INTERIM RECOVERY PLAN NO. 134

# WING-FRUITED LASIOPETALUM (*LASIOPETALUM PTEROCARPUM* MS)

## INTERIM RECOVERY PLAN

## 2003-2008

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Photograph: Andrew Brown

April 2003

Department of Conservation and Land Management
Western Australian Threatened Species and Communities Unit (WATSCU)
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Natural Heritage Trust
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Government of Western Australia

DEPARTMENT OF Conservation AND LAND MANAGEMENT
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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 results from a review of IRP number 35 (G. Stack and V. English, 1999-2002) and replaces it. This IRP will operate from April 2003 to March 2008 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked Critically Endangered, this IRP will be reviewed after five years and the need for a full Recovery Plan assessed.

This IRP was approved by the Director of Nature Conservation on 20 June, 2003. The provision of funds identified in this Interim Recovery Plan is dependent on budgetary and other constraints affecting the Department, as well as the need to address other priorities.

Information in this IRP was accurate as at April 2003.

## SUMMARY

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|---|---|---|---|
| **Scientific Name:** | *Lasiopetalum pterocarpum* ms | **Common Name:** | Wing-fruited Lasiopetalum |
| **Family:** | Sterculiaceae | **Flowering Period:** | September-November |
| **Dept Region:** | Swan | **Dept District:** | Perth Hills |
| **Shire:** | Serpentine-Jarrahdale | **Recovery Team:** | Swan Region Threatened Flora and Communities Recovery Team (SRTFCRT) |

**Illustrations and/or further information:** A. Brown, C. Thomson-Dans and N. Marchant (Eds) (1998) *Western Australia's Threatened Flora*; A. Markey (1997) *A Floristic Survey of the northern Darling Scarp*.

**Current status:** *Lasiopetalum pterocarpum* ms was declared as Rare Flora under the Western Australian *Wildlife Conservation Act* 1950 and ranked as Critically Endangered in 1998. It currently meets World Conservation Union (IUCN 2000) Red List Category 'CR' under criteria Ba1b(iii)+2ab(iii); C2a(i,ii) and D as it is known from a single wild population of 17 plants, in an area of National Park subject to heavy visitation by recreational users. It is also listed as Endangered under the Commonwealth *Environmental Protection and Biodiversity Conservation Act* 1999 (EPBC Act). Established weed invasion, by blackberry (*Rubus* aff. *selmeri*), watsonia (*Watsonia meriana*) and gladioli (*Gladiolus undulatus*), is a major threat to this species, and in combination with the recreational use of the area continues to impact its habitat. Changes to stream flows or water quality in the stream that flows adjacent to the population and inappropriate fire regimes are additional threats. An additional 48 plants were translocated into a new site in June 2001, but it is not yet known if this population will be self-sustaining.

An Interim Recovery Plan was written for *Lasiopetalum pterocarpum* ms in 1999 (Stack and English 1999). This plan is based on that document, includes additional information compiled since 1999, and replaces that plan.

**Critical habitat:** The critical habitat for *Lasiopetalum pterocarpum* ms comprises the area of occupancy of the known populations; similar habitat within 200 metres of known populations; native vegetation that links populations; additional nearby occurrences of similar habitat that do not currently contain the species but may be suitable for further translocations; and the surface and groundwaters that maintain its riparian habitat.

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

Given that this species is Critically Endangered it is considered that all known habitat is habitat critical. In addition all populations, including translocated populations, are considered important to the survival of the species.

**Benefits to other species/ecological communities**

Recovery actions, such as weed control, implemented to improve the security of *Lasiopetalum pterocarpum* ms are likely to improve the quality of the habitat in which this population is located.

**International Obligations**

This plan is fully consistent with the aims and recommendations of the Convention on Biological Diversity, ratified by Australia in June 1993, and will assist in implementing Australia's responsibilities under that Convention. However, as *Lasiopetalum pterocarpum* is not listed under any international agreement, the implementation of other international environmental responsibilities is not affected by this plan.

**Role and interests of indigenous people**

There are no known indigenous communities involved in the management of areas affected by this plan. Therefore no role has been identified for indigenous communities in the recovery of this species.

