INTERIM RECOVERY PLAN NO. 101

SILKY EREMOPHILA

(*EREMOPHILA NIVEA*)

INTERIM RECOVERY PLAN

2001-2004

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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This Interim Recovery Plan will operate from April 2001 to March 2004 but will remain in force until withdrawn or replaced.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 Deputy Director, Biodiversity Conservation on 13 September 2001. 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 April 2001.

SUMMARY

Scientific Name:	***Eremophila nivea***	**Common Name:**	Silky Eremophila
Family:	Myoporaceae	**Flowering Period:**	August to October
Department's Region:	Midwest	**Department's Districts:**	Moora, Geraldton
Shires:	Three Springs, Perenjori, Morawa	**Recovery Teams:**	Moora District Threatened Flora Recovery Team and Geraldton District Threatened Flora Recovery Team

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; Chinnock, R.J. (1986) Five endangered new species of Myoporaceae from south-western Australia. *Nuytsia* 5(3), 391-400; Richmond, G. and Coates, D. (1995) Population dynamics, seed biology and conservation of six endangered *Eremophila* species. Unpublished report for the Australian Nature Conservation Agency by the Department of Conservation and Land Management.

Current status: *Eremophila nivea* was declared as Rare Flora in September 1987 and ranked in September 1995 as Critically Endangered (CR). It currently meets World Conservation Union (IUCN 2000) Red List Category 'CR' under criteria A2c; A3c; A4c and B2a+biii due to the severe fragmentation of populations, and a decline in the area, extent and quality of the habitat. The main threats are weeds, salinity, road and firebreak maintenance activities, inappropriate fire regimes, grazing, chemical drift and poor regeneration.

Critical habitat: The critical habitat for *Eremophila nivea* comprises the area of occupancy of the known populations; areas of similar habitat ie. red-brown sandy loam and lateritic gravel, or clayey loam usually near the edge of seasonal creeks, in open York gum (*Eucalyptus loxophleba*) woodland among low scrub, within 200 metres of known populations; corridors of remnant vegetation that link populations; the local catchment for the surface and ground waters that provide the seasonal wetland habitat of the species; additional occurrences of red-brown sandy loam and lateritic gravel, or clayey loam usually near the edge of seasonal creeks, in open York gum woodland over low scrub, that do not currently contain the species.

Habitat requirements: *Eremophila nivea* occurs in red-brown sandy loam and lateritic gravel, or clayey loam usually near the edge of seasonal creeks, in open York gum woodland over low scrub (Brown *et al*., 1998).

Existing Recovery Actions: The following recovery actions have been or are currently being implemented:
1. Most managers of land on which *Eremophila nivea* is located, and managers of land adjacent to populations have been made aware of the species' locations and the associated legal obligations.
2. Declared Rare Flora (DRF) markers have been installed at Population 2 and Subpopulations 1a, 3a and 7a.
3. Dashboard stickers and posters that illustrate DRF markers and describe their purpose have been distributed.
4. Fruit from *Eremophila nivea* is stored in the Department's Threatened Flora Seed Centre at –18°C.
5. The Botanic Garden and Parks Authority currently have 65 *Eremophila nivea* plants in cultivation.
6. Weed control trials were conducted at Populations 2, 3 and 6 during 1998-2000.
7. Subpopulation 7b of *Eremophila nivea* on private property was fenced in August 1997. Seedlings were also planted to help reduce salt encroachment.
8. An A4 sized poster, that provides a description of the species, and information about threats and recovery actions, has been produced for *Eremophila nivea*.
9. The Moora and Geraldton District Threatened Flora Recovery Teams are overseeing the implementation of this IRP.
10. Staff from the Department's Moora and Geraldton District offices regularly monitor the populations.

