INTERIM RECOVERY PLAN NO. 279

SHORT-LEAVED FRANKENIA

(*FRANKENIA PARVULA*)

INTERIM RECOVERY PLAN

2006-2011

July 2006

Department of Environment and Conservation
Species and Communities Branch (SCB)
Kensington

Natural Heritage Trust
Helping Communities Helping Australia
An Australian Government Initiative

Government of Western Australia

Department of Environment and Conservation

FOREWORD

Interim Recovery Plans (IRPs) are developed within the framework laid down by the former Department of Conservation and Land Management (CALM), now the Department of Environment and Conservation (DEC) - 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.

DEC is committed to ensuring that Threatened taxa are conserved through the preparation and implementation of Recovery Plans (RPs) or IRPs, and by ensuring that conservation action commences as soon as possible and, in the case of Critically Endangered (CR) taxa, always within one year of endorsement of that rank by the Minister.

This IRP will operate from July 2006 to June 2011 but will remain in force until withdrawn or replaced. It is intended that, if the species is still ranked Endangered, this IRP will be reviewed after five years and the need for a full Recovery Plan will be assessed.

This IRP was given regional approval on 19 August 2008 and was approved by the Director of Nature Conservation on 12 September 2008. The allocation of staff time and provision of funds identified in this IRP is dependent on budgetary and other constraints affecting DEC, as well as the need to address other priorities.

Information in this IRP was accurate at July 2006.

ACKNOWLEDGMENTS

This IRP was prepared by Robyn Luu[1] and Andrew Brown[2].

[1] Project Officer, Species and Communities Branch, DEC, PO Box 51 Wanneroo, 6946.
[2] Threatened Flora Coordinator, Species and Communities Branch, DEC, PO Box 51 Wanneroo, 6946.

The following people have provided assistance and advice in the preparation of this IRP:

Heather Adamson	Land for Wildlife Officer, DEC's Yilgarn District
Ben Bayliss	Former Project Officer, DEC's Species and Communities Branch
Kate Brunt	Former Flora Conservation Officer, CALM's Yilgarn District
Anne Cochrane	Senior Research Scientist, DEC's Science Division
Joel Collins	Former Conservation Officer, DEC's Yilgarn District
Andrew Crawford	Technical Officer, DEC's Science Division
Craig Douglas	Project Officer, DEC's Species and Communities Branch
Anne Harris	Former Project Officer, DEC's Species and Communities Branch
Wendy Johnston	Conservation Officer, DEC's Yilgarn District
David Jolliffe	District Nature Conservation Officer, DEC's Yilgarn District
Mike Lyons	Research Scientist, DEC's Science Division
Diana Papenfus	Former Project Officer, DEC's Species and Communities Branch
Rosemarie Rees	Project Officer, DEC's Species and Communities Branch

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

Cover photograph by Diana Papenfus.

CITATION

This IRP should be cited as:

Department of Environment and Conservation (2006). Short-leaved frankenia (*Frankenia parvula*) Interim Recovery Plan 2006-2011. Interim Recovery Plan No. 279. Department of Environment and Conservation, Western Australia.

SUMMARY

Scientific Name:	*Frankenia parvula* Turcz.	**Common Name:**	Short-leaved Frankenia
Family:	Frankeniaceae	**Flowering Period:**	October to December
DEC Region:	Wheatbelt	**DEC District:**	Yilgarn
Shires:	Cunderdin, Kellerberrin, Yilgarn	**Recovery Team:**	Yilgarn District Threatened Flora Recovery Team

Illustrations and/or further information: Barnsley, B. (1982) Frankeniaceae p112-146. *Flora of Australia Volume 8 Lecythidales to Batales*. Commonwealth of Australia, New South Wales; Brown, A., Thomson-Dans, C. and Marchant, N. (Eds). (1998) *Western Australia's Threatened Flora*. Department of Environment and Conservation (formerly CALM), Western Australia; Western Australian Herbarium (1998) FloraBase - Information on the Western Australian Flora. Department of Environment and Conservation (formerly CALM), Western Australia. http://www.calm.wa.gov.au/science/.