**Social and economic impacts**

Wild and translocated populations of *Lasiopetalum pterocarpum* ms are located on public lands. There are unlikely to be any major social or economic impacts associated with the implementation of actions held in this plan.

**Evaluation of the Plan's Performance**

The Department of Conservation and Land Management, in conjunction with the Recovery Team will evaluate the performance of this IRP. 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.

**Habitat requirements:** *L. pterocarpum* ms is currently known from a very narrow range in the Serpentine area. It occurs in a riparian community in a National Park, much of it very close to a major carpark and walkway (Brown *et al*. 1998).

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

1. National Park Rangers are aware of the location and threatened status of the species.
2. Surveys for new populations have been conducted.
3. Weed control of blackberry, watsonia and gladioli is ongoing in the habitat of the wild population.
4. The habitat of Population 1a has been fenced.
5. Approximately 2700 seeds collected from Population 1 are stored in the Department's Threatened Flora Seed Centre.
6. The Botanic Garden and Parks Authority currently have 13 plants of *L. pterocarpum* ms from three clones.
7. A translocated population was established in 2001.
8. Trials have established that this species has low susceptibility to *Phytophthora cinnamomi*.
9. An information sheet that describes and illustrates the species has been produced.
10. Staff from the Department's Perth Hills District regularly monitor both wild and translocated populations of this species.
11. The Swan Region Threatened Flora and Communities Recovery Team is overseeing the implementation of this IRP and will include information on progress in an annual report to the Department's Corporate Executive and funding bodies.

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

**Recovery criteria**

**Criteria for success:** The number of individuals within populations and/or the number of populations have increased by ten percent or more.

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

**Recovery actions**

1. Coordinate recovery actions
2. Continue weed control
3. Restrict access, rehabilitate unauthorised tracks
4. Ensure appropriate stream flow and water quality
5. Develop and implement a fire management strategy
6. Map critical habitat
7. Monitor the populations
8. Collect seed and cutting material
9. Conduct further surveys
10. Continue to implement Translocation Proposal
11. Obtain biological and ecological information
12. Promote awareness
13. Incorporate recovery actions in Management Plan for National Park
14. Review the need for further recovery actions and/or a full Recovery Plan

# 1. BACKGROUND

## History

*L. pterocarpum* ms was poorly surveyed until 1997, when a floristic survey of the Darling Scarp was conducted by A. Markey[1] (Markey 1997). No additional populations were located during this survey, or in other subsequent surveys undertaken by Departmental staff or volunteers, and the species was ranked Critically Endangered in November 1998.

Wildfire burnt Populations 1a and 1b to ash in December 1999, leaving just 10 adult plants at Population 1c. Seedlings have germinated in the areas of Populations 1a and 1b since the fire, but the identification of these as *L. pterocarpum* ms needs to be confirmed when they are sufficiently mature. An additional 7 plants were located at Population 1c in 2001, giving a total of 17 mature plants in the wild.

48 plants of *Lasiopetalum pterocarpum* ms were translocated into a new site in 2001. This site was chosen for its similarity in vegetation, soils and topography to the wild population, the low level of public access and weeds, and sufficient distance from the wild population to make the burning of both populations in the same fire unlikely. These plants appeared healthy and vigorous when monitored in March 2003.

An Interim Recovery Plan was written for *Lasiopetalum pterocarpum* ms in 1999 (Stack and English 1999). This plan is based on that document, includes additional information compiled since 1999, and replaces that plan.

## Description

The winged membranous fruit is the main distinguishing feature of *Lasiopetalum pterocarpum* ms. The fruit has six to twelve elongated wings that usually consists of five large and several smaller wings. The fruit splits open when mature. The leaves are more obviously lobed than any other species of the genus Lasiopetalum. The bracteoles are linear and there are no petals or stipules. The apex of the style contains stalked star-shaped hairs (Brown *et al*. 1998).

