Government of **Western Australia**
Department of **Environment and Conservation**

Australian Government

INTERIM RECOVERY PLAN NO. 299

Yellow-Leafed Gastrolobium

(*Gastrolobium luteifolium*)

INTERIM RECOVERY PLAN

2009-2014

April 2009
Department of Environment and Conservation
Kensington

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: 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This IRP will operate from April 2009 to March 2014 but will remain in force until withdrawn or replaced. It is intended that, if the species is still listed as declared rare flora this IRP will be reviewed after five years and the need for further recovery actions assessed.

This IRP was given regional approval in May 2010 and approved by the Director of Nature Conservation in June 2010. 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 as at April 2009.

IRP PREPARATION

This IRP was prepared by Robyn Luu[1], Andrew Brown[2] and Kym Pryor[3].

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ACKNOWLEDGMENTS

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

Sarah Barrett	Conservation Officer Flora, DEC, Albany Work Centre
Anne Cochrane	Manager, DEC's Threatened Flora Seed Centre
Andrew Crawford	DEC's Threatened Flora Seed Centre
Mike Crisp	Botanist, Australian National University, Canberra
Greg Keighery	Principal Research Scientist, DEC, Science Division
Amanda Shade	Horticulturalist, Botanic Gardens and Parks Authority

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

Cover photograph by Sarah Barrett.

CITATION

This IRP should be cited as:
Department of Environment and Conservation (2009) Yellow-Leafed Gastrolobium (*Gastrolobium luteifolium*) Interim Recovery Plan 2009-2014. Interim Recovery Plan No. 299. Department of Environment and Conservation, Western Australia.

SUMMARY

Scientific Name:	***Gastrolobium luteifolium***	**Common Name:**	Yellow-leafed Gastrolobium
Family:	Papilionaceae	**Flowering Period:**	September to October
DEC Region:	South Coast	**DEC District:**	Albany Work Centre
Shire:	Gnowangerup	**Recovery Team:**	Albany District Threatened Flora Recovery Team (ADTFRT)
NRM Region:	South Coast		

Illustrations and/or further information: Keighery, G. and Beard, J. (1993) *Wildflowers, in Mountains of Mystery*. Department of Conservation and Land Management, Western Australia; DEC (2008) *Western Australian Herbarium FloraBase 2 – Information on the Western Australian Flora* (Accessed 2007) Department of Environment and Conservation, Western Australia. http://www.calm.wa.gov.au/science/.

Current status: *Gastrolobium luteifolium* was declared as Rare Flora (as *Nemcia luteifolia*) in November 2000. It currently meets World Conservation Union (IUCN 2001) Red List Category Critically Endangered (CR) under criteria B1ab(iii,v)+2ab(iii,v) due to the species being known from a single population, a continuing decline in habitat quality and area, a continuing decline in the number of mature plants and the low number of mature individuals. A revision of the species' IUCN ranking, following further research in 2007, has revealed that, while still meeting Critically Endangered, the species now fits only criteria B1ab(iii)+2ab(iii). While the number of plants appears to be increasing at this time (due to a revised estimate of plant density), the species is still known from a single, highly restricted population with a linear extent of 1 km, an area of occupancy of 20 ha and a projected decline in habitat quality due to the presence of *Phytophthora*. *Gastrolobium luteifolium* is not currently listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999). The main threats are disease and inappropriate fire regimes.

In 2002 Chandler, Crisp, Kayzer and Bayer synonymized *Nemcia* under *Gastrolobium* and as a result changed the generic and specific epithets of *Nemcia luteifolia* to *Gastrolobium luteifolium* (Chandler *et al*. 2002).

Description: *Gastrolobium luteifolium* is a rigid shrub 1-1.3 m in height, with thick branches and smooth, yellow-green ovate to elliptic leaves 4-6.5 cm long and 3-3.7 cm wide . The leaf-stalk is villous and 0.75-1 cm long with dark, bristled stipules at the base. The inflorescences contain 4-5 red flowers, the stems of which rise from a central point. The bracts are almost hemispherical and the pedicels, or individual flower stalks, are silky/hairy and 0.5 cm or sometimes longer. The calyx is bell-shaped and around 12 mm long with calyx lobes that are broadly oblong and reddish inside, the lower 3 being long and somewhat acute. The corolla, or petals, are dark purple when dry and 2 cm long and the ovary, containing 6 ovules, is distinct and supported by a stipe (Chandler *et al.* 2002).