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
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. Coordinate recovery actions.
2. Undertake weed control.
3. Stimulate and monitor germination.
4. Install fencing.
5. Install Declared Rare Flora markers.
6. Continue to rehabilitate habitat.
7. Conduct further surveys.
8. Propagate plants for translocation.
9. Undertake and monitor translocation.
10. Develop and implement a fire management strategy.
11. Monitor populations.
12. Collect seed and cutting material.
13. Notify and liaise with relevant land managers.
14. Seek measures to achieve conservation management.
15. Promote awareness.
16. Obtain biological and ecological information.
17. Write a full Recovery Plan.

1. BACKGROUND

History

Eremophila nivea was first collected near Three Springs in 1960 by C.A. Gardner. Four years later, the species was also collected north-east of Morawa, about 80 km away. Neither population has been relocated. In 1996 a new population was found to the north-west of Morawa.

Further collections of *Eremophila nivea* have since been made. Another population of *E. nivea*, located in 1997, was killed by fire in 1998 and has yet to be relocated. Despite numerous surveys, Population 4 (see Table, page 6) has not been relocated since 1977. It is thought that this population may have been mis-identified and could in fact have been *Ricinocarpus velutinus*, a similar looking species that occurs in the general area of *E. nivea*.

Currently, *Eremophila nivea* is known from nine populations consisting of 301 mature plants.

Description

Eremophila nivea is an erect, compact shrub to 2 m tall, with branches, leaves, flower stalks and sepals all densely covered with whitish, woolly hairs. The margins of the pointed, linear leaves are turned back slightly. Leaves are stalkless, up to 18 mm long, and arranged alternately along the stems. One or 2 flowers are borne in the leaf axils on stalks 2 to 5.5 mm long. The tubular, lilac flowers are about 2.3 cm long, and have pointed sepals, up to 11 mm long and 2.5 mm wide. The flowers are hairless outside and whitish inside and have 2 lips, with lilac to brown spots on the lower lip. Four stamens are held within the flower tube. The beaked, oval-shaped fruit is enclosed in a papery, buff-coloured coat, which splits at the apex (Brown *et al*.1998).

Eremophila nivea is distinguished from *Eremophila eriocalyx* by a more dense, persistent hairiness, the hairless, or almost hairless inner floral whorl, the open throat and the shorter stalks on flowers and shorter sepals (Chinnock 1986).

Distribution and habitat

Eremophila nivea is currently known from the Three Springs and Morawa areas of Western Australia. The species occurs in red-brown sandy loam and lateritic gravel, or clayey loam usually near the edge of seasonal creeks, in open York gum (*Eucalyptus loxophleba*) woodland over low scrub (Brown *et al*. 1998).

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*).

The critical habitat for *Eremophila nivea* comprises:

- the area of occupancy of the known populations,
- areas of similar habitat ie. red-brown sandy loam and lateritic gravel, or clayey loam usually near the edge of seasonal creeks, in open York gum woodland over low scrub, within 200 metres of known populations (these areas provide potential habitat for natural range extension),
- corridors of remnant vegetation that link populations (these areas are necessary to allow pollinators to move between populations and are usually road and rail reserves),
- the local catchment for the surface and ground waters that provide the seasonal wetland habitat of the species (the species generally occurs in areas that are seasonally inundated and are dependent on maintenance of local surface and ground water hydrology),
- additional occurrences of similar habitat ie. red-brown sandy loam and lateritic gravel, or clayey loam usually near the edge of seasonal creeks, in open York gum woodland over low scrub that do not currently contain the species (these areas represent possible translocation sites).

Biology and ecology

Eremophila is a genus endemic to Australia that is represented in all mainland states. It is comprised of some two hundred named species and many more unnamed. While most species occur in semi-arid and arid regions, they can be found in a range of environmental conditions. Species in this genus are commonly known as emu bush or poverty bush.

Results of a prescribed burn undertaken as part of a study on six *Eremophila* species found that *Eremophila nivea* was partially fire tolerant, as its foliage was not highly flammable. The relative density of starch grains, a further indication of the fire sensitivity in the genus *Eremophila,* also suggests that this species is partially fire tolerant (Richmond and Coates 1995).

