Spike Poison

(*Gastrolobium glaucum*)

RECOVERY PLAN

Department of Environment and Conservation
Kensington

Australian Government

Government of Western Australia

Department of Environment and Conservation
Our environment, our future

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. Note: the Department of CALM formally became the Department of Environment and Conservation (DEC) in July 2006. DEC will continue to adhere to these Policy Statements until they are revised and reissued.

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This IRP will operate from April 2008 to March 2013 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked CR, this IRP will be reviewed after five years and the need for further recovery actions assessed.

This IRP was approved by the Director of Nature Conservation on 30 April 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 in April 2008.

This IRP was prepared with financial support from the Australian Government to be adopted as a National Recovery Plan under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

IRP PREPARATION

This IRP was prepared by Craig Douglas[1], Wendy Johnston[2] and David Jolliffe[3]

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ACKNOWLEDGMENTS

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

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Andrew Crawford	Technical Officer, Threatened Flora Seed Centre, DEC
Bob Elkins	Technical Assistant, Botanic Gardens and Parks Authority
Amanda Shade	Assistant Curator of Displays and Development, Botanic Gardens and Parks Authority

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.

CITATION

This Recovery Plan should be cited as:

Department of Environment and Conservation (2009). Spike Poison (*Gastrolobium glaucum*) Recovery Plan, Department of Environment and Conservation, Western Australia.

SUMMARY

Scientific Name:	*Gastrolobium glaucum*	**Common Name:**	Wongan Poison, Spike Poison
Family:	Papilionaceae	**Flowering Period:**	August - September
DEC Region:	Wheatbelt	**DEC District:**	Avon Mortlock
Shire:	Wongan-Ballidu	**Recovery Team:**	Avon Mortlock District Threatened Flora Recovery Team

Illustrations and/or further information: Atkins, K. (2008) *Declared Rare and Priority Flora List for Western Australia.* Department of Environment and Conservation, Western Australia; Brown, A., Thomson-Dans, C. and Marchant, N. (Eds). (1998) *Western Australia's Threatened Flora*. Department of Conservation and Land Management, Western Australia. pp 94; Aplin, T. (1969). Poison Plants of Western Australia, the toxic species of the genera *Gastrolobium* and *Oxylobium*: Berry Poison, Spike Poison, Hook-Point Poison, Scale-Leaf Poison. *Western Australian Department of Agriculture, Bulletin no. 3706.* pp 5-6; DEC (2007a) *Western Australian Herbarium FloraBase 2 – Information on the Western Australian Flora.* Department of Environment and Conservation, Western Australia. Accessed 2007. http://www.calm.wa.gov.au/science/

Current status: *Gastrolobium glaucum* was declared as Rare Flora under the Western Australian *Wildlife Conservation Act, 1950* in 1980 and is currently ranked as Critically Endangered (CR) under World Conservation Union (IUCN 1994) Red List criterion C1, due to a continuing decline of 25% or greater over three years. The main threats are weed invasion, inappropriate fire regimes, road maintenance, grazing, maintenance of powerline access track, vehicle traffic, sand extraction and competition from associated species. The species is listed as Endangered (EN) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Gastrolobium glaucum is currently known from four populations in DEC's Avon Mortlock District. Since the late 1980's to early 1990's the number of known plants in wild populations has decreased from 1127 to 386 mature plants. This reduction is believed to be due to senescence and poor recruitment resulting from a lack of suitable disturbance such as fire.

Population 3 and Subpopulation 1b are on road reserves, Populations 2 and 4 are on water reserves, and Subpopulation 1a is located within an Experimental Farm vested with the Department of Agriculture and Food.

Description: *Gastrolobium glaucum* is a compact shrub up to 60 cm high with many stems arising from a woody rootstock. The bluish-green or almost grey leaves, up to 1.7 cm long and 1.3 cm wide, are arranged in whorls of three and vary from circular to elliptical or oval. They are held erect, and are flat, rather thick and rigid, with a very blunt tip bearing a hard prickly point. The orange and red flowers, well under 1 cm long, are borne above the leaves in closely clustered whorls of three. The sepals and flower stalks are densely hairy (Brown *et al.* 1998).