## Distribution and habitat

*L. pterocarpum* ms is endemic to the Serpentine area. It is known from a single wild population of just 17 plants that occur on either side of a stream (Population 1c). Populations 1a and 1b previously contained another 17 plants, but these were killed by wildfire in December 1999. These subpopulations appear to be regenerating well from seed, although identity still needs to be confirmed when plants mature. Population 1b is slightly higher in the landscape than Population 1a and is less likely to be subject to flooding. The population is located within National Park in a riparian community with *Eucalyptus rudis*, *Eucalyptus calophylla*, *Agonis linearifolia* and *Melaleuca rhaphiophylla*. Markey (1997) noted that this site was the only intact example of this type of riverine woodland within the northern Darling Scarp. The flow of water alongside the wetland habitat of Population 1 is artificially maintained by water piped to the weir adjacent to the population's wetland habitat. A second population of 48 plants has been translocated into an area of similar habitat with fewer threats.

## 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 (EPBC Act).

The critical habitat for *L. pterocarpum* ms comprises:

- the area of occupancy of known populations;

[1] Adrienne Markey, previously Botanist, the Department's Science Division

- areas of similar habitat within 200 metres of known populations, i.e. riparian community in *Eucalyptus rudis* / *Eucalyptus calophylla* woodland (these provide potential habitat for natural range extension);
- remnant vegetation that links populations (this is necessary to allow pollinators to move between populations and in this case is National Park);
- the water supply to the habitat of Population1 (Population 1 is likely to be dependent on the artificially maintained flows that sustain surface and ground water hydrology in the habitat); and
- additional occurrences of similar habitat that do not currently contain the species but may have done so in the past (these represent possible translocation sites).

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

Given that this species is critically endangered it is considered that all known habitat is habitat critical. In addition all populations, including translocated populations, are considered important to the survival of the species.

**Benefits to other species/ecological communities**

Recovery actions, such as weed control, implemented to improve the security of *Lasiopetalum pterocarpum* are likely to improve the quality of the habitat in which this population is located.

**International Obligations**

This plan is fully consistent with the aims and recommendations of the Convention on Biological Diversity, ratified by Australia in June 1993, and will assist in implementing Australia's responsibilities under that Convention. However, as *Lasiopetalum pterocarpum* ms is not listed under any international agreement, the implementation of other international environmental responsibilities is not affected by this plan.

**Role and interests of indigenous people**

There are no known indigenous communities involved in the management of areas affected by this plan. Therefore no role has been identified for indigenous communities in the recovery of this species.

**Social and economic impacts**

Wild and translocated populations of *Lasiopetalum pterocarpum* ms are located on public lands. There are unlikely to be any major social or economic impacts associated with the implementation of actions held in this plan.

**Evaluation of the Plan's Performance**

The Department of Conservation and Land Management, in conjunction with the Recovery Team will evaluate the performance of this IRP. 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.

**Biology and ecology**

In general, Lasiopetalums are non-clonal single stemmed plants, and are obligate seeders (personal communication C. Wilkins[2]). None of the adult plants of *L. pterocarpum* ms resprouted following the 1999 fire, and juvenile plants germinated from seed. It therefore appears that this Lasiopetalum is also an obligate reseeder.

Glasshouse trials indicate that *L. pterocarpum* ms is not susceptible to dieback caused by the plant pathogen *Phytophthora cinnamomi* (personal communication C. Crane[3]). This appears to be supported by field observations prior to the fire, as many plants occurred in high recreational use areas but did not appear to suffer the impacts of the disease.

[2] Carol Wilkins, Sterculiaceae specialist, the University of Western Australia's Botany Department
[3] Colin Crane, Senior Technical Officer, the Department's Science Division

The pollinators of Lasiopetalums are generally native bees (personal communication C. Wilkins). *L. pterocarpum* ms has an aril on the seed, which suggests the seed is distributed by ants. The seed would be 'buried' underground when the ants carry them into their nests.

## Threats

*L. pterocarpum* ms was declared as Rare Flora under the Western Australian *Wildlife Conservation Act* 1950 and ranked Critically Endangered in 1998. It currently meets World Conservation Union (IUCN, 2000) Red List Category 'CR' under criteria Ba1b(iii)+2ab(iii); C2a(i,ii) and D (IUCN 2000) as it is only known from a single wild population comprised of 17 mature individuals that occur over a very small range, with continued decline in the quality of the habitat. The species is also listed as Endangered under EPBC Act. The main threats are weed competition, trampling by recreational users in the National Park, inappropriate stream flows or water quality in the stream that flows adjacent to the wild population, and inappropriate fire regimes.