Three treatments were tested during weed control trials conducted at Populations 2, 3 and 6. These were no treatment (controls), weed control (fusilade), and weed control plus regeneration involving raking and spraying with concentrated smoke water. Data suggest that weed control alone provided no clear benefit in terms of plant growth, plant health or seedling recruitment in populations of *Eremophila nivea*. However, when weed control was combined with regeneration techniques, including raking and smoke treatment, there was an approximate ten fold increase in recruitment (Obbens 2000).

Eremophila nivea is a popular ornamental garden plant in Western Australia and South Australia (Richmond and Coates 1995).

Threats

Eremophila nivea was declared as Rare Flora in September 1987 and ranked in September 1995 as Critically Endangered (CR). It currently meets World Conservation Union (IUCN) Red List Category 'CR' under criteria A2c; A3c; A4c and B2a+biii (IUCN 2000) due to the severe fragmentation of populations, and a decline in the area, extent and quality of habitat. The main threats are weeds, salinity, road and firebreak maintenance activities, inappropriate fire regimes, grazing, chemical drift and poor regeneration.

- **Weed invasion** is a threat to all populations. Weeds suppress early plant growth by competing for soil moisture, nutrients and light. They also exacerbate grazing pressure and increase the fire hazard due to the easy ignition of high fuel loads that are produced annually by many grass weed species.

- **Salinity** occurs as a result of a rise in the water table due to clearing of deep-rooted native vegetation. This is causing degradation of the species' habitat at Population 6 and Subpopulation 7b. If not addressed, this decline will continue in the medium to long-term. Assessment and monitoring of the populations is required and will be addressed under Recovery Action 11.

- **Road and firebreak maintenance activities** threaten Subpopulations 1a, 1b and 7a and Populations 2, 3 and 5. Threats include actions such as grading road reserves, spraying of chemicals, constructing drainage channels and mowing the roadside vegetation to improve visibility. These disturbance events also often encourage weed invasion into adjacent habitat, as well as causing damage to actual plants. Relevant authorities need to be informed of the location of populations so that appropriate protective measures can be implemented. Managers of land adjacent to populations also need to be informed of the location of *Eremophila nivea* to help prevent possible damage due to grazing, crop maintenance, firebreak maintenance and other activities.

- **Inappropriate fire regimes** would affect the viability of populations, as adult plants of *Eremophila nivea* are probably killed by fire, with populations regenerating from soil-stored seed. The soil seed bank would, therefore, be rapidly depleted if fires recurred before juvenile plants reached maturity and replenished the soil seed bank. It is likely, however, that occasional fires are required for the propagation of the species.

- **Grazing** by rabbits (*Oryctolagus cuniculus*) and kangaroos (*Macropus rufus and M. fuliginosus*) has had a minor impact on Population 6. Although the population is fenced, kangaroos and rabbits still enter the area and graze on the plants. In addition, disturbance of soil by rabbit warren construction, increased nutrient levels and the introduction of weed seeds from their droppings are impacting on the habitat at Population 6. Stock grazing is also a potential threat to Subpopulation 3b. Grazing may have an impact on the establishment of *Eremophila nivea* seedlings thereby limiting natural recruitment.

- **Destruction of reproductive** parts of the plants by cockatoos is a minor threat to Population 6, which is located on private property. Cockatoos attack the plants, nipping off some of the flowers, and reducing the plants' reproductive capability. This destruction will be monitored.

- **Chemical drift** from herbicide and fertiliser applications from adjacent farmland may affect the species' growth and survival.

- **Poor regeneration**, due to lack of appropriate disturbance threatens most populations as few young plants of *Eremophila nivea* have been observed, except in some of the areas that have been subject to regeneration techniques.

Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants	Condition	Threats
1A. NNW of Three Springs	Shire road reserve	1987 5 1989 3 1990 3 1992 2 1993 1 1998 16 (3) [1 dead] 2001 21	Poor	Weed invasion, road maintenance, inappropriate fire regime, chemical drift, salinity, poor regeneration
1B. NNW of Three Springs	Private property	1989 1 1992 1 1993 2 (26) [2 dead] 1998 13 2001 14	Poor	Weed invasion, inappropriate fire regime, firebreak maintenance, chemical drift, salinity, poor regeneration
2. NNW of Three Springs	Shire road reserve	1990 15 1992 14 1993 17 (3) 1998 17 (9) 2000 18 (24+) 2001 22 (43)	Moderate/ Poor	Weed invasion, road maintenance, inappropriate fire regime, chemical drift, salinity
3A. NNW of Three Springs	Shire road reserve	2001 60 (24) 2001 50+ 2001 86 (7) 2001 76 (5) [2 dead] 2001 80 (38) 2001 93	Moderate/ Poor	Weed invasion, road maintenance, inappropriate fire regime, chemical drift, salinity
3B. NNW of Three Springs	Private property	2001 1	Poor	Weed invasion, inappropriate fire regime, chemical drift, salinity, stock grazing, poor regeneration
4. SW of Morawa	Shire road reserve	1977 4 1998 0 2000 0 2001 0	Extinct	Road maintenance, weed invasion, inappropriate fire regime, salinity, poor regeneration
5. N of Three Springs	Shire road reserve	1991 1 1993 1 1998 1 2001 0 [1 dead]	Poor	Weed invasion, road maintenance, inappropriate fire regime, chemical drift, salinity, poor regeneration
6. N of Three Springs	Private property	1993 265 (20) 1998 100+ 2001 100+	Moderate	Weed invasion, grazing, salinity, inappropriate fire regime, poor regeneration
7A. NW of Morawa	Shire road reserve	1997 45 2000 50+ 2001 38	Moderate/ Poor	Weed invasion, road maintenance, inappropriate fire regime, salinity, poor regeneration
7B. NW of Morawa	Private property	1997 9 2000 7 2001 11	Moderate/ Poor	Weed invasion, salinity, inappropriate fire regime, poor regeneration
8. NE of Three Springs	Shire road reserve	1997 1 1998 0 2001 0	Killed by fire	Road maintenance, weed invasion, inappropriate fire regime, salinity, poor regeneration
9. NNW of Three Springs	Private property	1998 1	Moderate	Weed invasion, inappropriate fire regime, salinity, poor regeneration

Note 1: Numbers in brackets = number of seedlings
Note 2: Population 8 was destroyed by fire

Guide for decision-makers

Section 1 provides details of current and possible future threats. Developments in the immediate vicinity of any of the populations or within the defined critical habitat of *Eremophila nivea* require assessment. No developments should be approved unless the proponents can demonstrate that they will have no significant impact on the species, its habitat or potential habitat, or the local surface and ground water hydrology (ie. the critical habitat of the species).

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.

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

Most managers of land on which *Eremophila nivea* is located, as well as managers of land adjacent to populations, have been made aware of the species' locations and the associated legal obligations. Private property owners, Shires and the Water Corporation have been formally notified of the presence of *Eremophila nivea* populations on or adjacent to their land.

Declared Rare Flora (DRF) markers have been installed at Population 2, and Subpopulations 1a, 3a and 7a. 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. To this end, dashboard stickers and posters that illustrate DRF markers, inform of their purpose and provide a contact telephone number to use if such a marker is encountered, have been produced and distributed.

