M RECOVERY PLAN NO. 26

HILL THOMASIA (*THOMASIA* SP. GREEN HILL) INTERIM RECOVERY PLAN 1999-2002

by

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Photograph: Diana Papenfus

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FOREWORD

Interim Recovery Plans (IRPs) are developed within the framework laid down in Department of Conservation and Land Management (CALM) Policy Statements Nos. 44 and 50.

IRPs outline the recovery actions that are required to urgently address those threatening processes most affecting the ongoing survival of threatened taxa or ecological communities, and begin the recovery process.

CALM is committed to ensuring that Critically Endangered taxa are conserved through the preparation and implementation of Recovery Plans or Interim Recovery Plans and by ensuring that conservation action commences as soon as possible and always within one year of endorsement of that rank by the Minister.

This Interim Recovery Plan will operate from April 1999 to March 2002 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked Critically Endangered, this IRP will be replaced by a full Recovery Plan after three years.

This IRP was approved by the Director of Nature Conservation on 30 August 1999. The provision of funds identified in this Interim Recovery Plan is dependent on budgetary and other constraints affecting CALM, as well as the need to address other priorities.

Information in this IRP was accurate at April 1999.

SUMMARY

Scientific Name: ***Thomasia* sp. Green Hill**
Common Name: Green Hill Thomasia
Family: Sterculiaceae
Flowering Period: October
CALM Region: Midwest
CALM District: Moora
Shire: Victoria Plains
Recovery Team: Moora 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; Paust, S. (1973). Key to the genera of Sterculiaceae in south west Western Australia (unpublished report).

Current status: *Thomasia* sp. Green Hill was declared as Rare Flora in October 1996 and ranked as Critically Endangered (CR) in November 1998. It currently meets World Conservation Union (IUCN) Red List category 'CR' under criterion B1+2c (IUCN 1994), as it consists of one population with a small number of adult plants, with declining quality of the habitat. The species exists in a bush block in New Norcia and the main threats are weed invasion, fire, firebreak maintenance, possible grazing by sheep, farming activities, and a lack of genetic diversity.

Habitat requirements: *Thomasia* sp. Green Hill is endemic to Western Australia and is apparently confined to the New Norcia area. It is known from only one population, consisting of two subpopulations, with over 65 plants. The subpopulations grow approximately 1.5 km apart but within the same bush block and on the same brown clayey sand over laterite, in open wandoo woodland. Associated taxa include *Grevillea*, *Melaleuca*, *Glischrocaryon*, *Hibbertia*, and *Stylidium* species.

Existing Recovery Actions: The following recovery actions have been or are currently being implemented:
1. The relevant property manager has been made aware of the existence of this species and its location.
2. Seed was collected from both subpopulations twice in November 1998 and is stored in the CALM Threatened Flora Seed Centre (TFSC).
3. Moora District Staff regularly monitor the population.

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

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

Recovery actions
1. Notify all relevant land managers.
2. Maintain boundary fence.
3. Undertake weed control.
4. Develop a fire management strategy.
5. Monitor populations.
6. Preserve genetic diversity of the species.
7. Conduct further surveys.
8. Obtain biological and ecological information.
9. Disseminate information.
10. Write full Recovery Plan.

1. BACKGROUND

History

The species was first officially collected in 1972, several kilometres south of New Norcia, however, S. Patrick and A. Brown (CALM Staff) could not relocate this population during flora surveys in 1993-94. Neither did the species appear in the extensive floristic surveys conducted in this region by T. Griffin during 1990-92. In September 1995 a survey was conducted specifically for *Thomasia* sp. Green Hill in the New Norcia area, and a collection was made in an area of remnant vegetation on private property. This consisted of two small subpopulations (13 and 8 plants respectively), separated by a distance of 1.5 km.

A *Thomasia* specimen collected by D. W. Giminez in 1923, appears very similar to the above taxon. Following the taxonomic review of *Thomasia*, this specimen may be identified as *Thomasia* sp. Green Hill.

Description

Thomasia sp. Green Hill is a low shrub approximately 400 mm in height and has multiple stems that grow from the rootstock. The leaves are flat, narrowly elliptic, 10-13 mm long and 5 mm wide. The inflorescences are racemes of about three flowers. The ribbed calyx is mauve with a reddish purple base. The calyx is approximately 7 mm long, and is divided for less than half its length into five obtuse arching lobes. The rounded petals and anthers are dark purple-black.