- **Weed competition** is a major threat to the only wild population of the species. There is existing competition from blackberry (**Rubis* aff. *selmeri*), watsonia (**Watsonia meriana*) and gladioli (**Gladiolus undulatus*), and cottonbush (**Gomphocarpus* sp.) appears to be an emerging threat. Weeds suppress early plant growth by competing for soil moisture, nutrients and light.

- **Trampling** by recreational users of the National Park is a threat to this species, as the only wild population occurs very near major walking tracks. Numerous visitors come to the Park each year and recreational use of some areas adjacent to trails leads to trampling and degradation of the habitat of *L. pterocarpum* ms. This may also lead to accidental destruction of *L. pterocarpum* ms plants.

- **Changes to streamflow or water quality** are a threat to *L. pterocarpum* ms. The only wild population occurs in close proximity to a creekline. A gauging station is immediately upstream, and two additional dams are located further upstream of this population. The water flow at the latter two dams is controlled by the Water Corporation. Changes to stream flow or water quality as a result of any developments along the stream channel upstream have the potential to impact the population. Redevelopment of the recreational site adjacent to the population is recommended in the draft Management Plan for the National Park (Department of Conservation and Land Management 2000). This includes removal of the weir immediately upstream and expansion of the nearby carpark.

- **Inappropriate fire regimes** may affect the viability of populations, as seeds of *L. pterocarpum* ms 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. In addition, fires generally stimulate weed invasion and vigour, and weeds already infest the habitat of the wild population. However, it is likely that occasional fires are needed for reproduction of this species.

## Summary of population information and threats

| Pop. No. & Location | Land Status | Year/No. plants | Condition | Threats |
|---|---|---|---|---|
| 1a. Serpentine | National Park | 1997 6<br>1999 7<br>2000 0 (?384)<br>2001 0 (?505) | Burnt 12.1999<br><br><br>Healthy regrowth | Weed competition, trampling, inappropriate water flow or quality, inappropriate fire regime |
| 1b. Serpentine | National Park | 1997 2<br>1999 10<br>2000 0<br>2001 0 | Burnt 12.1999 | Weed competition, trampling, inappropriate fire regime |
| 1c. Serpentine | National Park | 1999 10<br>2000 10<br>2001 17 | Moderate | Weed competition, trampling, inappropriate fire regime |
| 2T. Serpentine | National Park | 2001 48 | Good | Inappropriate fire regime |

Numbers in brackets = number of juveniles. '?' indicates seedlings require confirmation of identification when of sufficiently age. In 2001, indentations on leaves indicate most or all of these seedlings are likely to be *L. pterocarpum* ms, and not other Sterculiaceae species.

## Guide for decision-makers

Section 1 provides details of current and possible future threats. Any on-ground works (clearing, firebreaks, alteration of creek water levels etc) in the immediate vicinity of *L. pterocarpum* ms will require assessment. On-ground works should not be approved unless the proponents can demonstrate that they will not have an impact on the species, its habitat or potential habitat, or on the local hydrology.

## 2. RECOVERY OBJECTIVE AND CRITERIA

### Objectives

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

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

## 3. RECOVERY ACTIONS

### Existing recovery actions

All appropriate people have been made aware of the existence of this species and its locations. The National Park Rangers are familiar with the location of this species and its management needs. Water Corporation has been notified of the location and Declared Rare status of *Lasiopetalum pterocarpum* ms and the associated legal responsibilities.

Searches for this species have been carried out upstream and downstream of the wild population and in other similar habitat close to the population. Students from Joondalup College of Technical and Further Education (TAFE) assisted with surveys conducted in 1999 that were supervised by Departmental staff.

Where there is sufficient distance from flowing water to allow herbicide use, weed control of the watsonia (**Watsonia meriana*) has been undertaken. Some control of blackberry and watsonia was achieved with assistance from Environmental Management students from Joondalup TAFE in September 1999, shortly before a hot fire burnt the area on 15th December 1999. Follow-up control by staff from the Department's Perth Hills District on resprouting and germinating weeds has been ongoing, and to date, control of blackberry and watsonia is having a marked effect, and weed numbers are in decline.

