INTERIM RECOVERY PLAN NO. 295

Stylidium amabile

INTERIM RECOVERY PLAN

2010-2015

February 2010

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: the Department of CALM formally became the Department of Environment and Conservation (DEC) in July 2006.

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This plan will operate from February 2010 to January 2015 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still listed as threatened flora, this IRP will be reviewed after five years and the need for further recovery actions assessed.

This IRP was given regional approval on 21 January 2010 and was approved by the Director of Nature Conservation on 9 February 2010. The provision of funds identified in this IRP is dependent on budgetary and other constraints affecting DEC, as well as the need to address other priorities.

Information in this IRP was accurate at February 2010.

IRP PREPARATION

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

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ACKNOWLEDGMENTS

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

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Andrew Crawford	Principal Technical Officer, DEC Threatened Flora Seed Centre
Josie Dean	Acting Conservation Officer (Flora), DEC Geraldton District
Juliet Wege	Research Scientist, DEC Western Australian Herbarium
Amanda Shade	Assistant Curator (Nursery), 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.

Cover photographs by Juliet Wege.

CITATION

This IRP should be cited as:

Department of Environment and Conservation (2010) *Stylidium amabile* Interim Recovery Plan 2010-2015. Interim Recovery Plan No. 295. Department of Environment and Conservation, Western Australia.

SUMMARY

Scientific Name:	***Stylidium amabile***	**Common Name:**	None
Family:	Stylidiaceae	**Flowering Period:**	September to October
DEC Region:	Midwest	**DEC District:**	Geraldton
Shire:	Perenjori	**NRM Region:**	Northern Agricultural
Recovery Team:	Geraldton District Threatened Flora Recovery Team (GDTFRT)		

Illustrations and/or further information: Wege, J. and Coates, D. (2007) Observations on the rare triggerplant *Stylidium coroniforme* (Stylidiaceae) and the description of two allied taxa of conservation concern. *Nuytsia* 17(1): 433-434; Western Australian Herbarium (1998−) *FloraBase − The Western Australian Flora*. Department of Environment and Conservation. http://florabase.dec.wa.gov.au/.

Current status: *Stylidium amabile* was declared as Rare Flora under the Western Australian *Wildlife Conservation Act 1950* in June 2006 and is currently ranked as Critically Endangered (CR) under World Conservation Union (IUCN 2001) criterion C2a(i) due to a continuing decline in the number of mature individuals and no population estimated to contain more than 50 mature individuals. The species is not currently listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999). The main threats to the species are poor recruitment, road, rail and track maintenance, grazing and inappropriate fire regimes.

Description: *Stylidium amabile* is a rosetted, perennial herb, 0.06 to 0.23 m high. The oblanceolate leaves are 1.2 to 6 cm long and 1.8 to 4 mm wide. The leaf apex ends in a sharp point, is marginate and hairless. The leafless flower stalk rising directly from the root is smooth at the base and glandular on the inflorescence axis. The flowers are white and pink, occurring from September to October.

Habitat requirements: *Stylidium amabile* is known from the Maya area, northeast of Perth where it occurs amongst *Eucalyptus* and *Allocasuarina* scrub-heath or *Allocasuarina* and *Acacia* scrub in sandy lateritic-gravel soils high in the landscape.

Habitat critical to the survival of the species, and important populations: Given that *Stylidium amabile* is listed as threatened, 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 *S. amabile* includes the area of occupancy of populations, areas of similar habitat surrounding and linking populations (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: Recovery actions implemented to improve the quality or security of the habitat of *Stylidium amabile* will also improve the status of associated native vegetation. The species is not known to occur in association with any other threatened or priority species or threatened ecological community.

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. As *Stylidium amabile* is not listed under any specific international treaty this IRP does not affect Australia's obligations under any other international agreements.

Indigenous Consultation: As the Aboriginal Sites Register maintained by the Department of Indigenous Affairs does not list any significant sites in the vicinity of known populations of this species input and involvement is being sought through the South West Aboriginal Land and Sea Council (SWALSC) and Department of Indigenous Affairs to determine if there are any issues or interests. As this is not expected to be completed before the approval of the IRP, further consultation has been included as a recovery action to ensure there has been Indigenous engagement in relation to the recovery actions posed in this plan.

Social and economic impacts: As both known populations occur on road and rail reserves the protection of *Stylidium amabile* may potentially affect asset protection measures at these sites. Actions will involve liaison and cooperation with all stakeholders with regard to these areas.