Current status: *Frankenia parvula* is declared as Rare Flora under the Western Australian *Wildlife Conservation Act 1950* and currently meets World Conservation Union (IUCN 2000) Red List Category Endangered (EN) under criteria B1ab(iii)+2ab(iii) due to the limited area of occupancy and number of locations and a continuing decline in the area, extent and/or quality of habitat. The species is not currently listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Threats to the species include grazing by rabbits and changes to hydrology from rising salinity and waterlogging.

Description: *Frankenia parvula* is a small shrub that has creeping stems which produce short, upright branches. The leaves are tiny and are 1.5 to 3 mm long, stalked, narrowly oblong, circular in cross-section, slightly hairy on the upper surface and have curled under margins. The leaf sheath is half as long as the blade. Flowers are on the ends of the branches and may be solitary or in heads of two or three. The thickly ribbed calyx has a mixture of spreading bristly hairs ad short flat-lying hairs above, but is hairless below. The five petals are 5-6mm long. There are six or seven stamens and a style which has three branches. Eleven to fifteen ovules are attached to the walls of the ovary (Brown *et al*. 1998).

Habitat requirements: *Frankenia parvula* is sparsely distributed in the Kellerberrin, Yellowdine and Cunderdin areas. The species is found in white to brown sand over sandy clay around the high water mark of major drainage channels where it grows both independent of and within fringing vegetation (Harris 2004).

Habitat critical to the survival of the species, and important populations: Habitat critical to the survival of the species includes the area of occupancy of important populations; areas surrounding important populations, i.e. white to brown sand over sandy clay around the high water mark of major drainage channels (these provide potential habitat for natural range extension and allow pollinators to move between populations); the local catchment of the surface and possibly ground water that maintains the habitat of the species; and additional occurrences of similar habitat that may contain the species or be suitable sites for future translocations.

Given that this species is ranked as Endangered it is considered that all known habitat for wild and translocated populations is habitat critical to their survival.

Benefits to other species/ecological communities: Population 2 is located within occurrences of a Threatened Ecological Community (TEC) ranked as Endangered in Western Australia. Other listed and priority flora also occur in the wider habitat of populations. Recovery actions implemented to improve the quality or security of the habitat of these populations are likely to improve the status of the TEC in which they are located, as well as the other rare and priority flora.

International Obligations: This plan is fully consistent with the aims and recommendations of the Convention on Biological Diversity that was ratified by Australia in June 1993, and will assist in implementing Australia's responsibilities under that Convention. The species is not listed under the United Nations Environment Program World Conservation Monitoring Centre (UNEP-WCMC) Convention on International Trade in Endangered Species (CITES). In addition, it is not listed under any other specific international treaty and this Interim Recovery Plan (IRP) does not affect Australia's obligations under these international agreements.

Role and interests of indigenous people: According to the Department of Indigenous Affairs Aboriginal Heritage Sites Register, no sites of Aboriginal significance are known at or near populations of the species covered by this IRP. However, the involvement of the Indigenous community is currently being sought to determine whether there are any issues or interests identified in the Plan. If no role is identified for indigenous communities in the recovery of this species, opportunities may exist through cultural interpretation and awareness of the species.

The advice of the South West Aboriginal Land and Sea Council (SWALSC) and Department of Indigenous Affairs is being sought to assist in the identification of potential indigenous management responsibilities for land occupied by threatened species, or groups with a cultural connection to land that is important for the species' conservation.

Continued liaison between DEC and the indigenous community will identify areas in which collaboration will assist implementation of recovery actions.

Social and economic impacts: The implementation of this recovery plan has the potential to have some limited social and economic impact where populations of *Frankenia parvula* occur on private land. In addition, an exploration licence has been applied for the area containing Population 1. Recovery actions refer to continued liaison between stakeholders with regard to these areas.

Affected interests: Stakeholders potentially affected by the implementation of this plan include the owners of private land that contains populations 2 and 3.