Distribution and habitat

Thomasia sp. Green Hill is endemic to Western Australia and is apparently confined to the New Norcia area. It is known from only one population, consisting of two subpopulations, with a total of 66 plus plants. The subpopulations grow approximately 1.5 km apart but within the same remnant bush block and on the same brown clayey sand over laterite, in open wandoo woodland. Associated taxa include *Grevillea*, *Melaleuca*, *Glischrocaryon*, *Hibbertia*, and *Stylidium* species.

Biology and ecology

Very little is known about the biology and ecology of the genus *Thomasia* or about *Thomasia* sp. Green Hill. There is some field evidence that suggests the species is clonal and research confirming the genetic differentiation of the two subpopulations would therefore be desirable to prioritise management actions (see 8 – Obtain biological and ecological information).

There is no information about pollinators, but work on germination rates of seed collected from both subpopulations will indicate the viability of the seed being produced. To date the germination rate under standard conditions (surface sterilised with bleach, boiled in water and allowed to soak for several hours, then placed on agar in a controlled temperature cabinet) is low, but further testing is required to confirm these results.

The response of the species to fire and disturbance is not yet known and will be covered in recovery action, 8 – Obtain biological and ecological information.

Threats

This species was officially ranked as Critically Endangered in November 1998. It currently meets IUCN Red List category 'CR' under criterion B1+2c (IUCN 1994) as it consists of one population with a small number of adult plants, with declining quality of the habitat. The main threats are weeds, fire, and firebreak maintenance, possible grazing by sheep, farming activities, and a lack of genetic diversity.

- **Weed invasion** is a threat to both subpopulations. The weeds at this site not only compete with adult plants but also with germinants from soil stored seed. *Thomasia* sp. Green Hill exists on the edge of the bush block adjacent to farmland and the site is therefore prone to weed invasion from adjacent land and external seed sources.

- **Inappropriate fire regimes** would affect the viability of populations, as seeds of *Thomasia* sp. Green Hill probably germinate following fire. The soil seed bank would rapidly be depleted if fire occurs regularly, before regenerating or juvenile plants reach maturity and replenish the soil seed bank.

- **Firebreak maintenance activities** threaten population 1a as the plants grow very close to the firebreak. Vehicles turning, grading activities, and other track maintenance activities could affect both subpopulations of *Thomasia* sp. Green Hill. The landowners are, however, aware of the species location and importance, but also need to be made aware that care is needed when maintaining the firebreak and fences.

- **Grazing** by sheep is a possible threat to both subpopulations. The fence line between the pasture and the bush block will need to be maintained to reduce the risk of sheep entering the area where *Thomasia* sp. Green Hill grows.

- **Farming Activities:** Fence and firebreak maintenance may damage plants that are growing close to the fence line and firebreak. The subpopulations of *Thomasia* sp. Green Hill are also close enough to crops to be effected by herbicide and fertiliser applications from adjacent farmland. Care needs to be taken to avoid chemical or fertiliser drift.

- **Genetic diversity:** As there are only two subpopulations of *Thomasia* sp. Green Hill, the genetic diversity of the species is extremely limited. Genetic diversity is required to provide a species with the ability to adapt to change.

Summary of population information and threats

Pop. # & Location.	Land Status	Year / No. plants	Condition	Threats
1a SW of New Norcia	Private (East)	1995 - 13 1998 - 16	Good	fire, weeds, farming activities
1b SW of New Norcia	Private (West)	1995 - 8 1998 - 50+	Good	fire, weeds, grazing, firebreak maintenance, farming activities

2. RECOVERY OBJECTIVE AND CRITERIA

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

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

3. RECOVERY ACTIONS

Existing recovery actions

Inform landowners: In 1995, the landowner was made aware of the existence and importance of *Thomasia* sp. Green Hill. Since then, the Farm Manager has participated in a survey for further populations and assisted CALM staff in locating the current subpopulations. Care is also being taken in the management of the bush block to conserve the two subpopulations of *Thomasia* sp. Green Hill.