A fence was erected around the habitat of Population 1a in early 2000. This has served to prevent trampling of the area while the vegetation re-establishes after the fire. Regeneration has been good, with some native species emerging that were not evident prior to the 1999 fire.

Seed was collected in December 1998 and 1999 from the wild population, and approximately 2700 seeds are now stored in the Department's Threatened Flora Seed Centre (TFSC) at -18°C. The 1999 collection was made immediately prior to the wildfire. The TFSC tests viability of the seed initially, after one year in storage and again after five years. The initial viability of these collections ranged from 84% to 97%. After one year in storage the germination rate ranged from 11% to 75% (unpublished data A. Cochrane[4]).

The BGPA currently hold 13 plants of *L. pterocarpum* ms from three clones. The species demonstrates a generally low strike rate from cuttings, often around 10%, and some plants usually die after potting up (personal communication A. Shade[5]).

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

A Translocation Proposal was developed in 2001. A suitable translocation site was selected that is as close as possible in character to the existing site, but sufficiently far away that it is unlikely that both sites will be burnt in the same fire.

The propagation of plants in readiness for translocation was initiated prior to the previous plantings and will continue as necessary. A high proportion of the 300 seeds previously collected from Population 1a germinated successfully in October 2000. However, many deaths occurred from unknown causes after germination. Cuttings were also taken from eighty percent of adult plants at Population 1c and propagated by BGPA. A total of 48 plants were planted into the translocation site in June 2001, following good rains in May. Of these, 17 were propagated from cuttings from 6 clones, and 31 from seedlings. The growth of these plants has been vigorous, and they appeared very healthy when monitored in March 2003. Many plants produced flowers in 2002, but it is not known whether they produced viable seed in this first fruiting season.

Staff from the Department's Perth Hills District regularly monitor the wild and translocated populations.

Trials have been conducted to assess the susceptibility of *L. pterocarpum* ms to *Phytophthora cinnamomi*. The species appears to have low susceptibility (personal communication C. Crane).

A double-sided information sheet is being distributed to the local community through libraries, wildflower shows and other avenues.

The Swan Region Threatened Flora and Communities Recovery Team (SRTFCRT) is overseeing the implementation of this IRP and will include information on progress in its annual report to the Department's Corporate Executive and funding bodies.

**Future recovery actions**

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

**1. Coordinate recovery actions**

The Swan Region Threatened Flora and Communities Recovery Team (SRTFCRT) will coordinate recovery actions for *L. pterocarpum* ms and other Declared Rare flora in the region. They 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 (Perth Hills District) through the SRTFCRT
**Cost:** $400 per year

**2. Continue weed control**

Following several years of very successful weed control, the previously severe infestation of blackberry (*Rubis* aff. *selmeri*), watsonia (*Watsonia meriana*) and gladioli (*Gladiolus undulatus*) in the habitat of the wild population has been reduced. However, the weeds are still present, and propagules are continually introduced from infestations upstream of this population. Cottonbush is also an emerging threat. Adult *Lasiopetalum pterocarpum* ms plants are threatened by competition from weeds, and recruitment is severely threatened. The objectives of weed control are to reduce weed competition and create opportunities for recruitment of the species, and to lessen the fire risk through reduction in fuel loadings. Effective weed control with the use of herbicides and hand removal will continue to be implemented. The tolerance of native plant species to herbicides at *L. pterocarpum* ms sites is unknown, so caution will be exercised during application.

The proposed strategy is to continue to control the watsonia and gladioli with herbicides, and hand grubbing where necessary. The blackberry will be controlled through slashing and wick application of herbicides in the first two years, and if feasible through careful selective cool burns of the infestation in the second and third years. Ideally, weed control will be extended upstream if resources permit. All applications of weed control in

the habitat of the population will be followed by a report on the method, timing and success of the treatment against weeds, and the effect on *L. pterocarpum* ms and associated native plant species.