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

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

1. Land managers have been notified of the location and threatened status of the species.
2. Private land containing subpopulations 2a (10 hectares) and 2b (16 hectares) of *Frankenia parvula* were fenced in 2002 and 2004 to prevent access by stock.
3. Private property containing Population 3 of the species has been dedicated as a conservation block. It is part of the World Wide Fund for Nature (WWF) Woodland Watch Program and a Land for Wildlife site (DEC).
4. A review of the monitoring bore network located on the Mortlock River Flats in Cunderdin was initiated in 2002 (Geo and Hydro Environmental Management Pty Ltd 2002).
5. An article on the rediscovery of *Frankenia parvula* appeared in the March/April 2001 Newsletter of the former Department of Conservation and Land Management (CALM).
6. A survey of *Frankenia parvula* and a number of other rare wheatbelt species was undertaken by Diana Papenfus in spring 2003. One new population of the species was located (Population 3).
7. Research into the population characteristics of *Frankenia parvula* was undertaken in 2003/2004 by staff from the former Department of CALM Species and Communities Branch (Harris 2004).
8. Staff from DEC's Yilgarn District regularly monitor all populations of this species.
9. The Yilgarn District Threatened Flora Recovery Team (YDTFRT) is overseeing the implementation of this IRP and will include information on progress in their annual report to DEC'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 populations have increased and/or the number of mature individuals in populations have increased by ten percent or more over the term of the plan.

Criteria for failure: The number of populations have decreased and/or the number of mature individuals in populations have decreased by ten percent or more over the term of the plan.

Recovery actions

1. Coordinate recovery actions.
2. Map habitat critical to the species' survival.
3. Conduct further surveys and confirm populations.
4. Collect seed.
5. Monitor populations.
6. Monitor salinity and groundwater levels.
7. Control rabbits.
8. Obtain additional biological and ecological information.
9. Promote awareness.
10. Achieve long-term protection of habitat.
11. Liaise with relevant land managers.
12. Review the need for further recovery actions.

1. BACKGROUND

History

Frankenia parvula was first collected by James Drummond in the Mt Stirling and Mt Caroline areas in 1847. It was then thought to be extinct until rediscovered in the Cunderdin and Yellowdine areas during surveys conducted in 2000/2001 by M. Lyons[1] as part of a 'Botanical Survey of the Wheatbelt'. When confirming the identity of the specimens, another two collections that had been made previously but not identified as *F. parvula* were also discovered at the WA Herbarium. These collections were made in 1988 by S Hopper and 1997 by R. Cranfield.

In 2003, surveys for the species were conducted by D. Papenfus[2] and a new population (Population 3) was discovered approximately 7 km from a known population near Yellowdine (Population 1). Collections were also made near Kellerberrin and Kwyolin that are thought to be the species or a variety of the species but are yet to have their identity confirmed (Papenfus 2003). Currently, the species is known from three populations that together contain approximately 1164 plants.

Description

Frankenia parvula is a small shrub with creeping stems and short, upright branches. The leaves are tiny and are 1.5 to 3 mm long, stalked, narrowly oblong, circular in cross-section, slightly hairy on the upper surface and curled on the under margins. The leaf sheath is half as long as the blade. Flowers are on the ends of the branches and may be solitary or in heads of two or three. The thickly ribbed calyx has a mixture of spreading bristly hairs and short flat-lying hairs above, but is hairless below. The five petals are 5-6 mm long. There are six or seven stamens and a style which has three branches. Eleven to fifteen ovules are attached to the walls of the ovary (Brown *et al*. 1998).

Distribution and habitat

Frankenia parvula is sparsely distributed in the Kellerberrin, Yellowdine and Cunderdin areas. The species is found in white to brown sand over sandy clay around the high water mark of major drainage channels where it grows both independent of and within fringing vegetation. Associated species include *Melaleuca halmaturorum* and *Halosarcia halocnemoides*, along with many ephemeral species (Harris 2004).