Distribution and habitat: *Gastrolobium luteifolium* is endemic to Western Australia where it is confined to the Stirling Range National Park. The species grows on brown, sandy loam/clay over schist in heath.

Habitat critical to the survival of *Gastrolobium luteifolium* and important populations: Given that *Gastrolobium luteifolium* is ranked as CR, it is considered that all known habitat for the wild population is critical to the survival of the species, and that the wild population is an important population. Habitat critical to the survival of *G. luteifolium* includes the area of occupancy of the known population, areas of similar habitat (i.e. brown sandy loam/clay over schist in heath) surrounding the known population, this providing potential habitat for population expansion and for pollinators), additional occurrences of similar habitat that may contain undiscovered populations of the species or be suitable for future translocations, and the local catchment for the surface and/or groundwater that maintains the habitat of the species.

Benefits to other species or ecological communities: *Gastrolobium luteifolium* occurs in the Stirling Range National Park and recovery actions implemented to improve its long-term conservation will also improve the status of its associated heath habitat. Eleven other DRF and Priority flora, occur in association with *G. luteifolium*. The species also occurs within a TEC.

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

Indigenous Consultation: The Aboriginal Sites Register maintained by the Department of Indigenous Affairs does not list any significant sites in the vicinity of populations of *Gastrolobium luteifolium* and no indigenous communities that may be interested or involved in the area affected by this plan have been identified. Therefore, as there are no specific actions identified in the plan that would potentially be at variance with indigenous culture or land management practices, no

specific consultation has been undertaken in the preparation of this plan. Never-the-less, the advice of the South West Aboriginal Land and Sea Council (SWALSC) and Department of Indigenous Affairs is being sought to determine whether there are any other 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.

Social and economic impact: The implementation of this recovery plan is unlikely to cause significant adverse social and economic impact as the single known population of *Gastrolobium luteifolium* occurs in a National Park and the site is not associated with any public recreational activities.

Affected Interests: There are no significant external stakeholders likely to be affected by implementation of this plan, as the only known population occurs in a National Park.

Evaluation of the Plan's Performance: DEC, in conjunction with the Albany Work Centre Threatened Flora Recovery Team (ADTFRT), 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.

Objectives: The objective of this Interim Recovery Plan 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 or habitat quality has remained stable or improved over the term of the plan.
Criteria for failure: The population has become extinct or habitat quality has declined over the term of the plan.

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

1. From 1994 to 1996, and 1999 to 2002 surveys for *Gastrolobium luteifolium* were undertaken on a number of peaks in the Stirling Range National Park.
2. Testing conducted on two samples of *Gastrolobium luteifolium* confirmed the presence of *Phytophthora cinnamomi*.
3. Stirling Range National Park Rangers are aware of the threatened nature of the species and its location.
4. In December 2000, 1153 seeds were collected from Population 1 and are being stored at -18ºC in DEC's Threatened Flora Seed Centre (TFSC).
5. Phosphite was applied to Subpopulations 1a and 1c in autumn 2001, 2004 and 2007 (1c only) and monitoring quadrats were established in Subpopulation 1c.
6. The Albany District Threatened Flora Recovery Team (ADTFRT) is overseeing the implementation of this IRP and will include it in its annual report to the Department's Corporate Executive and funding bodies.
7. Staff from the Department's Albany Work Centre regularly monitor the *Gastrolobium luteifolium* population and conduct searches for additional populations.