Affected interests: Stakeholders potentially affected by the implementation of this plan include Main Roads Western Australia and Westnet Rail as the managers of land containing this species.

Evaluation of the Plan's Performance: The DEC in conjunction with the Geraldton District Threatened Flora Recovery Team (GDTFRT) 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.

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

1. Relevant people have been made aware of the existence of this species and its locations.
2. Declared Rare Flora (DRF) markers have been installed at all road and rail reserve populations.
3. DEC staff have undertaken surveys for *Stylidium amabile*, however no new populations have been discovered.
4. A proposal for an Induced Recruitment Trial has been written for *Stylidium amabile*.
5. In December 1993, 9320 *Stylidium amabile* seeds were collected from Population 1 and 13605 seeds from Population 2. Further seed collections were made from Population 2 in 2004, 2007 and 2008. These are all stored in DEC's Threatened Flora Seed Centre (TFSC) at –18°C.
6. Both populations of *Stylidium amabile* have been fenced.
7. Staff from DEC's Geraldton District regularly monitor the species.
8. The GDTFRT are overseeing the implementation of this IRP and will include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

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

Recovery Criteria

Criteria for success: The number of populations have increased and/or the number of mature individuals have increased by twenty percent or more over the term of the plan.

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

Recovery actions

1. Coordinate recovery actions
2. Nominate *Stylidium amabile* for listing under the Commonwealth EPBC Act
3. Implement proposed recruitment trials
4. Map habitat critical to the survival of *Stylidium amabile*
5. Upgrade fencing at both populations
6. Implement rabbit control
7. Collect seed
8. Monitor populations
9. Conduct further surveys
10. Develop and implement a fire management strategy
11. Develop, undertake and monitor translocations
12. Liaise with relevant land managers and Indigenous groups
13. Promote awareness
14. Obtain biological and ecological information
15. Review this IRP and assess the need for further recovery actions

1. BACKGROUND

History

The first known collection of *Stylidium amabile* was made near Maya by Dave Coates in 1989 and is housed at the WA Herbarium. Although further collections have been made, the species is only known from two locations.

Stylidium amabile was originally thought to be a disjunct population of *S. coroniforme* (Wongan Hills triggerplant) which occurs some 140 km away. Although the two Maya populations were included in the Wongan Hills Triggerplant Recovery Plan (1995) and *S. coroniforme* Interim Recovery Plan (2003) there was some speculation that these were in fact a different species. DNA sequence data (Coates 1992) and morphological studies (Wege and Coates 2007) later confirmed that the Maya populations were in fact taxonomically distinct from the Wongan Hills populations.

Populations of *Stylidium amabile* are located in highly disturbed road and rail reserves where a lack of recruitment has seen plant numbers dwindle from 94 mature individuals in 1989 to approximately 27 mature individuals in 2008.

Description

Stylidium amabile is a rosetted, perennial herb, 0.06 to 0.23 m high. The oblanceolate leaves are 1.2 to 6 cm long and 1.8 to 4 mm wide. The leaf apex ends in a sharp point, is marginate and hairless. The leafless flower stalk rising directly from the root is smooth at the base and glandular on the inflorescence axis. The flowers are white and pink, occurring from September to October (description from Florabase 1998−). The name *amabile* comes from the Greek *amabilis* meaning loveable, or worthy of love (Wege and Coates 2007).

Stylidium amabile is similar to *S. coroniforme* but differs in having two sets of markings on the corolla lobes, leaves up to 4 mm wide, and larger, subsessile stigmas (Wege and Coates 2007).

Distribution and habitat

Stylidium amabile is known from the Maya area, northeast of Perth where it occurs amongst *Eucalyptus* and *Allocasuarina* scrub-heath or *Allocasuarina* and *Acacia* scrub in sandy lateritic-gravel soils high in the landscape (Wege and Coates 2007). Associated species include *Allocasuarina acutivalvis*, *Petrophile shuttleworthiana*, *Grevillea petrophiloides*, *G. paradoxa*, *G. teretifolia*, *Gastrolobium reflexum*, *Hemigenia westringioides*, *Cyanostegia angustifolia*, *Hakea scoparia*, *H. subsulcata*, *Eucalyptus oldfieldii*, *Melaleuca cordata* and *Isopogon divergens*.