Population 2 of *Frankenia parvula* is located on a threatened ecological community (TEC) 'Salt Flats Plant Assemblages of the Mortlock River (East Branch)' (English and Blyth 1999). This community comprises braided channels up to 2 km wide and flats, wash-lines and sandy rises up to 2 m high stretching 39 km along the Mortlock River (East) from Meckering eastwards to 8 km west of Tammin. A mosaic of plant communities assorted by elevation occurs on the river flats. The area represents the most extensive braided saline drainage line in this part of the South West agricultural zone. There are only fourteen occurrences of this community covering 6310 hectares remaining. A large amount of this community is located on private property and is highly modified.

Summary of population land vesting, purpose and tenure

Pop. No. & Location	DEC District	Shire	Vesting	Purpose	Manager
1. NW of Yellowdine	Yilgarn	Yilgarn	Unvested Reserve	Timber and Goldfields water supply	DEC
2A. W of Cunderdin	Yilgarn	Cunderdin	Freehold	Private property	Landholders
2B. W of Cunderdin	Yilgarn	Cunderdin	Freehold	Private property	Landholders
3. Kellerberrin	Yilgarn	Kellerberrin	Freehold	Private property	Landholders

Populations in **bold text** are considered to be Important Populations.

[1] Mike Lyons, Research Scientist, DEC Science Division

[2] Diana Papenfus, former Project Officer, Department of Conservation and Land Management (CALM), now DEC

Biology and ecology

In 2003/2004, staff from the Department of CALM's (now DEC) Species and Communities Branch researched plant size and vigour, reproductive characteristics and soil characteristics and developed a framework for monitoring changes in five different locations of *Frankenia parvula* (Harris 2004). This study concluded the following:

- Evidence of re-sprouting was observed, which suggests the species may have the ability to recover from disturbance events;
- *Frankenia parvula* plants have the capacity to spread with the largest plant recorded at 1969 cm^2, but most (80%) were small with a canopy area of less than 50 cm^2;
- The highest number of plant deaths occurred close to the waterline at Yellowdine (Population 1);
- Flower and fruit production varied and the proportion of fruits with viable seed was under 50%;
- The species recruits both sexually and vegetatively (clonally by the production of adventitious roots);
- Results of soil salinity analysis varied between sites from 1750 ppm to 2470 ppm (Harris 2004).

Threats

Frankenia parvula is declared as Rare Flora under the Western Australian *Wildlife Conservation Act 1950* and currently meets World Conservation Union (IUCN 2000) Red List Category Endangered (EN) under criteria B1ab(iii)+2ab(iii) due to the limited area of occupancy and number of locations; and a continuing decline in the area, extent and/or quality of habitat. The species is not currently listed under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). Threats to the species include grazing by rabbits and changes to hydrology from rising salinity and waterlogging.

- **Grazing** by rabbits has been indicated as a threat to Population 1. Soil disturbance, weed invasion and the addition of nutrients are secondary effects of animal movement in areas inhabited by the species.

- **Rising saline water tables and waterlogging** resulting from broad scale clearing of the catchment for agriculture has the potential to impact on all populations. *Frankenia parvula* grows on the edge of sandy rises in naturally saline drainages. These small rises act as islands in a saline landscape, so the plants in this area are sitting above the saline water table and would be subject to periodic inundation of relatively fresh water after rains. Any increase in water logging and salinity in these areas as a result of extensive land clearing potentially threatens all populations, particularly those with little vegetation buffer (populations 2 and 3). These threats may lead to a degradation of the species' habitat and, if not addressed, are likely to become worse in the medium to long term. Scouring of the habitat has also been observed at Subpopulation 2a following summer rain in 2000 (Harris 2004).

Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants	Condition	Threats
1. NW of Yellowdine	Unvested reserve	2003 1000+	Healthy	Grazing, hydrological changes
2A. W of Cunderdin	Private property	2000 1 2001 40 2006 1000+	Moderate	Hydrological changes
2B. W of Cunderdin	Private property	2001 15 2001 117 [3]	Moderate	Hydrological changes
3. Kellerberrin	Private property	2003 7	Healthy	Hydrological changes

Populations in **bold text** are considered to be Important Populations; Note: [ ] = number of dead plants

Guide for decision-makers

Section 1 provides details of current and possible future threats. Proposed developments and on-ground works (clearing, firebreaks etc) in the immediate vicinity of habitat critical to the survival of *Frankenia parvula* will

require assessment. Works should not 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 or ground water hydrology.

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

Habitat critical to the survival of the species includes the area of occupancy of populations; areas of similar habitat surrounding populations, i.e. sandy rises near saline drainage lines and salt lake edges (these provide potential habitat for natural range extension and allows pollinators to move between populations); the local catchment of the surface and possibly ground waters that maintain the habitat of this species; and additional occurrences of similar habitat that may contain the species or be suitable for future translocations.

Given that this species is listed as Endangered it is considered that all known habitat for wild and translocated populations is habitat critical to its survival, and that all wild and translocated populations are important populations.

Benefits to other species/ecological communities

Subpopulation 2a of *Frankenia parvula* occurs on the 'Salt Flats Plant Assemblages of the Mortlock River (East Branch)' Threatened Ecological Community (TEC) that is listed as Endangered in Western Australia. Other listed and priority flora that occur in the wider habitat of populations include *Centrolepis caespitosa* (Endangered under both the *Wildlife Conservation Act 1950* and the EPBC Act), *Roycea pycnophylloides* (Vulnerable under the *Wildlife Conservation Act 1950* and Endangered under the EPBC Act), *F. bracteata* (Priority 1), *Drosera salina* (Priority 2), *Stylidium pulviniforme* (Priority 3), *Verticordia mitodes* (Priority 3), *Sarcocornia globosa* (Priority 3), *Hopkinsia anoectocolea* (Priority 3), *Angianthus micropodioides* (Priority 3), *Blennospora phlegmatocarpa* (Priority 3) and *Frankenia glomerata* (Priority 3). Recovery actions implemented to improve the quality or security of the habitat of populations of *Frankenia parvula* are likely to improve the status of the TEC in which populations are located, as well as these other rare and priority flora.

International Obligations

This plan is fully consistent with the aims and recommendations of the Convention on Biological Diversity that was ratified by Australia in June 1993, and will assist in implementing Australia's responsibilities under that Convention. The species is not listed under the United Nations Environment Program World Conservation Monitoring Centre (UNEP-WCMC) Convention on International Trade in Endangered Species (CITES). In addition, it is not listed under any other specific international treaty and this Interim Recovery Plan (IRP) does not affect Australia's obligations under these international agreements.

Role and interests of indigenous people

According to the Department of Indigenous Affairs Aboriginal Heritage Sites Register, no sites of Aboriginal significance are known at or near populations of the species covered by this IRP. However, the involvement of the Indigenous community is currently being sought to determine whether there are any issues or interests identified in the Plan. If no role is identified for indigenous communities in the recovery of this species, opportunities may exist through cultural interpretation and awareness of the species.

The advice of the South West Aboriginal Land and Sea Council (SWALSC) and Department of Indigenous Affairs is being sought to assist in the identification of potential indigenous management responsibilities for land occupied by threatened species, or groups with a cultural connection to land that is important for the species' conservation.

Continued liaison between DEC and the indigenous community will identify areas in which collaboration will assist implementation of recovery actions.

Social and economic impacts

The implementation of this recovery plan has the potential to have some limited social and economic impact where populations of *Frankenia parvula* occur on private land. In addition, an exploration licence has been

applied for the area containing Population 1. Recovery actions refer to continued liaison between stakeholders with regard to these areas.

Affected interests

Stakeholders potentially affected by the implementation of this plan include the owners of private land that contains populations 2and 3.

Evaluation of the Plan's Performance

DEC will evaluate the performance of this IRP in conjunction with the Yilgarn District Threatened Flora Recovery Team. In addition to annual reporting on progress with listed actions and comparison against the criteria for success and failure, the plan is to be reviewed within five years of its implementation.