Gastrolobium glaucum may be confused with *Gastrolobium hamulosum* and *Gastrolobium rotundifolium* although these are easily distinguished as *G. hamulosum* has smaller leaves with a hooked point which *G. glaucum* lacks. *G. rotundifolium* has dark green leaves that contrast with the grey leaves of *G. glaucum*, *G. glaucum* also lacks the very long needle-like, pungent point on the leaf that *G. rotundifolium* has. *G. rotundifolium* also has much larger stipules than *G. glaucum* (Brown *et al.* 1998; Chandler *et al.* 2002).

Habitat requirements: *Gastrolobium glaucum* occurs in soils containing sand, loam, clay and gravel on slightly sloping habitat in mixed low heath dominated by *Hakea*, *Melaleuca* and *Acacia*.

Habitat critical to the survival of the species, and important populations: Given that *Gastrolobium glaucum* is ranked as Endangered (EPBC Act), it is considered that all known habitat for wild populations is critical to species survival, and that all wild populations are important populations. Habitat critical to the survival of *G. glaucum* includes the area of occupancy of extant populations, areas of similar habitat (i.e. sand, loam, clay and gravel soils in mixed low heath dominated by *Hakea*, *Melaleuca* and *Acacia*) surrounding populations (this is necessary to allow access for pollinators and expansion of populations) and additional occurrences of similar habitat that may contain the species or be suitable for future translocations.

Benefits to other species or ecological communities: Recovery actions implemented to improve the quality or security of the habitat of *Gastrolobium glaucum* will also improve the status of remnant associated native vegetation dominated by *Hakea*, *Melaleuca* and *Acacia*. No other conservation listed flora is located in the vicinity of *G. glaucum*.

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. *Gastrolobium glaucum* is not listed under any specific international treaty and this IRP does not affect Australia's obligations under any other international agreements.

Indigenous consultation: The Department of Indigenous Affairs Aboriginal Heritage Sites Register lists no sites of Aboriginal significance 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 impact: The implementation of this recovery plan is unlikely to cause significant adverse social and economic impacts. Minor adjustments to management practices may be required to ensure the protection of populations on lands not managed primarily for conservation.

Affected interests: Stakeholders potentially affected by the implementation of this plan include the Shire of Wongan-Ballidu, Department of Agriculture and Food and the Water Corporation.

Evaluation of the plan's performance: The Department of Environment and Conservation, in conjunction with the Avon Mortlock District Threatened Flora Recovery Team (AMDTFRT) will evaluate the performance of this IRP. In addition to annual reporting on progress and evaluation against the criteria for success and failure, the plan will be reviewed following four years of implementation.

Completed Recovery Actions

1. Land managers have been made aware of the threatened nature of this species, its location and their legal obligations to protect it.
2. Declared Rare Flora markers have been installed at Population 3 and Subpopulation 1b.
3. Fencing of a portion of Population 2 has been undertaken.
4. Collections of seed from several populations are stored with the Botanic Gardens and Parks Authority (BGPA) and DEC's Threatened Flora Seed Centre (TFSC).

Ongoing and future recovery actions

1. The AMDTFRT 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.
2. Staff from DEC's Avon Mortlock District office are monitoring all known populations.

IRP objective: The objective of this IRP is to abate identified threats and maintain or enhance viable *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 have increased by ten percent or more over the five year term of the plan.
Criteria for failure: The number of populations have decreased and/or the number of mature individuals have decreased by ten percent or more over the five year term of the plan.

Recovery actions

1. Coordinate recovery actions
2. Monitor populations
3. Collect seed
4. Develop and implement fire and disturbance trails
5. Develop and implement a fire management strategy
6. Promote awareness
7. Seek security of tenure for important populations
8. Undertake weed control
9. Install DRF markers
10. Obtain biological and ecological information
11. Conduct further surveys
12. Map habitat critical to the survival of *Gastrolobium glaucum*
13. Review the plan and need for further recovery actions

1. BACKGROUND

History

The species was first collected *Gastrolobium glaucum* in 1924 and described in 1942 (Gardner 1942).