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

Pop. No. & Location	DEC District	Shire	Vesting	Purpose	Manager
1a. SSE of Latham	Geraldton	Perenjori	MRWA	Road Reserve	MRWA
1b. SSE of Latham	Geraldton	Perenjori	Public Transport Authority	Rail reserve	WestNet Rail
2a.S of Latham	Geraldton	Perenjori	MRWA	Road Reserve	MRWA
2b. S of Latham	Geraldton	Perenjori	Public Transport Authority	Rail reserve	WestNet Rail

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

Biology and ecology

Stylidium amabile appears to require habitat disturbance such as fire for plant recruitment with plant numbers in these areas likely to be much higher than in undisturbed sites (Coates 1992). Population monitoring data indicates that, although plants may live up to 15 to 20 years, most senesce within a decade. The only recent significant natural disturbance event occurred in 1990. This disturbance resulted in an increase in plant numbers from 42 prior to the fire to 132 two years later. A fire disturbance trial was carried out in 2009 which resulted in new recruits within burnt plots.

Threats

Stylidium amabile was declared as Rare Flora under the Western Australian *Wildlife Conservation Act 1950* in June 2006 and is currently ranked as Critically Endangered (CR) under World Conservation Union (IUCN 2001) criterion C2a(i) due to a continuing decline in the number of mature individuals and no population estimated to contain more than 50 mature individuals. The species is not currently listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999). The main threats to the species are poor recruitment, road, rail and track maintenance, grazing and inappropriate fire regimes.

- **Poor recruitment** has been observed in both populations of the species and is likely to be due to a reduction of suitable fire regimes or other factors that influence reproduction.
- **Road, rail and track maintenance activities** threaten populations and their habitat. Threats include grading, spraying of chemicals, construction and maintenance of drainage channels, mowing roadside vegetation to improve visibility and burning of old rail sleepers. As well as causing direct damage to plants these disturbance events may also encourage weed invasion into adjacent habitat.
- **Grazing** by rabbits (*Oryctolagus cuniculus*) is a threat to Population 2. Grazing of plants is likely to reduce recruitment and digging, erosion, addition of nutrients and introduction of weed seeds encourages weed invasion. Although both known populations are fenced the fences are not rabbit proof.
- **Inappropriate fire regimes** are a potential threat to populations of *Stylidium amabile*. The species appears to require disturbance such as fire to stimulate germination from soil-stored seed. However frequent fire may kill plants before they reach maturity and replenish the seed bank. Fire may also facilitate weed invasion and should be followed up with appropriate weed control. Fire should, as much as possible, be prevented from occurring in the area of the populations unless being used as a recovery tool to stimulate recruitment from soil-stored seed.

The intent of this plan is to provide actions that will deal with immediate threats to *Stylidium amabile*. Although climate change may have a long-term effect on the species, actions taken directly to prevent the impact of climate change are beyond the scope of this plan.

Table 2. Summary of population information and threats

Pop. No. & Location	Land Status	Year / No. of plants	Current Condition	Threats
1a. SSE of Latham	MRWA Road Reserve	1989 *25 1990 2 1992 19 1993 19 1994 18 [1] 1995 14 [2] 2000 *6 (3) 2001 *6 2003 *3 2008 *1 [1]	Poor	Poor recruitment, road maintenance, inappropriate fire regimes
1b. SSE of Latham	Westnet Rail reserve	1989 18 1990 15 1992 1 1993 0 1994 0 1995 0 2000 *6 (3) 2001 *6 2003 4 2006 19 2007 *3 2008 *1 [1]	Poor	Poor recruitment, rail maintenance, inappropriate fire regimes
2a. S of Latham	MRWA Road Reserve	1989 43 1990 22 1992 68 1993 67 1994 63 [4] 1995 48 [16] 2000 *47 2001 *48 2003 22 2007 23	Moderate	Poor recruitment, road maintenance, inappropriate fire regimes, grazing

		2008 *26		
2b. S of Latham	Westnet Rail reserve	1989 26 1990 25 1992 64 1993 49 1994 42 [7] 1995 37 [13] 2000 *47 2001 *48 2003 27 2004 10 2006 19 2007 1 2008 *26	Moderate	Poor recruitment, rail maintenance, inappropriate fire regimes, grazing

Note: ( ) = number of seedlings; * = total for both subpopulations; [ ] = number of dead

Guide for decision-makers

Section 1 provides details of current and possible future threats. Development and/or land clearing in the immediate vicinity of *Stylidium amabile* will require assessment. On-ground works should not be approved unless the proponents can demonstrate that their actions will have no significant negative impact on the species, its habitat or potential habitat or on the local surface hydrology, such that drainage in the habitat of the species would be altered.