2. RECOVERY OBJECTIVE AND CRITERIA

IRP Objective: The objective of this IRP 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 populations have increased and/or the number of mature individuals in populations have increased by ten percent or more over the term of the plan.
Criteria for failure: The number of populations have decreased and/or the number of mature individuals in populations have decreased by ten percent or more over the term of the plan.

3. RECOVERY ACTIONS

Existing recovery actions

Land managers have been notified of the location and threatened status of the species. The notification details the Declared Rare status of *Frankenia parvula* and associated legal obligations.

Private land containing subpopulations 2a (10 hectares) and 2b (16 hectares) of *Frankenia parvula* were fenced in 2002 and 2004 to prevent access by stock.

Private property containing Population 3 of the species has been dedicated as a conservation block. It is part of the World Wide Fund for Nature (WWF) Woodland Watch Program and a Land for Wildlife site (DEC) (H. Adamson[3] personal communication).

A review of the monitoring bore network located on the Mortlock River Flats in Cunderdin, which contains Subpopulation 2a of the *Frankenia parvula*, was initiated in 2002 (Geo and Hydro Environmental Management Pty Ltd 2002). This project aimed to:

- Review construction and condition of monitoring bores and data sets relating to water quality and depths.
- Collection of monitoring bore data over four seasonal visits over 2002-2003.
- Survey of aquifer properties through slug and pump tests.
- Investigate the effects of local tree planting on recharge rates and throughflow to Mortlock drainage line.
- Install four to eight further monitoring bores in summer 2003.

Results so far indicate:

- Minor elevation of dunes can provide a haven for biodiversity and biomass productivity as they maintain outward drainage of their watertable;

[3] Heather Adamson, Land for Wildlife Officer, DEC's Yilgarn District

- Land degradation is not just due to rising salinity as salinity is accompanied by acidity and sodicity of soils and groundwater in specific locations;
- Fringing vegetation does not mitigate salinity and protecting river flats should include engineering measures to adjust both surface and subsoil hydrology;
- Active interventions, such as channels, banks of additional soil around dunes, selective evaporator areas, and pumping stations, to improve protection of particular areas of high conservation interest should be used (Geo and Hydro Environmental Management Pty Ltd 2003-2004).

An article on the rediscovery of *Frankenia parvula* appeared in the March/April 2001 newsletter of the former Department of CALM.

A survey of *Frankenia parvula* and a number of other rare wheatbelt species was undertaken by Diana Papenfus in spring 2003. One new population of the species was located (Population 3). Another three collections were also made but identification has yet to be confirmed (Papenfus 2003).

Research into the population characteristics of *Frankenia parvula* was undertaken in 2003/2004 by staff from CALM's Species and Communities Branch (Harris 2004). The aims of this project were to establish a quantitative monitoring framework and data baseline to obtain information on populations and species growth characteristics and for detecting changes in population abundance, health, life stage structure and reproductive potential. The project included:

- establishing five permanently marked quadrats at five different locations;
- permanently labelling at least 100 *Frankenia parvula* plants for long-term monitoring;
- assessing canopy dimensions of each labelled plant by measuring width;
- assessing health and vigour of each plant by estimating the percentage of live canopy;
- counting the total number of inflorescences on each plant labelled;
- recording life-stage classification of each plant assessed, ie. mature or juvenile; and
- recording other ecological and biological observations relevant to *Frankenia parvula* populations that will assist in management of the species (eg. soil characteristics) (Harris 2004).

Staff from DEC's Yilgarn District regularly monitor all populations of this species.

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

Future recovery actions

Where populations occur on lands other than those managed by DEC, permission has been or will be sought from appropriate land managers prior to recovery actions being undertaken. The following recovery actions are roughly in order of descending priority; influenced by their timing over the term of the Plan. However this should not constrain addressing any of the priorities if funding is available for 'lower' priorities and other opportunities arise.