Recovery actions

1. Coordinate recovery actions
2. Apply phosphite
3. Monitor population
4. Collect seed for long-term storage and future translocation
5. Conduct further surveys
6. Develop and implement a fire management strategy
7. Obtain biological and ecological information
8. Promote community awareness
9. Map habitat critical to the survival of the species
10. Review this plan and assess the need for further recovery actions

1. BACKGROUND

History

Gastrolobium luteifolium was described by Karel Domin in 1923 (as *Nemcia luteifolia*) from specimens collected at Warranup Hill in the Stirling Range by A.A. Dorrien Smith. However, it was then not seen again until collected by M. Crisp and W. Keys in 1993. This is currently the only known population as, what was thought to be a second population discovered by Greg Keighery[1] on Mount Hassell in the Stirling Range, is now known to be *Gastrolobium vestitum*.

In 1996, S. Barrett[2] surveyed six peaks in the Stirling Range National Park as part of the 'Biological Survey of Mountains in southern Western Australia' project but no new populations were found (Barrett 1996). The single known population of *Gastrolobium luteifolium* was relocated in 1999 and consists of three sub-populations. The third sub-population was located in 2000 on the southernmost peak of Mt Trio. Further surveys were subsequently conducted on other peaks but no new populations were found.

In 2002 Chandler, Crisp, Kayzer and Bayer (Chandler *et al*. 2002) synonymised *Nemcia* under *Gastrolobium* and as a result changed the generic and specific epithets of *Nemcia luteifolia* to *Gastrolobium luteifolium*.

Gastrolobium luteifolium is currently known from a single population of 15,656 adult plants, all of which are threatened by dieback disease (*Phytophthora cinnamomi*).

Description

Gastrolobium luteifolium is a rigid shrub 1-1.3 m in height, with thick branches and smooth, yellow-green leaves 4-6.5 cm long and 3-3.7 cm wide, ovate to elliptic in shape. The leaf-stalk is villous and 0.75-1 cm long with dark, bristled stipules at the base. The inflorescences contain 4-5 red flowers, the stems of which rise from a central point. The bracts are almost hemispherical and the pedicels, or individual flower stalks, are silky/hairy and 0.5 cm or sometimes longer. The calyx is bell-shaped and around 12 mm long with calyx lobes that are broadly oblong and reddish inside, the lower 3 being long and somewhat acute. The corolla, or petals, are dark purple when dry and 2 cm long and the ovary, containing 6 ovules, is distinct and supported by a stipe.

Gastrolobium luteifolium flowers in September, although the fruiting period is unknown. The species is similar to *G. vestitum* but differs in its smooth, silky leaves, wavy leaf margins and generally larger flowers (Chandler *et al.* 2002).

Distribution and habitat

Gastrolobium luteifolium is endemic to the Stirling Range National Park in Western Australia. Habitat consists of brown, sandy loam/clay over schist in heath. Associated species include *G. crenulata*, *Kunzea montana*, *Banksia solandri*, *Banksia foliolata*, *B. concinna*, *Calothamnus crassus*, *Darwinia leiostyla*, *Hypocalymma phillipsii* and *Taxandria parviceps*.

Table 1. Summary of population land vesting, purpose and tenure

Pop. No. & Location	DEC District	Shire	Vesting	Purpose	Manager
1a,b,c. Mt Trio	Albany Work Centre	Gnowangerup	Conservation Commission of Western Australia	National Park and Recreation	DEC

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

Biology and ecology

Gastrolobium luteifolium has flowers that appear to be adapted for pollination by bees. The 'bullseye' on the flower provides a point for bees to aim to, and special ridges on the winged petals provide an area for bees to grip as they attempt to open flowers in search of nectar and pollen. The contrasting flower colours are

[1] Greg Keighery, Principal Research Scientist, DEC Science Division
[2] Sarah Barrett, Flora Officer, DEC's Albany Work Station

particularly noticeable in ultra-violet, which bees can see. Many related *Gastrolobium* species are bird pollinated and have lost the conspicuous eye found in *G. luteifolium*. These species tend to have uniformly red flowers that hang down, allowing the honeyeater to perch on the stem and probe the flower for nectar and are much larger than bee-pollinated flowers (Keighery and Beard 1993).