**Action**: Continue weed control
**Responsibility**: The Department (Perth Hills District) through the SRTFCRT
**Cost**: $3,900 in the first and second years, and $3,400 in subsequent years

**3. Restrict access, rehabilitate unauthorised tracks**

Foot access to the populations will be restricted to reduce damage to the species and its habitat by trampling. A fence is currently in place preventing access to the portion of the wild population that was burnt in 1999 (Population 1a), and the native vegetation is regenerating well. Small unauthorised access tracks around and through the wild population are an ongoing issue as recreational users attempt to move from one point of the river to others, and will be addressed as necessary. Access will be controlled by placement of brush cut from local species and strategic plantings. The composition of the riparian community will be maintained by using only local provenance seed from species that occur in the habitat of Population 1 in rehabilitation work.

**Action:** Restrict access, rehabilitate unauthorised tracks
**Responsibility:** The Department (Perth Hills District) through the SRTFCRT
**Cost:** $3,700 in the first year, and $2,600 in subsequent years

**4. Ensure appropriate stream flow and water quality adjacent to populations**

Water flows and water quality in the stream adjacent to the wild and translocated populations of *Lasiopetalum pterocarpum* ms must be adequate to maintain populations and associated habitat, whilst not causing excessive erosion of the stream bank. The Department will liaise with the Water Corporation, and ensure flows and water quality are monitored and are appropriate for *Lasiopetalum pterocarpum* ms and its habitat.

**Action:** Ensure appropriate stream flow and water quality adjacent to populations
**Responsibility:** The Department (Perth Hills District) through the SRTFCRT
**Cost:** $ 700 per year

**5. Develop and implement a fire management strategy**

It is known that fire kills adult plants of the species and regeneration is from seed. It seems likely that the species requires occasional fire for recruitment from soil-stored seed, but that frequent fires would be detrimental to the long-term survival of the species. Fire also promotes the introduction and proliferation of weed species. Fire should therefore be prevented from occurring in the area of populations, except where it is being used experimentally as a recovery tool. A fire management strategy will be developed to determine fire control measures and recommended fire frequency and intensity.

**Action:** Develop and implement a fire management strategy
**Responsibility:** The Department (Perth Hills District) through the SRTFCRT
**Cost:** $2,000 in second year, and $1,000 in subsequent years

**6. Map critical habitat**

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

**Action:** Map critical habitat
**Responsibility:** The Department (Swan Region, WA Threatened Species and Communities Unit (WATSCU)) through the SRTFCRT
**Cost:** $2000 in the first year

### 7. Monitor the populations

Monitoring of factors such as habitat degradation (including weed densities, plant diseases such as *Phytophthora cinnamomi*), population stability (expansion or decline), pollination activity, seed production, recruitment and longevity and predation is essential. The recruitment of *Lasiopetalum pterocarpum* ms from soil-stored seed as a result of the removal of weeds such as blackberry and watsonia from the habitat, and the requirement for rehabilitation following weed control will be monitored in particular. Both wild and translocated populations will be inspected annually.

**Action:** Monitor the populations
**Responsibility:** The Department (Perth Hills District) through the SRTFCRT
**Cost:** $1,000 per year

### 8. Collect seed and cutting material

Preservation of germplasm is essential to guard against extinction if the wild population is lost. Such collections are also needed to propagate plants for translocation. Seed was collected from Population 1a before it was burnt, and cuttings have since been taken from eight of the ten mature plants at Population 1c for propagation for translocation. Seed will also be collected from Population 1c, and material collected from all mature plants in the wild population for BGPA's living collection.

**Action:** Collect seed and cutting material
**Responsibility:** The Department (Perth Hills District TFSC,) through the SRTFCRT
**Cost:** $2,300 in the first and second years, and $ 1,000 in subsequent years

### 9. Conduct further surveys

Community volunteers will be encouraged to be involved in further surveys supervised by Departmental staff. Surveys will be conducted during the species' flowering period (September - November).

**Action:** Conduct further surveys
**Responsibility:** The Department (Perth Hills District) through the SRTFCRT
**Cost:** $2,200 in the second and fourth years

### 10. Continue to implement Translocation Proposal

Translocation is essential for the conservation of this species, as the single small wild population is not secure from threats including weed competition, inappropriate fire and trampling. Information on the translocation of threatened plants and animals in the wild is provided in the Department's Policy Statement No. 29 *Translocation of Threatened Flora and Fauna*.