Due to the proximity of the subpopulations to crops, the managers of adjacent land should also be informed of the location of *Thomasia* sp. Green Hill, to ensure that due care is taken. This is being addressed in action 1 - Notify all relevant landowners.

Seed was collected from both subpopulations twice in November 1998 and stored in the CALM Threatened Flora Seed Centre. The TFSC holds 130 bulked seed from 45 plants at population 1a and 106 bulk seeds from 17 plants from population 1b. This seed has been cleaned and is in the initial stages of germination tests. Only a few seeds have germinated to date and germinants have been delivered to KPBG for maturation into full plants (A. Cochrane, personal communication[1]).

The TFSC Manager has recommended that Kings Park and Botanic Garden (KPBG) include *Thomasia* sp. Green Hill in their tissue culture research and cryostorage. This is addressed in recovery action 6 - Preserve the genetic diversity of the species.

Staff at the CALM Moora District Office, TFSC and WATSCU monitor both subpopulations for changes in population size, increased threats and habitat changes. Action 5 - Monitor Populations also recommends mapping of the subpopulations to aid future surveys and monitoring.

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

Future recovery actions

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

1. Notify all relevant land managers

The owners of the land on which *Thomasia* sp. Green Hill is located have been informed of the species' existence, and have adjusted the management of the bush block accordingly. However, due to the positioning of the population close to crops, owners of the adjacent land will also be advised of the species' location. Special note should be made of the need to manage weed invasion, spray drift and fertiliser leaching into the population and its habitat.

Action:	Notify all relevant land managers
Responsibility:	CALM (Endangered Flora Clerk, Moora District) through the Moora District Threatened Flora Recovery Team (MDTFRT)
Cost:	$300 for year 1.

2. Maintain boundary fence

Adjacent cropland is currently being grazed by sheep and continued maintenance of the fence line between the crop and the subpopulations is needed to prevent any damage to *Thomasia* sp. Green Hill.

Action:	Maintain boundary fence
Responsibility:	CALM (Moora District, WATSCU) through the MDTFRT and the relevant Farm Manager

[1] Anne Cochrane, Manager, Threatened Flora Seed Centre, CALM

Cost: $600 for year 1, for maintenance see action 5.

3. Undertake weed control

Subpopulations 1a and 1b are both moderately weed infested. Adult *Thomasia* sp. Green Hill plants are coping with the competition from weeds, but the effect on recruitment is potentially a greater threat. Effective weed control with the use of herbicides and hand pulling is required in these areas. A weed control program for these subpopulations will involve:

1. Accurately mapping the boundaries of the weed species present.
2. Selection of an appropriate herbicide or method of weed control.
3. Controlling invasive weeds internal to the boundary by hand removal or spot spraying around individual *Thomasia* sp. Green Hill plants when weeds first emerge.
4. Scheduling to include weed spraying at other DRF populations requiring weed control within the district.

Action:	Undertake weed control
Responsibility:	CALM (Moora District) through the MDTFRT and the relevant Farm Manager
Cost:	$5,400 per year.

4. Develop a fire management strategy

Little is known about the effects of fire on this species, however, it is likely that the species requires occasional fire for recruitment from soil-stored seed, but that frequent fires may be detrimental to long term survival.

A fire management strategy will be developed by the MDTFRT in consultation with relevant parties.

Action:	Develop a fire management strategy
Responsibility:	CALM (Moora District) through the MDTFRT and the relevant Farm Manager and adjacent land managers
Cost:	$1,700 for year 1.

5. Monitor populations

Monitoring of factors such as weed encroachment, habitat degradation, population stability, seed production, recruitment, and longevity is essential. To date the exact boundaries and number of plants is not known, and a full count will be done and the location of individual plants mapped.

Populations will be inspected annually.

Action:	Monitor populations
Responsibility:	CALM (Moora District) through the MDTFRT and the relevant Farm Manager
Cost:	$600 per year.

6. Preserve the genetic diversity of the species

Germplasm collection is essential as future extinction of *Thomasia* sp. Green Hill is possible due to its limited distribution, low number of plants and existing threats. If destruction of the subpopulations occurs, recovery of the species is likely to require *ex situ* conservation techniques. Some seed has been collected for this species, however, further collection is required.