Although killed by fire *Gastrolobium* species have hard-coated seeds that germinate in large numbers following fire (Keighery and Beard 1993). This was evident when good recruitment from soil-stored seed occurred after a 1996 fire burnt the *G. luteifolium* population (S. Barrett pers. ob.).

Gastrolobium luteifolium is known to be susceptible to dieback disease caused by *Phytophthora cinnamomi* with the pathogen being present in two specimens sampled in April 2000 (S. Barrett pers. comm.).

Threats

Gastrolobium luteifolium was declared as Rare Flora (as *Nemcia luteifolia*) in November 2000. It is currently ranked as Critically Endangered (CR) under World Conservation Union (IUCN 2001) Red List criteria B1ab(iii,v)+2ab(iii,v) due to being known from a single population, a continuing decline in habitat quality and area of occupation, a continuing decline in the number of mature plants and the low number of mature individuals. A revision of the species' IUCN ranking, following further research in 2007, has revealed that, while still meeting Critically Endangered, the species now fits only criteria B1ab(iii)+2ab(iii). While the number of plants appears to be increasing at this time (due to a revised estimate of plant density), the species is still known from a single, highly restricted population with a linear extent of 1 km, an area of occupancy of 20 ha and a projected decline in habitat quality due to the presence of *Phytophthora cinnamomi*. *Gastrolobium luteifolium* is not currently listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999). The main threats are disease and inappropriate fire regimes.

- **Dieback disease** (*Phytophthora cinnamomi*), a pathogen that causes root rot resulting in susceptible plants dying of drought stress, is a serious threat to the single known *Gastrolobium luteifolium* population with some deaths already occurring.

- **Inappropriate fire regimes** may affect the long-term viability of the population. Seeds of *Gastrolobium luteifolium* germinate following fire and it is likely that occasional fires are needed for recruitment. Approximately 50% of the population reached reproductive maturity six years after a 1996 fire and if fire frequency is increased the soil seed bank could be depleted before juvenile plants have reached maturity.

The intent of this plan is to provide actions that will deal with immediate threats to *Gastrolobium luteifolium*. As *G. luteifolium* is likely to be vulnerable to drying trends associated with climate change, such trends may result in, among other things, an increase in fire frequency. As the species occurs in a mountain habitat, an area of higher rainfall, it is already at the limit of its climatic range. Continuing drying trends would put strain on the continuing existence of the species in the wild. However, the threat of climate change is beyond the scope of this IRP, and so cannot be addressed under the listed actions.

Table 2: Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants	Condition	Threats
1 a,b,c Mt Trio	National Park	1999 20 (150) [10] 2000 20 (1000) [20] 2001 300 (1000] [20] 2002 500 (500) [20] 2003 750 (500) [20] 2006 1000 2008 15656 [20] (1b not surveyed in 2008)	Moderate Moderate to healthy	Disease (dieback), inappropriate fire regimes

(.) = seedlings, [.] = dead plants.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Developments and/or land clearing in the immediate vicinity of *Gastrolobium luteifolium* populations require assessment. Developments or clearing

should not be approved unless the proponents can demonstrate that their actions will have no significant impact on the species, its habitat or potential habitat, the local surface hydrology, such that drainage in the habitat of the species would be altered, or have the potential to spread or amplify dieback disease caused by the plant pathogen *Phytophthora cinnamomi*.

Habitat critical to the survival of *Gastrolobium luteifolium* and important populations

Given that *Gastrolobium luteifolium* is ranked as CR, it is considered that all known habitat for the wild population is critical to the survival of the species, and that the wild population is an important population. Habitat critical to the survival of *G. luteifolium* includes the area of occupancy of the known population, areas of similar habitat surrounding and linking the known population (these providing potential habitat for population expansion and for pollinators), additional occurrences of similar habitat that may contain undiscovered populations of the species or be suitable for future translocations, and the local catchment for the surface and/or groundwater that maintains the habitat of the species.

Benefits to other species or ecological communities

Gastrolobium luteifolium occurs in the Stirling Range National Park and recovery actions implemented to improve its long-term conservation will also improve the status of its associated heath habitat. Eleven other DRF and Priority flora occur in association with *G. luteifolium* and are listed in the table below.