In 1970 *Gastrolobium glaucum* Subpopulation 1b was found. Numerous plants were observed growing on road verges. In 2007 a few plants were observed growing on the road verges at this site.

Between 1999 and 2002 extensive surveys of the Wongan Hills area were undertaken, however no new populations of *Gastrolobium glaucum* were found.

Gastrolobium glaucum is currently known from four populations and 386 mature plants in DEC's Avon Mortlock District.

Description

Gastrolobium glaucum is a compact shrub up to 60 cm high with many stems arising from a woody rootstock. The bluish-green or almost grey leaves, up to 1.7 cm long and 1.3 cm wide, are arranged in whorls of three and vary from circular to elliptical or oval. They are held erect, and are flat, rather thick and rigid, with a very blunt tip bearing a hard prickly point. The orange and red flowers, well under 1 cm long, are borne above the leaves in closely clustered whorls of three. The sepals and flower stalks are densely hairy (Brown *et al.* 1998).

Gastrolobium glaucum may be confused with *Gastrolobium hamulosum* and *Gastrolobium rotundifolium* although these are easily distinguished as *G. hamulosum* has smaller leaves with a hooked point which *G. glaucum* lacks. *G. rotundifolium* has dark green leaves that contrast with the grey leaves of *G. glaucum*, *G. glaucum* also lacks the very long needle-like, pungent point on the leaf that *G. rotundifolium* has. *G. rotundifolium* also has much larger stipules than *G. glaucum* (Brown 1998; Chandler *et al.* 2002).

Distribution and habitat

Gastrolobium glaucum has a restricted range in the Shire of Wongan-Ballidu.

Habitat is sand, loam, clay and gravel in mixed low heath dominated by *Hakea*, *Melaleuca* and *Acacia*.

Summary of population land vesting, purpose and manager

Pop. No. & Location	DEC District	Shire	Vesting	Purpose	Manager
1a N of Wongan Hills	Avon Mortlock	Wongan-Ballidu	Department of Agriculture and Food	Experimental Farm	Department of Agriculture and Food
1b N of Wongan Hills	Avon Mortlock	Wongan-Ballidu	Unvested Reserve	Road Reserve	Shire of Wongan-Ballidu
2 S of Wongan Hills	Avon Mortlock	Wongan-Ballidu	Water Corporation	Water Conservation	Water Corporation
3 E of Wongan Hills	Avon Mortlock	Wongan-Ballidu	Unvested Reserve	Road reserve	Shire of Wongan-Ballidu
4 S of Wongan Hills	Avon Mortlock	Wongan-Ballidu	Water Corporation	Water Conservation	Water Corporation

Populations in **bold text** are considered to be important populations.

Biology and ecology

Gastrolobium glaucum is a disturbance opportunist that is likely to be killed by fire (Sampson and Hopper 1990). The species flowers from August to September, rarely into October with immature fruit appearing in November.

Threats

The main threats are weed invasion, inappropriate fire regimes, road maintenance, grazing, maintenance of a powerline access track, vehicle traffic, sand extraction and competition from associated species.

- **Weed invasion.** Weeds have been noted as a threat in several populations. Weeds reduce the survival of *G. glaucum* germinants.
- **Inappropriate fire regimes** threaten all populations. Fire is needed to germinate *G. glaucum* seed but may lead to population decline if fire intervals are too short for the maturation of adult plants. Fire also increases weed invasion reducing germination success post fire.
- **Road maintenance** including grading, spraying of herbicides and spoon drain maintenance threatens one subpopulation and one population. Apart from causing direct damage to plants, such activities also encourage weed invasion.
- **Grazing by stock** threatens one population. Although *Gastrolobium glaucum* is toxic to stock, grazing in the habitat of this species causes soil compaction, erosion, trampling of plants and seedlings and competition due to invasion by weed species.
- **Maintenance of a powerline access track** threatens one population as plants grow in close proximity to and on the access track. Relevant authorities have been informed of these locations so that appropriate protective actions can be implemented.
- **Vehicle traffic.** One population is threatened by vehicles used to access the powerline. Vehicles cause physical damage to plants some of which grow on the access track. Soil disturbance and compaction associated with this threat also increases weed invasion. See action 8.
- **Sand extraction** is a possible future threat to one population which is growing in an old sand and gravel extraction pit.

Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants	Current Condition	Threats
1a N of Wongan Hills	Experimental Farm Reserve	1991 430 2000 92 2001 153 2006 335 2008 335	Healthy	Inappropriate fire regime
1b N of Wongan Hills	Road Reserve	1992 384 2000 12 2006 19 (2) 2008 21	Moderate	Road maintenance – grading, spraying, maintenance of spoon drains, inappropriate fire regime
2 S of Wongan Hills	Water Reserve	1989 170 1998 30 2006 10 2008 10	Moderate	Maintenance of powerline access track, inappropriate fire regime
3 E of Wongan Hills	Road Reserve	1989 138 1999 40 2003 6 2006 19 2008 19	Healthy	Weeds, road maintenance, inappropriate fire regime
4 S of Wongan Hills	Water Reserve	1992 5 (13) 2006 3 2008 3	Moderate	Sand extraction, inappropriate fire regime

Populations in **bold text** are considered to be important populations; Note: ( ) = number of seedlings, [ ] = number dead

Guide for decision-makers

The above table provides details of current and possible future threats. Proposed actions in the immediate vicinity of populations or within the defined habitat critical to the survival of *Gastrolobium glaucum* require assessment for the potential for a significant level of impact.

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

Given that *Gastrolobium glaucum* is ranked as Endangered (EPBC Act), it is considered that all known habitat for wild populations is critical to the survival of the species, and that all wild populations are important populations. Habitat critical to the survival of *G. glaucum* includes the area of occupancy of extant populations, areas of similar habitat (i.e. sand, loam, clay and gravel soil in mixed low heath dominated by *Hakea*, *Melaleuca* and *Acacia*) surrounding populations (this is necessary to provide habitat for pollinators and future population expansion) and additional occurrences of similar habitat that may contain the species or be suitable for future translocations.

Benefits to other species or ecological communities

Recovery actions implemented to improve the quality or security of the habitat of *Gastrolobium glaucum* will also improve the status of remnant associated vegetation. No conservation listed flora are located in the vicinity of *G. glaucum* populations.

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. *Gastrolobium glaucum* is not listed under any specific international treaty however and this IRP does not affect Australia's obligations under any other international agreements.

Indigenous consultation

The Department of Indigenous Affairs Aboriginal Heritage Sites Register, lists no sites of Aboriginal significance 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 impact

The implementation of this recovery plan is unlikely to cause significant adverse social and economic impacts. Minor adjustments to management practices may be required to ensure the protection of populations on lands not managed primarily for conservation.

Affected interests

Stakeholders potentially affected by the implementation of this plan include the Shire of Wongan-Ballidu, Department of Agriculture and Food and the Water Corporation.

Evaluation of the plan's performance

The Department of Environment and Conservation in conjunction with the Avon Mortlock District Threatened Flora Recovery Team (AMDTFRT) will evaluate the performance of this IRP. In addition to annual reporting on progress and evaluation against the criteria for success and failure, the plan will be reviewed following five years of implementation

2. RECOVERY OBJECTIVE AND CRITERIA

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

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

3. RECOVERY ACTIONS

Completed recovery actions

Land managers have been made aware of the threatened nature of the species, its location and their legal obligations to protect it.

Declared Rare Flora (DRF) markers have been installed at Population 3 and Subpopulation 1b.

Fencing has been erected to protect a portion of Population 2.

The Botanic Gardens and Parks Authority (BGPA) holds two accessions of seed from Subpopulations 1a and b. DEC's Threatened Flora Seed Centre (TFSC) holds 73 seeds collected from Population 3.