If it is not possible to collect adequate quantities of viable seed, other more costly methods of germplasm storage may need to be investigated such as producing plants from cuttings or storage of tissue culture material. This will be coordinated by the Moora District Threatened Flora Recovery Team.

Action:	Preserve the genetic diversity of the species
Responsibility:	CALM (TFSC, Moora District) through the MDTFRT and the Kings Park and Botanic Gardens (KPBG)
Cost:	$1,300 for cryostorage for year 1, and $2,300 per year for seed collection.

7. Conduct further surveys

Further survey for the species will be undertaken on a systematic basis during its flowering period in areas of suitable habitat. In addition, with the permission of the landowners, appropriate habitat on other adjacent private lands will also be surveyed. Volunteers from the local community, Wildflower Societies, and Naturalist Clubs will be invited to be involved in surveys supervised by CALM staff.

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

8. Obtain biological and ecological information

Investigations designed to increase knowledge of the biology and ecology of the species will provide a scientific basis for future management of *Thomasia* sp. Green Hill in the wild. Studies will include:

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

Action:	Obtain biological and ecological information
Responsibility:	CALM (CALMScience, Moora District) through the MDTFRT
Cost:	$23,200 per year.

9. Disseminate information

An information sheet will be prepared for *Thomasia* sp. Green Hill. This will include a description of the plant, its habitat, threats, management actions and several photos. The exact location of this species will remain confidential. The sheet will be distributed to the public from the CALM District office and the Shire ofVictoria Plains office and library. The distribution of this information may lead to the discovery of new populations.

An information flier will be produced for distribution in the New Norcia area. These are aimed at local residents to provide information and a contact if they locate the species on their properties or in surrounding areas.

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

10. Write full Recovery Plan

At the end of the three-year term of this Interim Recovery Plan, the need for further recovery will be assessed. If the taxon is still ranked Critically Endangered, a full Recovery Plan will be written to describe action required for long-term maintenance of the taxon.

Action:	Write full Recovery Plan
Responsibility:	CALM (Moora District and WATSCU) through the MDTFRT
Cost:	$19,900 for year 3 (if required).

4. TERM OF PLAN

This Interim Recovery Plan will operate from April 1999 to March 2002 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked Critically Endangered, this IRP will be replaced by a full Recovery Plan after three years.

5. ACKNOWLEDGMENTS

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

Alex Agafonoff	Previously Conservation Officer, CALM Merredin District
Anne Cochrane	Manager, CALM Threatened Flora Seed Centre
Emma Holland	Previously Consultant, CALM W.A. Threatened Species and Communities Unit
Keith Hunt	Farm Manager, Benedictine Community, New Norcia
Sophie Juszkiewicz	Propagator, Kings Park and Botanic Garden
Kim Kershaw	Conservation Officer, CALM Narrogin District
Diana Papenfus	Previously Botanist, CALM W.A. Herbarium
Sue Patrick	Senior Research Scientist, W.A. Herbarium
Robyn Phillimore	Project Officer, CALM W.A. Threatened Species and Communities Unit
Gillian Stack	Project Officer, CALM W.A. Threatened Species and Communities Unit
Rebecca Carter	Previously Conservation Officer, CALM Moora District.

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

6. REFERENCES

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7. TAXONOMIC DESCRIPTION

Paust (1973)

A. Petals small and scale like or absent
  B. Anthers opening in terminal pores or short slits opening inwards or laterally.
    C. Calyx with thickened ribs
      D. One rib per calyx lobe

B. Vestiture stellate, racemes usually 4 or more flowered
  C. Anthers > filament length, narrowly triangular, leaves flat

D. Petals present, calyx exduplicate, flowers few. (New Norcia) *Thomasia* sp. nov
(now *Thomasia* sp. Green Hill)

Papenfus (1995)

A low shrub to ca. 400 mm in height, multi-stemmed from root stock. Leaves are flat, narrowly elliptic, 10 - 13 mm long and 5 mm wide. The inflorescences are racemes of about three flowers. The calyx is mauve in colour with the ribs and base reddish purple. The calyx is c. 7 mm long, divided less than half way into five obtuse, arching lobes. The petals and anthers are dark purple - black; the petals are rounded.