Approximately 1500 fruits were collected from Population 2 in January 1996 and stored in the Department's Threatened Flora Seed Centre (TFSC) at –18°C. The TFSC test the viability of the seed initially and after one year in storage. The initial germination rate of *Eremophila nivea* seed was found to range between 88% and 94%. Another collection of 2504 fruits (Population 6) and 2280 fruits (Population 3) was made in January 1996, and had initial germination rates of 0% and 87% respectively, and up to 68% after one year in storage. In January 1997, 160 fruits were collected from Population 1, and in February 1998, 898 fruit were collected from Population 7. The initial germination rates were 67%, 80% and 63% respectively. After one year of storage the germination rate ranged from 50% to 100% (pers. comm. A. Cochrane[1]).

The Botanic Gardens and Parks Authority (BGPA) currently have 65 *Eremophila nivea* plants, most of which are in containers or planted out in the gardens. The species is propagated by grafting onto *Myoporum* rootstock and through cuttings (pers. comm. A. Shade[2]).

Weed control trials using three treatments were conducted at Populations 2, 3 and 6 during 1998-2000. The treatments were controls, weed control using fusilade, and weed control plus regeneration involving raking and spraying with concentrated smoke water. Data suggests that weed control alone provided no clear benefit in terms of plant growth, plant health or seedling recruitment in populations of *Eremophila nivea*. However, when weed control was combined with regeneration techniques, short-term regeneration of populations was achieved (Obbens 2000).

Subpopulation 7b of *Eremophila nivea* on private property was fenced in August 1997. With funding assistance from the World Wide Fund for Nature 1.2 kms of fencing was erected by the Australian Conservation Trust for Volunteers, in collaboration with the Department. The fenced area included a large buffer zone where seedlings were planted to help reduce salt encroachment. Three thousand seedlings of salmon gums (*Eucalyptus salmonophloia*), York gums and *Melaleuca eleuterostachya* were planted.

An A4 sized poster, that provides a description of the species, and information about threats and recovery actions, was produced for *Eremophila nivea*. It is hoped that the poster will result in the discovery of new populations.

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

The Moora and Geraldton District Threatened Flora Recovery Teams (MDTFRT, GDTFRT) are overseeing the implementation of this IRP and will include information on progress in their annual reports to the Department's Corporate Executive and funding bodies.

Staff from the Department's Moora and Geraldton District Offices regularly monitor the populations.

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 MDTFRT and GDTFRT will continue to oversee the implementation of recovery actions for *Eremophila nivea* and 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 (Moora and Geraldton Districts) through the MDTFRT and GDTFRT
Cost: $500 per year.

2. Undertake weed control

Weeds are a threat to all populations. The following actions will be implemented:

1. Selection of appropriate herbicides after determining which weeds are present.
2. Controlling invasive weeds by hand removal or spot spraying around *Eremophila nivea* plants when weeds first emerge.
3. Scheduling weed control to include spraying at other threatened flora populations within the district.

The tolerance of associated native plant species to herbicides at the site of *Eremophila nivea* is not known and weed control programs will be undertaken in conjunction with research.

Action: Undertake weed control
Responsibility: The Department (Moora and Geraldton Districts) through the MDTFRT and GDTFRT
Cost: $1,000 per year.

3. Stimulate and monitor germination

Smoke water has been shown to be an effective method of stimulating germination of *Eremophila nivea* and this method will be used around a number of dead plants. The time to first flowering and seeding, and the age of plants at senescence will be recorded. This will provide information on the optimal time interval between disturbance events to maintain populations of *Eremophila nivea*.

Action: Stimulate and monitor germination
Responsibility: The Department (Moora and Geraldton Districts) through the MDTFRT and GDTFRT
Cost: $4,000 in first and second years, $1,500 in third year.

4. Install fencing

The fence currently erected around Population 6 consists of two sections, and these two sections will be joined. A fence is also required around Population 3b to prevent potential damage from livestock.

Action: Install fencing
Responsibility: The Department (Moora District) through the MDTFRT
Cost: $1,100 in the first year.

5. Install Declared Rare Flora markers

DRF markers are required on the road reserve at Populations 5 and 8. Their purpose is to alert people operating in the area (eg, Shire staff and contractors, Bushfire Brigade) to the presence of DRF to help prevent accidental damage.