Table 3: Conservation-listed flora species occurring in association with *Gastrolobium luteifolium*

Species name	Conservation Status (Western Australia)	Conservation Status (EPBC Act 1999)
Sphenotoma drummondii	DRF - Endangered	Endangered
Gastrolobium crenulatum	Priority 2	
Gonocarpus rudis	Priority 2	
Andersonia echinocephala	Priority 3	
Lasiopetalum monticola	Priority 3	
Banksia concinna	Priority 4	
Banksia foliolata	Priority 4	
Banksia solandri	Priority 4	
Billardiera drummondii	Priority 4	
Calothamnus crassus	Priority 4	
Darwinia leiostyla	Priority 4	

DRF = Declared Rare Flora; For a description of the Priority categories see Atkins (2006)

Gastrolobium luteifolium also occurs within a Threatened Ecological Community (TEC).

Table 4: Threatened Ecological Community (TEC) in which *Gastrolobium luteifolium* occurs within

Community Name	Conservation status (WA)	Conservation Status (EPBC Act 1999)
Montane mallee-thicket and heath of the eastern Stirling Range	Critically Endangered	Endangered

For a description of the TEC categories see DEC (2007)

International obligations

This IRP 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 luteifolium* is not listed under any specific international treaty however, and this plan does not affect Australia's obligations under any other international agreements.

Indigenous Consultation

The Aboriginal Sites Register maintained by the Department of Indigenous Affairs does not list any significant sites in the vicinity of populations of *Gastrolobium luteifolium* and no indigenous communities that may be interested or involved in the area affected by this plan have been identified. Therefore, as there are no specific actions identified in the plan that would potentially be at variance with indigenous culture or land management

practices, no specific consultation has been undertaken in the preparation of this plan. Never-the-less, the involvement of the South West Aboriginal Land and Sea Council (SWALSC) and Department of Indigenous Affairs is being sought to determine whether there are any other 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.

Social and economic impacts

The implementation of this recovery plan is unlikely to cause significant adverse social and economic impact as the single known population of *Gastrolobium luteifolium* occurs in a National Park and the site is not associated with any public recreational activities.

Affected interests

There are no significant external stakeholders likely to be affected by implementation of this plan, as the only known population occurs in a National Park.

Evaluation of the Plan's Performance

DEC, in conjunction with the Albany Work Centre Threatened Flora Recovery Team, 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.

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 or habitat quality has remained stable or improved over the term of the plan.

Criteria for failure: The population has become extinct or habitat quality has declined over the term of the plan.

3. RECOVERY ACTIONS

Existing recovery actions

Between 1994 and 1996 surveys for *Gastrolobium luteifolium* were undertaken on six peaks in the Stirling Range National Park as part of the 'Biological Survey of Mountains in southern Western Australia' project. In 1999 DEC's Science Division and Albany Work Centre staff conducted surveys on several additional peaks. During these surveys no new populations were found.

Testing conducted on two samples of *Gastrolobium luteifolium* taken in April 2000 by DEC's Science Division staff confirmed the presence of *Phytophthora cinnamomi*.

Stirling Range National Park Rangers are aware of the threatened nature of the species and its location.

1153 seeds collected from Population 1 in December 2000, are stored at -18ºC in DEC's Threatened Flora Seed Centre (TFSC).

Phosphite was applied to Subpopulations 1a and 1c in autumn 2001, 2004 and 2007 (1c only) and monitoring quadrats were established in Subpopulation 1c. Within the quadrats, 57% of plants survived from 2002 to 2005, although some of this decline may have been due to intra-species competition.

The increase from 1000 plants in 2006 to 15656 in 2008 is due to a revised estimate of plant density in that year.

The Albany District Threatened Flora Recovery Team (ADTFRT) is overseeing the implementation of this IRP and will include it in its annual report to DEC's Corporate Executive and funding bodies.

Staff from the Department's Albany Work Centre regularly monitor *Gastrolobium luteifolium* and conduct searches for additional populations.

