*. These trials will be conducted in conjunction with weed control so that any *E. scaberula* germinants are not overwhelmed by competition. The trials will be monitored regularly.

Action: Attempt to stimulate germination
Responsibility: CALM (Moora District) through the MDTFRT
Cost: $2,500 for year 2 and $900 for year 3.

3. Develop a fire management strategy

Little is known about the effects of fire on this species. It is likely that it requires occasional fire for recruitment from soil-stored seed, but frequent fires may be detrimental to the long-term survival of the species. Fire also promotes the introduction and proliferation of weed species.

A fire management strategy will be developed by CALM's Moora District in consultation with relevant land managers and the MDTFRT.

Action: Develop a fire management strategy
Responsibility: CALM (Moora District) through the MDTFRT, relevant land managers
Cost: $2,200 for year 1.

4. Monitor populations

Monitoring factors such as weed densities, habitat degradation, population stability (expansion or decline), pollination activity, seed production, recruitment and longevity is essential, and populations will be inspected annually. The visibility of DRF markers will also be monitored and maintained at all populations. The paint may become dull, and weed or other vegetation growth may obscure markers, rendering them ineffective.

Action: Monitor populations
Responsibility: CALM (Moora District) through the MDTFRT
Cost: $400 per year.

5. Obtain biological and ecological information

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

1. Study of the soil seed bank dynamics and the role of various factors (disturbance, competition, rainfall, grazing) in recruitment and seedling survival.
2. Determination of reproductive strategies, phenology and seasonal growth.
3. Investigation of the mating system and pollination biology.
4. Investigation of population genetic structure, levels of genetic diversity and minimum viable population size.
5. Investigation of the impacts of herbicide on habitat.

Action: Obtain biological and ecological information
Responsibility: CALM (CALMScience, Moora District) through the MDTFRT
Cost: $16,500 per year.

6. Conduct further surveys

Further surveys for *E. scaberula* will be undertaken during its flowering period (September-October) on a systematic basis in areas of suitable habitat. Appropriate habitat on private lands will be surveyed where possible. Areas considered to be suitable habitat for the species will be noted and considered for translocation. Volunteers from the local community, Wildflower Societies, Naturalist Clubs and other community-based groups will be invited to be involved in surveys supervised by CALM staff.

Suggested survey locations include the road and railway reserves along Midlands Road north of Moora and the Moora Town Reserve.

Action: Conduct further surveys
Responsibility: CALM (Moora District) through the MDTFRT
Cost: $1,700 per year.

7. Disseminate information

The importance of biodiversity conservation, the preservation of critically endangered species generally and *E. scaberula* in particular will be promoted to the public. Awareness will be encouraged in the community through a publicity campaign using the local print and electronic media and poster displays. Formal links with local naturalist groups and interested individuals will also be encouraged. A poster illustrating all critically endangered flora in Moora District will be prepared and displayed at shire offices and shopping centres. An information sheet for *E. scaberula* will also be produced. This will include photographs, a description of the plant, its habitat type, threats and management actions. The exact location of this species will remain confidential. The information sheets will be distributed to the public through CALM's Moora District office and the office and library of the Shire of Moora. Copies will also be supplied to Fire and Rescue Service, Westrail, MRWA and Agriculture Western Australia to raise awareness of the plant and its appearance. Such activities may lead to the discovery of new populations of the species.

Action: Disseminate information
Responsibility: CALM (Moora District, Corporate Relations Division) through the MDTFRT
Cost: $900 for year 2 and $400 for years 1 and 3.

8. Write full Recovery Plan

At the end of the three-year term of this Interim Recovery Plan, the need for further recovery will be assessed. If the species is still ranked Critically Endangered, a full Recovery Plan will be written to describe action required for long-term maintenance of the taxon. A full Recovery Plan will be prepared with the benefit of the knowledge gained over the time frame of this Interim Recovery Plan.

Action: Write full Recovery Plan
Responsibility: CALM (Moora District) through the MDTFRT
Cost: $18,700 for year 3.

4. TERM OF PLAN

This Interim Recovery Plan will operate from May 1999 to April 2001 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:

Robert Chinnock	Adelaide Herbarium
Anne Cochrane	Manager, CALM Threatened Flora Seed Centre
Rebecca Evans	Project Officer, CALM W.A. Threatened Species and Communities Unit
Sophie Juszkiewicz	Propagator, Kings Park and Botanic Garden
Frank Obbens	Research Scientist, CALMScience
Rebecca Carter (nee Wolstenholm)	Previously Conservation Officer, Moora District

Thanks also to CALMScience staff for providing access to Herbarium databases and specimen information, and the staff of CALM's Wildlife Branch for 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.

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

CALM (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.

Fitzgerald, W.V. (1905). Some new species of West Australian plants. *Journal of the West Australian Natural History Society* 2: 29.

Grieve, B.J. and Blackall, W.E. (1982). *How to Know Western Australian Wildflowers* IV, 2nd ed.: 637. University of Western Australia Press, Perth.

Panetta, F.D. and Hopkins, A.J.M. (1991). Weeds in Corridors: Invasion and Management. Pp 341-51 in *Nature Conservation 2: The Role of Corridors*. D.A. Saunders and R.J. Hobbs (eds). Surrey Beatty & Sons. Chipping Norton, N.S.W.

World Conservation Union (1994). *IUCN Red List Categories. Prepared by the IUCN Species Survival Commission., As approved by the 40th meeting of the IUCN Council*. Gland, Switzerland.

7. TAXONOMIC DESCRIPTION

(Fitzgerald 1905).

Eremophila* (*Pholidia*) *scaberula

A low growing, almost procumbent heath-like shrub, the branches with raised decurrent lines from each leaf-stalk and along with the foliage scaberulous and scarcely viscid. Leaves rather crowded, spreading or incurved, linear or almost subulate, obtuse, attenuated into a short petiole, entire, thick, flat above, the midrib prominent beneath, 2-4 lines long. Flowers purple, solitary, on thick axilliary pedicels of 1-2 lines long. Calyx glabrous, about 2 lines long, the segments lanceolate-ovate and terminating in subulate recurved points. Corolla 5-6 lines long, tube not longer than the calyx, the obliquely broad campanulate portion longer; lobes broad and rather short, the upper ones connate high up and recurved, the lower middle one broader and longer than the others, quite glabrous without, slightly woolly within. Stamens included. Ovary glabrous, scarcely rugose, slightly laterally compressed, cylindrico-conical, 2-celled, each cell 2-ovulate. Style slender, glabrous, hooked at the end, exserted. Fruit narrow-ovate, not longer than the calyx, rugose and usually 4-celled.

Locality: Moora, growing in clay or rich loam in flat country. E.W. Hursthouse, October, 1903.

Remarks: This new species approaches *Eremophila* (*Pholidia*) *microtheca*, F. v. M., differing principally in the branches and foliage being scaberulous, not plumose-pubescent; shape and arrangement of the leaves; calyx segments glabrous, not plumose-pubescent, also in the shape of the corolla and less rugose fruits.