Action: Install DRF markers
Responsibility: The Department (Moora and Geraldton Districts) through the MDTFRT and GDTFRT
Cost: $500 in first year.

6. Continue to rehabilitate habitat

Rehabilitation of *Eremophila nivea* habitat by re-introduction of local native plant species along the creekline near Subpopulation 7b will be continued to help prevent encroachment of salinisation.

Action: Continue to rehabilitate habitat
Responsibility: The Department (Geraldton District) through the GDTFRT
Cost: $2,400 in first and second years.

7. Conduct further surveys

Historical records suggest that *Eremophila nivea* was once more widespread than its current distribution. It is possible that the taxon is still extant in other small isolated remnants or in more remote pastoral areas inland from Morawa. Local naturalists and wildflower society groups and interested individuals will be encouraged to participate in further surveys during the species' flowering period (August to October), supervised by the Department's staff.

Action: Conduct further surveys
Responsibility: The Department (Moora and Geraldton Districts) through the MDTFRT and GDTFRT
Cost: $2,400 per year.

8. Propagate plants for translocation

The propagation of plants in readiness for translocation is essential as the known wild populations of *Eremophila nivea* are under threat. Seed and/or cuttings will need to be taken for germination and propagation at the BGPA for planting in the following year.

Action: Propagate plants for translocation
Responsibility: The Department (Moora and Geraldton Districts) and the BGPA through the MDTFRT and GDTFRT
Cost: $2,800 in first and second years.

9. Undertake and monitor translocation

Although translocations are generally undertaken under full Recovery Plans, the many threats to the wild populations of this species are indicative of the need for the development of a translocation proposal within the time frame of this IRP. This will be coordinated by the MDTFRT and GDTFRT. Information on the translocation of threatened animals and plants 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 Director of Nature Conservation.

Monitoring of the translocation is essential and will be undertaken according to the timetable to be developed for the Translocation Proposal.

Action: Undertake and monitor translocation
Responsibility: The Department (Science Division, Moora and Geraldton Districts) through the MDTFRT and GDTFRT
Cost: $12,100 in first year and $5,900 in subsequent years.

10. Develop and implement a fire management strategy

The fire response of *Eremophila nivea* is not known. As adult plants are probably killed by fire, too frequent fire may prevent the accumulation of sufficient soil stored seed to allow regeneration. Fire should therefore be prevented from occurring in the populations at least in the short term. A fire management strategy will be developed that describes fire control measures, and timing and fire frequency.

Action: Develop and implement a fire management strategy
Responsibility: The Department (Moora and Geraldton Districts) through the MDTFRT and GDTFRT
Cost: $2,700 in first year and $1,100 in subsequent years.

11. Monitor populations

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

Action: Monitor populations
Responsibility: The Department (Moora and Geraldton Districts) through the MDTFRT and GDTFRT
Cost: $1,100 per year.

12. Collect seed and cutting material

Preservation of germplasm is essential to guard against extinction if wild populations are lost and to provide material from which plants can be propagated for translocations. A quantity of seed has been collected but additional seed is required from all populations. Cuttings will also be collected to further establish a living collection of genetic material at the BGPA.

Action: Collect seed and cutting material
Responsibility: The Department (Moora and Geraldton Districts) through the MDTFRT and GDTFRT
Cost: $3,300 in first and second years.

13. Notify and liaise with relevant land managers

Some land managers have yet to be notified about the presence of *Eremophila nivea* populations on or adjacent to their land. Staff from the Department's Moora and Geraldton Districts will continue to liaise with land managers and the managers of land adjacent to the populations to help ensure the populations are not accidentally damaged or destroyed.

Action: Liaise with relevant land managers
Responsibility: The Department (Moora and Geraldton Districts) through the MDTFRT and GDTFRT
Cost: $500 per year.