The propagation of plants for translocation has been undertaken and will continue as necessary. The first planting of 48 plants has been done and follow-up plantings will occur in accordance with the approved Translocation Proposal. Monitoring of the translocation is essential, and will continue to be done according to the timetable in the Translocation Proposal.

**Action:** Continue to implement Translocation Proposal
**Responsibility:** The Department (Perth Hills District, TFSC, WATSCU) and BGPA through the SRTFCRT
**Cost:** $3,800 in the first and third years, and $1,500 in the second, fourth and fifth years

### 11. Obtain biological and ecological information

Improved knowledge of the biology and ecology of *L. pterocarpum* ms will provide a better scientific basis for its management in the wild. An understanding of the following is particularly necessary for effective management:

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

**Action:** Obtain biological and ecological information
**Responsibility:** The Department (Science Division, Perth Hills District) through the SRTFCRT
**Cost:** $16,300 per year in the second, third and fourth years

### 12. Promote awareness

The importance of biodiversity conservation and the need for the long-term protection of populations of this species will be promoted to the community through poster displays and the local print and electronic media. Formal links with local naturalist groups and interested individuals, and the continuing involvement of groups in implementing recovery actions will also be encouraged.

**Action:** Promote awareness
**Responsibility:** The Department (Perth Hills District) through the SRTFCRT
**Cost:** $500 per year

### 13. Incorporate general recovery actions for *L. pterocarpum* ms into Management Plan for National Park

The general management recommendations for *Lasiopetalum pterocarpum* ms will be included in the Management Plan for the National Park in which the species occurs. This will include recommendations on weed control, restricting access, maintaining steam flow and water quality, fire management and monitoring. The current Management Plan will expire in 2009 (Department of Conservation and Land Management 2000).

**Action:** Include general recovery actions in Management Plan for National Park
**Responsibility:** The Department (Planning Branch, Mundaring District) through the SRTFCRT
**Cost:** $2,000 in fifth year.

### 14. Review the need for further recovery actions and/or a full Recovery Plan

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

**Action:** Review the need for further recovery actions and/or a full Recovery Plan
**Responsibility:** The Department (WATSCU, Perth Hills District) through the SRTFCRT
**Cost:** $20,300 in the fifth year (if full RecoveryPlan required)

## 4. TERM OF PLAN

This Interim Recovery Plan will operate from April 2003 to March 2008 but will remain in force until withdrawn or replaced. If the taxon is still ranked Critically Endangered after five years, the need to review this IRP or to replace it with a full Recovery Plan will be determined.

## 5. ACKNOWLEDGMENTS

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Anne Cochrane Manager, the Department's Threatened Flora Seed Centre
Colin Crane Senior Technical Officer, the Department's Science Division

Amanda Shade Horticulturalist, Botanic Garden and Parks Authority
Carol Wilkins Sterculiaceae specialist, the University of Western Australia's Botany Department
Alan Wright Nature Conservation Officer, the Department's Perth Hills District

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## 6. REFERENCES

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

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

Department of Conservation and Land Management (1995) Policy Statement No. 29 *Translocation of Threatened Flora and Fauna*. Perth, Western Australia.

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

Department of Conservation and Land Management (2000). Serpentine National Park Management Plan 2000-2009. Management Plan number 44. Perth, Western Australia.

Markey, A. (1997). *A Floristic Survey of the northern Darling Scarp*. Unpublished Report to the Western Australian Department of Conservation and Land Management, the Western Australian Department of Environmental Protection and the Western Australian Conservation Council (Inc.) for the Australian Heritage Commission.

Stack, G. and English, V. (1999). Interim Recovery Plan number 35 *Lasiopetalum pterocarpum* ms 1999-2002. Department of Conservation and Land Management. Perth, Western Australia.

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

From Brown *et al*. (1998).

The winged membranous fruit is the main distinguishing feature of *Lasiopetalum pterocarpum* ms. The fruit has six to twelve elongated wings that usually consists of five large and several smaller wings. The fruit splits open when mature. The leaves are more obviously lobed than any other species of the genus *Lasiopetalum*. The bracteoles are linear and there are no petals or stipules. The apex of the style contains stalked star-shaped hairs.