Ongoing and future recovery actions

The AMDTFRT 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.

Staff from DEC's Avon Mortlock District office are monitoring all populations

Future recovery actions

Where populations occur on lands other than those managed by DEC, permission has been or will be sought from the 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 AMDTFRT will continue to coordinate the implementation of recovery actions for *Gastrolobium glaucum* and will include information on progress in their annual reports to DEC's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: AMDTFRT
Cost: $1,400 per year

2. Monitor populations

Monitoring of factors such as weed invasion, habitat degradation, population stability (expansion or decline), pollinator activity, seed production, recruitment, and longevity is essential.

Action: Monitor populations
Responsibility: DEC (Avon Mortlock District) through the AMDTFRT
Cost: $1,500 per year

3. Collect and store seed

Further seed collections need to be made. The *Germplasm Conservation Guidelines for Australia* produced by the Australian Network for Plant Conservation (ANPC) should be used to guide this process (Offord & Meagher 2009).

Actions: Collect seed
Responsibility: DEC (Avon Mortlock District, TFSC), and BGPA through the AMDTFRT
Cost: $2,800 in years 1, 3 and 5

4. Develop and implement fire and disturbance trials

Gastrolobium glaucum requires fire to stimulate the germination of soil-stored seed-banks. DEC's Avon Mortlock District will, in consultation with Department of Agriculture and Food, Water Corporation, the Shire of Wongan-Ballidu and relevant authorities develop and implement a recovery burn and disturbance trial. The results of the trials will be monitored and if successful a larger scale operation undertaken. Attention will be given to each of the following to ensure maximum recruitment but at the same time maintaining the integrity of the population:

- burning discrete dead plants
- raking of the soil near dead plants

Action: Develop and implement fire and disturbance trials
Responsibility: DEC (Science Division, Avon Mortlock District) and relevant authorities through the AMDTFRT
Cost: $2,700 in the first year, $900 in years 2 and 4, $3,600 in years 3 and 5

5. Develop and implement a fire management strategy

The development of a fire management strategy is recommended to protect plants from wildfire.

Action: Develop and implement a fire management strategy
Responsibility: DEC (Avon Mortlock District) and relevant authorities through the AMDTFRT.
Cost: $2,500 in the first year

6. Promote awareness

It is recommended that an information sheet that provides a description of the species and information about threats and recovery actions be developed. It is hoped the poster will result in discovery of new populations. In conjunction with this, a publicity campaign is also suggested to increase local community awareness of this species. Formal links with local naturalist groups and interested individuals should also be encouraged.

Action: Promote awareness
Responsibility: DEC (Avon Mortlock District, Species and Communities Branch (SCB) and Strategic Development and Corporate Affairs Division) through the AMDTFRT
Cost: $1,600 in the first year; 1,000 in years 3 and 5

7. Seek security of tenure for important populations

It is recommended that land currently vested with the Department of Agriculture and Food, and the Water Corporation be placed in the conservation reserve system.

Action: Seek security of tenure for important populations
Responsibility: DEC (Avon Mortlock District) through the AMDTFRT
Cost: $1,600 in the first year

8. Liaise with relevant land managers

Staff from DEC's Avon -Mortlock, District will continue to liaise with relevant land managers 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 *Gastrolobium glaucum*.

Action: Liaise with relevant land managers
Responsibility: DEC (Avon-Mortlock District) through the AMTFRT recovery team
Cost: $900 per year

9. Undertake weed control

Weeds are a threat to *Gastrolobium glaucum* Subpopulation 1b and Population 3. The following actions will be implemented:

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

Action: Undertake weed control
Responsibility: DEC (Avon Mortlock District, Science Division) through the AMDTFRT
Cost: $3,900 per year

10. Install DRF markers

Declared Rare Flora markers should be installed along a powerline maintenance track that runs through Population 2. The purpose of DRF markers is to alert people operating in the area to the presence of DRF and to help prevent habitat disturbance and accidental damage to the plants.