1. Coordinate recovery actions

The Yilgarn District Threatened Flora Recovery Team will continue to coordinate recovery actions for *Frankenia parvula* and other Declared Rare Flora in their District. They will include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: DEC (Yilgarn District) through the YDTFRT
Cost: $2,000 per year

2. Map habitat critical to the species' survival

It is a requirement of the EPBC Act that spatial data relating to total habitat of the species be determined. Although habitat critical to the species' survival is described in Section 1, the areas as described have not yet been accurately mapped and that will be redressed under this action. If any additional populations are located, then habitat critical to their survival will also be determined and mapped.

Action: Map habitat critical to the species survival
Responsibility: DEC (Yilgarn District, Species and Communities Branch) through the YDTFRT
Cost: $4,000 in the first year

3. Conduct further surveys and confirm populations

Further surveys by DEC staff and community volunteers will be conducted during the flowering period of this species (October to December). A number of sites that were identified in previous surveys as, either containing the species or contained potential habitat for the species, will need to be surveyed. Collections of what may be this species have been made in Kellerberrin and Kwolyin and need to be confirmed. Records of areas surveyed will be sent to Species and Communities Branch and retained at the District, even if the species is not found.

Action: Conduct further surveys and confirm populations
Responsibility: DEC (Yilgarn District, Species and Communities Branch) through the YDTFRT
Cost: $5,400 per year

4. Collect seed

It is necessary to store germplasm as a genetic resource, ready for use in translocations and as an *ex situ* genetic 'blueprint' of the species. The germplasm stored will include seed and live plants in cultivation. Seed has not been collected yet, so collections are required from all populations to maintain an adequate representation of the genetic diversity of the species. The patterns of viability that emerge from standard tests on seed collected may indicate the need for other recovery actions. For example, if viability is consistently low, it may be appropriate to conduct some hand pollination trials.

Action: Collect seed
Responsibility: DEC (Yilgarn District), TFSC through the YDTFRT
Cost: $3,200 in the first, third and fifth years

5. Monitor populations

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

Action: Monitor populations
Responsibility: DEC (Yilgarn District) through the YDTFRT
Cost: $2,000 per year

6. Monitor salinity and groundwater levels

A number of monitoring bores have been installed at Subpopulation 2a of *Frankenia parvula* to monitor groundwater and salinity levels. These may also need to be installed at other populations. Soil salinity and pH readings will also be taken annually during winter (as per methods used in Harris 2004). Soil samples may be collected using an auger to provide a soil profile. The monitoring results will be examined and implications for management determined.

Action: Monitor salinity and groundwater levels
Responsibility: DEC (Yilgarn District) through the YDTFRT
Cost: $4,500 in year one; $6,500 in year two, $4,500 per year thereafter

7. Control rabbits

Population 1 is affected by rabbits. It is not certain if the rabbits are grazing on the plants themselves but it is believed that young shoots would be extremely vulnerable to grazing. In addition, the soil is being disturbed, and this combined with the increased nutrient levels and the presence of weed seed in their droppings has the potential to increase weed invasion in the habitat. Baiting will be undertaken in and around these areas.

Action: Control rabbits
Responsibility: DEC (Yilgarn District) through the YDTFRT
Cost: $600 in first, second and third years.

8. Obtain additional biological and ecological information

Improved knowledge of the biology and ecology of *Frankenia parvula* will provide a scientific basis for its management in the wild. The five quadrats established at Populations 1 and 3 in 2003/2004 will provide a basis for remonitoring (Harris 2004). An understanding of the following is necessary for effective management:

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

Action: Obtain additional biological and ecological information
Responsibility: DEC (Science Division, Yilgarn District) through the YDTFRT
Cost: $12,500 per year in the first, second and third years

9. Promote awareness

The importance of biodiversity conservation and the need for the long-term protection of wild populations of *Frankenia parvula* 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. This will be distributed to the public through DEC's Yilgarn District offices and at the offices and libraries of the Shires of Cunderdin, Kellerberrin and Yilgarn. Such information distribution may lead to the discovery of new populations.