Future recovery actions

Gastrolobium luteifolium is currently only known from the Stirling Range National Park which is managed by DEC. However, should further populations be discovered on lands other than those managed by DEC, permission will be sought from the appropriate land managers prior to recovery actions being undertaken. The following recovery actions are generally in order of descending priority, influenced by their timing over the life of the plan. However this should not constrain addressing any of the actions if funding is available and other opportunities arise.

1. Coordinate recovery actions

The ADTFRT will coordinate recovery actions for *Gastrolobium luteifolium* and other DRF located in the area covered by the Albany Work Centre. They will include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

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

2. Apply phosphite

As *Gastrolobium luteifolium* and the community in which it grows are infested with *Phytophthora cinnamomi*, DEC will continue applying phosphite as a protective measure. Phosphite application will also protect a number of other threatened plant species that occur in the area and an occurrence of the Montane mallee thicket TEC.

Action: Apply phosphite
Responsibility: DEC (Albany Work Centre) through the ADTFRT
Cost: $6000 in years 1 and 3.

3. Monitor population

Annual monitoring of factors such as habitat degradation (including the impact of dieback), population stability (expansion or decline), pollinator activity, seed production, recruitment, longevity, predation and the impact of phosphite application on *Gastrolobium luteifolium* and the control of *Phytophthora cinnamomi* is essential.

Action: Monitor populations
Responsibility: DEC (Albany Work Centre) through the ADTFRT
Cost: $2,200 per year.

4. Collect seed for long term storage and future translocation

It is important to preserve an *ex situ* genetic 'blueprint' of a rare taxon and to store germplasm as a genetic resource that can be available for translocation purposes. Seed has already been collected from the population but further collections from this and any new populations are required.

Action: Collect seed for long-term storage and future translocation
Responsibility: DEC (Albany Work Centre, TFSC) BGPA, through the ADTFRT
Cost: $3,300 per year.

5. Conduct further surveys

Further surveys supervised by DEC staff, and with assistance from local naturalists and wildflower society members, will be conducted during the species' flowering period (September to October).

Action: Conduct further surveys
Responsibility: DEC (Albany Work Centre) through the ADTFRT
Cost: $4,000 per year.

6. Develop and implement a fire management strategy

Fire is known to kill adult *Gastrolobium luteifolium* plants and could be detrimental to the species' long-term survival if occurring at high frequencies, i.e. before soil seed stores have been replenished. Fire should therefore be prevented from occurring in the area of the population, except where it is being used as a recovery tool.

A fire management strategy will be developed to determine fire control measures and fire frequency. This strategy should incorporate other priority and threatened flora species in the area.

Action: Develop and implement a fire management strategy
Responsibility: DEC (Albany Work Centre) through the ADTFRT
Cost: $2,400 in first year and $1,000 in years 2-5.

7. Obtain biological and ecological information

As an improved knowledge of the biology and ecology of *Gastrolobium luteifolium* will provide a better scientific basis for its management in the wild, an understanding of the following is necessary:

1. Species' response to disturbance, including fire, following Adaptive Management principles.
2. Species' pollination biology.
3. Levels of flower and fruit production.
4. Seed longevity and viability.
5. Conditions necessary for germination.
6. Longevity of plants and time taken to reach maturity.
7. Species' genetic diversity.
8. Impact of dieback disease and phosphite application on *Gastrolobium luteifolium* and its habitat.

Action: Obtain biological and ecological information
Responsibility: DEC (Science Division, Albany Work Centre) through the ADTFRT
Cost: $17,000 per year.

8. Promote community awareness

Awareness of the importance of biodiversity conservation and the need for long-term protection of the wild population of this species will be promoted throughout the community. Formal links with local naturalist groups and interested individuals will also be encouraged. An information sheet, which includes a description of the plant, its habitat type, threats, management actions and photos will be produced.

Due to the potential susceptibility of the habitat of this species to dieback, the need for hygiene procedures will be included in information provided to visitors to the area. This will stress the need to restrict the movement of soil into the habitat of the population.

Action: Promote community awareness
Responsibility: DEC (Albany Work Centre, Corporate Relations) through the ADTFRT
Cost: $2,500 in first year and $800 in years 2-5.