14. Seek measures to achieve conservation management

Ways and means of achieving protection of the land on which Population 6 of *Eremophila nivea* occurs will be investigated. Possible methods of achieving future conservation management include covenanting and land purchase.

Action: Seek measures to achieve conservation management
Responsibility: The Department (Moora District) through the MDTFRT
Cost: To be determined.

15. Promote awareness

The importance of biodiversity conservation and the protection of the Critically Endangered *Eremophila nivea* will be promoted to the public. Awareness will be encouraged in the community through a publicity campaign utilising 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 (Moora and Geraldton Districts) through the MDTFRT and GDTFRT
Cost: $900 per year.

16. Obtain biological and ecological information

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

1. The impact of salinity on *Eremophila nivea* and its habitat.
2. Study of the soil seed bank dynamics and the role of various factors including disturbance (such as fire), competition, rainfall, and grazing in recruitment and seedling survival.
3. Determination of reproductive strategies, phenology and seasonal growth.
4. Investigation of the mating system and pollination biology.
5. Investigation of population genetic structure, levels of genetic diversity and minimum viable population size.

Action: Obtain biological and ecological information
Responsibility: The Department (Science Division, Moora and Geraldton Districts) through the MDTFRT and GDTFRT
Cost: $19,600 per year.

17. Write a full Recovery Plan

At the end of the second year 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 developed to describe actions required for long-term maintenance. A Recovery Plan will be prepared with the benefit of knowledge gained over the time frame of this Interim Recovery Plan.

Action: Write a full Recovery Plan
Responsibility: The Department (WATSCU, Moora and Geraldton Districts) through the MDTFRT and GDTFRT
Cost: $20,600 in third year.

4. TERM OF PLAN

This Interim Recovery Plan will operate from April 2001 to March 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:

Alanna Chant	Conservation Officer, the Department's Geraldton District, Geraldton
Bob Chinnock	South Australian Herbarium
Anne Cochrane	Manager, the Department's Threatened Flora Seed Centre, Science Division
Leonie Monks	Research Scientist, Science Division
Sue Patrick	Senior Research Scientist, Science Division
Alice Reaveley	Conservation Officer, the Department's Moora District, Jurien Bay
Amanda Shade	Horticulturalist, Botanic Garden and Parks Authority
Colin Yates	Research Scientist, Science Division

Thanks also to 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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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

Chinnock, R.J. (1986) Five endangered new species of Myoporaceae from south-western Australia. *Nuytsia* 5(3), 391-400.

Eremophila nivea is a 1.6 m tall shrub with branches, leaves, pedicels and sepals (outer surface) completely clothed in white to greyish white lanate tomentum. *Branches* terete, non-tuberculate, hairs branched and often floccose in older parts. *Leaves* sessile, alternate but occasionally with a few opposite, linear, (6)8-18(22) x 1.5-3.5 mm, acute, margins entire, slightly revolute, purplish black sometimes visible through indumentum, subequal, triangular to lanceolate, 7-11 x 0.7-2.5 mm, acute to attenuate, inside surface glabrous below, with dense white branched hairs above especially towards the margins. *Corolla* 15-23 mm long, lilac, tube white inside on the lower side, faintly lilac to brownish spotted, 2-lipped,

outside surface glabrous or with a few scattered branched hairs, inside of tube arachnoid hairy and lobes glabrous; lobes obtuse, medial one of lower lip dilated, emarginate. *Stamens* 4, included, glabrous. *Ovary* ovoid, c. 3 x 1 mm, pale yellow, quadrilocular with one ovule per loculus, glabrous; style eccentric, pilose. *Fruit* ovoid, 4-5 x 2.2-2.6 mm, prominently beaked, splitting at apex, glabrous; exocarp buff-coloured, papery, endocarp brown, smooth. *Seed* ovoid, c. 1.5 x 0.7 mm, buff-coloured.