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

Given that *Stylidium amabile* is listed as threatened, 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 *S. amabile* includes the area of occupancy of populations, areas of similar habitat surrounding and linking populations (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

Recovery actions implemented to improve the quality or security of the habitat of *Stylidium amabile* will also improve the status of associated native vegetation. The species is not known to occur in association with any other threatened or priority species or threatened ecological community.

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. As *Stylidium amabile* is not listed under any specific international treaty this IRP does not affect Australia's obligations under any other international agreements.

Indigenous Consultation

Although the Aboriginal Sites Register maintained by the Department of Indigenous Affairs does not list any significant sites in the vicinity of known populations of this species input and involvement is being sought through the South West Aboriginal Land and Sea Council (SWALSC) and Department of Indigenous Affairs to determine if there are any issues or interests. As this is not expected to be completed before the approval of the IRP, further consultation has been included as a recovery action to ensure there has been Indigenous engagement in relation to the recovery actions posed in this plan.

Social and economic impacts

As both populations occur on road and rail reserves the protection of *Stylidium amabile* may potentially affect asset protection measures on these sites. Actions will involve liaison and cooperation with all stakeholders with regard to these areas.

Affected interests

Stakeholders potentially affected by the implementation of this plan include Main Roads Western Australia and Westnet Rail as the managers of the land containing both populations.

Evaluation of the Plan's Performance

The DEC in conjunction with the Geraldton District Threatened Flora Recovery Team (GDTFRT) 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

Objective

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

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

3. RECOVERY ACTIONS

Existing recovery actions

Main Roads Western Australia and the Public Transport Authority have been notified about populations of *Stylidium amabile* that occur on lands that they manage. Notifications detail the Declared Rare status of the species and associated legal obligations.

Declared Rare Flora (DRF) markers have been installed at both populations. The markers alert people working in the vicinity to the presence of DRF, and the need to avoid actions that may damage the habitat of the species. Awareness of the significance of these markers is being promoted to relevant bodies such as MRWA and WestNet Rail. To this end, posters, dashboard stickers and can holders have been produced and distributed. These illustrate DRF markers and inform of their purpose.

Surveys for *Stylidium amabile* have been undertaken by DEC staff. However, no new populations have been discovered.

An Induced Recruitment Trial (Phelan 2008) was conducted to induce recruitment of the species in order to:

- Promote the ongoing persistence of the species, given that both populations have been in decline over the last two decades, and the longevity of the seed bank is unknown.
- Provide important information on the biology and ecology of the species, including seed bank longevity, fire regime requirements, germination triggers, and life cycle. This information will inform future management of the species such as *ex situ* conservation, translocations, and management of disturbance regimes.

Monitoring in November 2009 recorded many new recruits in several plots.

In December 1993, 9320 *Stylidium amabile* seeds were collected from Population 1 and 13605 seeds from Population 2. These are stored in DEC's Threatened Flora Seed Centre (TFSC) at –18°C. When tested for vialability, the initial germination rate was found to be 30% and 36% respectively. Further seeds were collected from Population 2 in 2004, 2007 and 2008 but these have not yet been tested for viability.

Both populations of *Stylidium amabile* have been fenced.

DEC staff from Geraldton District regularly monitor populations.

The GDTFRT are overseeing the implementation of this IRP and will include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

Future recovery actions

Where recovery actions occur on lands other than those managed by DEC, permission has been or will be sought from appropriate owners/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 GDTFRT will continue overseeing the implementation of recovery actions for *Stylidium amabile* and will include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $3,000 per year

2. Monitor recruitment trials

The proposal (Phelan 2008) to undertake recruitment trials on *Stylidium amabile* was approved and implemented. As part of this proposal three potential disturbance triggers were examined including fire and smoke. Monitoring will occur every three months and after a year, every six months if required. Although the sites are not currently subjected to weed invasion, weed levels will be monitored and controlled if necessary.

Action: Monitor recruitment trials
Responsibility: DEC (Science Division, Geraldton District) through the GDTFRT
Cost: $3,500 in years 1 and 2, $1,000 in years 3, 4 and 5

3. Monitor populations

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

Action: Monitor populations
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $3,500 per year

4. Upgrade fencing at both populations

Fencing at populations requires upgrading to keep out rabbits. Fences may also need realigning to include plants that are located outside the current fenceline.

Action: Upgrade fencing at both populations
Responsibility: DEC (Geraldton District) through the GDTFRT

Cost: $5,000 in year 1 for fencing upgrade, $500 per year thereafter for maintenance

5. Implement rabbit control

The level of threat posed by rabbits may vary from year to year with conditions and numbers. When monitoring ascertains the threat is high, control measures may be required. Control should be undertaken in summer months when less green feed is available as an alternative food source.