9. Map habitat critical to the survival of the species

It is a requirement of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) that spatial data relating to habitat critical to the survival of threatened species be determined. Although this is alluded to in Section 1, all the areas described have not yet been accurately mapped and will be addressed under this action. If additional populations are located, habitat critical to their survival will also be determined and mapped.

Action: Map habitat critical to the survival of *Gastrolobium luteifolium*
Responsibility: DEC (Albany Work Centre) through the ADTFRT
Cost: $2,500 in year 1.

10. Review this plan and assess the need for further recovery actions

If *Gastrolobium luteifolium* is still listed as declared rare flora at the end of the five-year term of this IRP, the need for further recovery actions, or a review of this IRP will be assessed and a revised plan prepared if necessary.

Action: Review this plan and assess the need for further recovery actions
Responsibility: DEC (Species and Communities Branch, Albany Work Centre) through the ADTFRT
Cost: $2,000 in year 5.

Table 5. Summary of recovery actions

Recovery Actions	Priority	Responsibility	Completion date
Coordinate recovery actions	High	ADTFRT	Ongoing
Apply phosphite	High	DEC (Albany Work Centre) through the ADTFRT	2012
Monitor population	High	DEC (Albany Work Centre) through the ADTFRT	Ongoing
Collect seed for long term storage and future translocation	Medium	DEC (Albany Work Centre, Threatened Flora Seed Centre) through the ADTFRT	2014
Conduct further surveys	Medium	DEC (Albany Work Centre) through the ADTFRT	2014
Develop and implement a fire management strategy	Medium	DEC (Albany Work Centre) through the ADTFRT	Develop by 2010 with implementation ongoing
Obtain biological and ecological information	Medium	DEC (Albany Work Centre, Science Division) through the ADTFRT	2014
Promote community awareness	Medium	DEC (Albany Work Centre, Species and Communities Branch (SCB)) through the ADTFRT	2014
Map habitat critical to the survival of the species	Medium	DEC (Albany Work Centre) through the ADTFRT	2010
Review the need for further recovery actions	Medium	DEC (Albany Work Centre, SCB) through the ADTFRT	2014

4. TERM OF PLAN

This Interim Recovery Plan will operate from April 2009 to March 2014 but will remain in force until withdrawn or replaced. If *Gastrolobium luteifolium* is still listed as declared rare flora after five years, this IRP will be reviewed and, if necessary, further recovery actions put in place.

5. REFERENCES

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6. TAXONOMIC DESCRIPTION

Domin, K. (1923) *Nemcia*, a new genus of the Leguminosae. *Preslia* 2:27-28.

Nemcia luteifolia (*Gastrolobium luteifolium*) is a rigid shrub, probably tall, branches thick, juvenile subcompressed 2 strongly angled and appressed short densely hairy, aged subterete, sparingly velvety or glabrous; leaves opposite, petiolate, rigid, thickly leathery, broadly ovate, elliptic, apex round, truncate, emarginate, leaf blade narrow without petiole 4 to 6.5 cm long and 3 to 3.7 cm wide, usually glabrous, underneath pale yellow, margin nerve cartilaginous, flexible paired undulate-crenulate and revolute enclosed, pinnately nerved, midrib below strongly raised, reticulate, dense both sides conspicuous; petiole 0.75 to 1 cm long, villous; stipules setaceous, dark, stipules are persistent; flowers superb, numerous, in clusters pedunculate in upper axils, peduncle thick, grooved, apex is dilated, hairy, around 1 cm long; bracts almost hemisphere, dense short hairs, soon falling off; flowers pedicellate; pedicel 0.5 cm or sometimes longer, silky/hairy; calyx bell-shaped, c. 12 mm long, exterior hairy, interior glabrous or nearly glabrous and purple; calyx lobes broadly oblong, reddish inside, lower 3 long somewhat acute tube is white, superior 2 lobes are connate and strongly obtuse; corolla when dry dark purple, 2 cm and ultra long; ovary distinct stipitate, white silky hairs, 4 ovules.