Actions: Install DRF markers
Responsibility: DEC (Avon Mortlock District) through AMDTFRT
Cost: $400 in the first year

11. Obtain biological and ecological information

Improved knowledge of the biology and ecology of *Gastrolobium glaucum* will provide a better scientific basis for management of the wild populations. An understanding of the following is particularly necessary for effective management:

1. Optimal fire frequency and intensity to maximise population size and health.
2. Identify factors that trigger or influence germination and seedling survival.
3. Appropriate herbicides for weed control that will not adversely affect *G. glaucum.*
4. Pollination biology and method of seed dispersal.
5. Rate of seed set and size of soil seed banks.
6. Seed viability and germination rates.

Action: Obtain biological and ecological information
Responsibility: DEC (Science Division, Avon Mortlock District) through the AMDTFRT
Cost: $8,000 in years 2 and 3

12. Conduct further surveys

It is recommended that further surveys be conducted in areas of suitable habitat.

Action: Conduct further surveys
Responsibility: DEC (Avon Mortlock District) through the AMDTFRT
Cost: $2,300 in years 3 and 4

13. Map habitat critical to the survival of *Gastrolobium glaucum*

Although habitat critical is described in Section 1, not all populations have been mapped and this will be addressed under this action.

Action: Map habitat critical to the survival of *Gastrolobium glaucum*
Responsibility: DEC (Avon Mortlock District) through the MDTFRT
Cost: $3,000 in the second year

14. Review the plan and need for further recovery actions

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

Action: Review the plan and need for further recovery actions
Responsibility: DEC (SCB, Avon Mortlock District) through the MDTFRT
Cost: $1,500 in the fourth year

Summary of recovery actions

Recovery Actions	Priority	Responsibility	Completion date
Coordinate recovery actions	High	AMDTFRT	Ongoing
Monitor populations	High	DEC (Avon Mortlock District) through the AMDTFRT	Ongoing
Collect seed	High	DEC (Avon Mortlock District, TFSC), and BGPA through the AMDTFRT	2013
Develop and implement fire and disturbance trials	High	DEC (Science Division, Avon Mortlock District) and relevant authorities through the AMDTFRT	Ongoing
Develop and implement a fire management strategy	High	DEC (Avon Mortlock District) and relevant authorities through the AMDTFRT	Develop by 2007 with implementation ongoing
Promote awareness	High	DEC (Avon Mortlock District, SCB and Strategic Development and Corporate Affairs Division) through the AMDTFRT	2013
Seek security of tenure	High	DEC (Avon Mortlock District) through the AMDTFRT	2009
Liaise with relevant land managers	High	DEC (Avon Mortlock District) through the AMDTFRT	Ongoing
Undertake weed control	Moderate	DEC (Avon Mortlock District, Science Division) through the AMDTFRT	Ongoing
Install DRF markers	Moderate	DEC (Avon Mortlock District) through AMDTFRT	2011
Obtain biological and ecological information	Moderate	DEC (Science Division, Avon Mortlock District) through the AMDTFRT	2011
Conduct further surveys	Moderate	DEC (Avon Mortlock District) through the AMDTFRT	2013
Map habitat critical to the survival of *Gastrolobium glaucum*	Moderate	DEC (Avon Mortlock District) through the AMDTFRT	2010
Review the plan and need for further recovery actions	Moderate	DEC (SCB, Avon Mortlock District) through the AMDTFRT	2013

4. TERM OF PLAN

Western Australia

This IRP will operate from April 2008 to March 2013 but will remain in force until withdrawn or replaced. If the species is still ranked CR after five years, the need for further recovery actions and an update of this IRP will be assessed.

Commonwealth

In accordance with the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* this adopted recovery plan will remain in force until revoked.

The recovery plan must be reviewed at intervals of not longer than five years.

5. REFERENCES

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Sampson J.F. and Hopper, S.D. (1990). *Endangered poison plants of Western Australia: Final report WWF project P105*. World Wildlife Fund Australia. pp 21-22.