Action: Promote awareness
Responsibility: DEC (Yilgarn District) through the YDTFRT
Cost: $1,300 in first year; $600 per year thereafter

10. Achieve long-term protection of habitat

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, or registration through the Land for Wildlife Scheme. The reservation status of the land parcel that supports Population 1 should be reviewed, and the possibility of additional protection through the reservation system investigated.

Action: Achieve long-term protection of habitat
Responsibility: DEC (Yilgarn District) through the YDTFRT
Cost: $1,500 per year

11. Liaise with relevant land managers

Staff from DEC's Yilgarn District will continue to liaise with relevant land managers and landowners to ensure that populations are not accidentally damaged or destroyed. Input and involvement will also be sought from any Aboriginal groups that have an active interest in areas that are habitat for *Frankenia parvula*.

Action: Liaise with relevant land managers
Responsibility: DEC (Yilgarn District) through the YDTFRT
Cost: $900 per year.

12. Review the need for further recovery actions

At the end of the fourth year of this five-year term IRP this IRP will be reviewed and the need for further recovery actions assessed.

Action: Review the need for further recovery actions
Responsibility: DEC (Species and Communities Branch, Yilgarn District) through the YDTFRT
Cost: $22,700 in the fifth year (if required)

4. TERM OF PLAN

This IRP will operate from May 2006 to April 2011 but will remain in force until withdrawn or replaced. If the taxon is still ranked EN after five years, the need for further recovery actions and an update of this IRP will be assessed.

5. REFERENCES

Barnsley, B. (1982) Frankeniaceae p112-146. *Flora of Australia Volume 8 Lecythidales to Batales*. Commonwealth of Australia, New South Wales.

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

Department of Conservation and Land Management (1992) Policy Statement No. 44 *Wildlife Management Programs*. Department of Conservation and Land Management (now DEC), Perth, 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 (now DEC), Perth, Western Australia.

English, V. and Blyth, J. (1999) Development and application of procedures to identify and conserve threatened ecological communities in the South-west Botanical Province of Western Australia. *Pacific Conservation Biology* 5, 124-138.

Geo and Hydro Environmental Management Pty Ltd (2002) *A Review of the Monitoring Bore Network located on the Mortlock River Flats, Cunderdin*. Roleystone, WA.

Geo and Hydro Environmental Management Pty Ltd (2003-2004) *Conservation Hydrogeology with a New Set of Shallow Monitoring Bores. Mortlock River Flats, Cunderdin*. Roleystone, WA.

Harris, A. (2004) Population characteristics of *Frankenia parvula* (Drummonds Frankenia). Unpublished report to the WA Threatened Species and Communities Unit. Department of Conservation and Land Management (now DEC), Perth, Western Australia.

Papenfus, D. (2003) Report on Flora Surveys done between October – November 2003 to the Western Australian Threatened Species and Communities Unit, Department of Conservation and Land Management (now DEC), Perth, Western Australia.

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

World Conservation Union (2000) *IUCN red list categories 3.1* prepared by the IUCN Species Survival Commission, as approved by the 51st meeting of the IUCN Council. Gland, Switzerland.

6. TAXONOMIC DESCRIPTION

Frankenia parvula Turcz. is a small shrub; stems procumbent to ascendent, much-branched, glabrous or sparsely pubescent; internodes short, to 7 mm long. Leaves petiolate, slightly curved; upper surface slightly grooved, sparsely pilose, later glabrous; underside pubescent; margins revolute; sheath ciliate. Flowers in

dichasia; bracts and bracteoles similar to leaves or with longer petioles. Calyx ovoid-cylindrical, 4mm long, 1.8mm diam., 5-ribbed, with spreading bristly hairs and short appressed hairs above, glabrous below. Petals 5, 5-6mm long. Stamens 6 or 7. Style 3-branched; stigmas clavate-capitate; ovules 11-15; placentation parietal (Barnsley 1982).