6. TAXONOMIC DESCRIPTION

Excerpt from: Chandler, G., Crisp, M., Cayzer, L. and Bayer, R. (2002). Monograph of Gastrolobium (Fabaceae: Mirbelieae) *Australian Systematic Botany*. **15**: 655.

Low *shrub* 0.2-1.2m high. *Branchlets* ascending, terete, densely pubescent. *Petioles* terete, continious but not decurrent with the branchlet, 1-3mm long. *Leaves* ascending, opposite or whorled, elliptic to obovate (10-)13-17 x (6-)8-11(-13)mm, glaucous, venation prominently reticulate, raised on both surfaces; apex rounded, recurved, with or without a pungent point; margins entire, not recurved; base rounded to broadly cuneate. *Stipules* erect, hyaline, 3-4mm long. *Inflorescences* terminal racemes, 8-16-flowered; *peduncle* with a number of apparently aborted buds (5-)8-10mm long; *rachis* 25-35(-40)mm long; *subtending bracts* caducous, scale-like, entire, ovate 5-7mm long. *Pedicels* terete, 2-2.5mm long. *Calyx* campanulate, c. 6mm long including the 1-mm receptacle, moderately to densely villous, lobes all recurved to reflexed, rarely not recurved; upper 2 lobes united higher than the lower 3, rounded, 2-3mm long; lower 3 lobes triangular, acute, 1.5-3mm long. *Corolla*: *standard* transversely elliptic, 10-11 x 13-14mm including the c. 3mm claw, yellow-orange to orange with a red ring surrounding the yellow centre, apex emarginate, base cordate, auriculate; *wings* broadly obovate, 6.5-8 x c. 3.5mm including the 2-3mm claw, orange-yellow to red at the base, apex rounded, incurved and overlapping to enclose the keel, base auriculate on both margins, not saccate; *keel* half transversely ovate, 6-6.5 x c. 3mm including the c. 2mm claw, red to maroon, apex acute, spout-like, base auriculate, saccate, with a circular opening near claws to expose the stamens from below. *Style* very short, incurved, hairs present in the lower half; *ovary* stipitate, densely pubescent; *ovules* 2. *Pod* stipitate, very broadly transversely elliptic to circular, 4-4.5 x 4.5mm, moderately to densely villous.

SUMMARY OF RECOVERY ACTIONS AND COSTS

	Year 1			Year 2			Year 3			Year 4			Year 5		
Recovery action	DEC	Other	Ext.	DEC	Other	Ext.	DEC	Other	Ext.	DEC	Other	Ext.	DEC	Other	Ext.
Coordinate recovery actions	1,000	300	100	1,000	300	100	1,000	300	100	1,000	300	100	1,000	300	100
Monitor populations	1,000		500	1,000		500	1,000		500	1,000		500	1,000		500
Collect seed	1,800		1,000				1,800		1,000				1,800		1,000
Develop and implement fire and disturbance trials	1,300	800	600	500		400	1,800	800	1,000	500		400	1,800	800	1,000
Develop and implement a fire management strategy	1,000	1,000	500												
Promote awareness	1,000		600				1,000						1,000		
Seek security of tenure	1,300		300												
Liaise with relevant land managers	900			900			900			900			900		
Undertake weed control	3,000		900	3,000		900	3,000		900	3,000		900	3,000		900
Install DRF markers	300		100												
Obtain biological and ecological information				1,500	2,500	4,000	1,500	2,500	4,000						
Conduct further surveys							1,500		800	1,500		800			
Map habitat critical to the survival of *Gastrolobium glaucum*				900		2,100									
Review the plan and need for further recovery actions													1,500		
Total	12600	2,100	4,600	8,800	2,800	8,000	13,500	3,600	8,300	7,900	300	2,700	12000	1,100	3,500
Yearly Total	**19,300**			**19,600**			**25,400**			**10,900**			**16,600**		

Ext. = External funding (funding to be sought), Other = in kind contribution and BGPA

Total DEC: $54,800
Total Other: $9,900
Total External Funding: $27,100
Total Costs: $91,800