Action: Implement rabbit control
Responsibility: DEC (Geraldton District) through the GDTFRT; relevant land managers
Cost: $3,000 in first, third and fifth years

6. Conduct further surveys

It is recommended that areas of potential habitat be surveyed for the presence of *Stylidium amabile* during its flowering period in September to October. All surveyed areas should be recorded and the presence or absence of the species documented to increase future survey efficiency and reduce unnecessary duplicate surveys. Where possible, volunteers from the local community, Landcare groups, wildflower societies and naturalists clubs will be encouraged to become involved.

Action: Conduct further surveys
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $3,000 in years 1, 3 and 5

7. Collect seed

Although seed has already been collected from both populations, further collections by DEC's TFSC staff are required to ensure the genetic diversity of the species is captured and sufficient material is available for propagation if translocations are undertaken.

Action: Collect seed
Responsibility: DEC (Geraldton District, TFSC) through the GDTFRT
Cost: $2,500 per year

8. Develop and implement a fire management strategy

Fire will be prevented from occurring in the habitat of populations, except where it is being used experimentally as a recovery tool. A fire management strategy will be developed that recommends fire frequency, intensity, season, and control measures.

Action: Develop and implement a fire management strategy
Responsibility: DEC (Geraldton District) through the GDTFRT; relevant authorities
Cost: $2,500 in first year and $1,000 in subsequent years

9. Nominate *Stylidium amabile* for listing under the Commonwealth EPBC Act

Staff from DEC's Species and Communities Branch (SCB) will develop a Species Profile and Threats (SPRAT) form for this species, and forward it to the Commonwealth Department of the Environment, Water, Heritage and the Arts for referral to the Commonwealth Threatened Species Scientific Committee (TSSC) for endorsement under the EPBC Act.

Action: Nominate *Stylidium amabile* for listing under the Commonwealth EPBC Act
Responsibility: DEC (SCB)
Cost: $1,500 in year 1

10. Map habitat critical to the survival of *Stylidium amabile*

Although habitat critical to the survival of the species is alluded to in Section 1, it has not been mapped and will be addressed under this action. If additional populations are located, then habitat critical to their survival will also be determined and mapped.

Action: Map habitat critical to the survival of *Stylidium amabile*
Responsibility: DEC (SCB, Geraldton District) through the GDTFRT
Cost: $3,000 in year 2

11. Develop, undertake and monitor translocations

Translocation is essential for the long-term conservation of *Stylidium amabile*, as the number of extant plants is declining and populations are threatened by road and rail maintenance. This will require the development of a translocation proposal and selection of suitable translocation sites. Information on the translocation of threatened plants and animals in the wild is provided in the Department's Policy Statement No. 29 *Translocation of Threatened Flora and Fauna*. All translocation proposals require endorsement by the Department's Director of Nature Conservation.

Monitoring of the translocation is essential and will be undertaken according to the timetable developed for the Translocation Proposal.

Action: Develop, undertake and monitor translocations
Responsibility: DEC (Science Division, Geraldton District) through the GDTFRT
Cost: $36,000 in the third and fourth years, and $3,500 in other years

12. Liaise with relevant land managers and Indigenous groups

Staff from DEC's Geraldton District will liaise with appropriate land managers to ensure that populations of *Stylidium amabile* are not damaged or destroyed. Indigenous consultation will take place to determine if there are any issues or interests in areas that are habitat for *S. amabile*.

Action: Liaise with relevant land managers and Indigenous groups
Responsibility: DEC (Geraldton District) through the GDTFRT
Cost: $500 per year

13. Promote awareness

The importance of biodiversity conservation and the protection of *Stylidium amabile* will be promoted to the public. This will be achieved through an information campaign using local print and electronic media and by setting up poster displays. An information sheet that includes a description of the plant, its habitat type, threats and management actions, and photos will be produced. Formal links with local naturalist groups and interested individuals will also be encouraged.

Action: Promote awareness
Responsibility: DEC (Geraldton District, SCB, Strategic Development and Corporate Affairs Division) through the GDTFRT
Cost: $1,500 in year 1 and $1,000 in years 2-5

14. Obtain biological and ecological information

Increased knowledge of the biology and ecology of the species will provide a scientific basis for management of *Stylidium amabile* in the wild. Overall investigations will ideally include:

1. Study of the soil seed bank dynamics and the role of various factors including disturbance, competition, drought, inundation and 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.
5. The impact of changes in hydrology in the habitat.

Action: Obtain biological and ecological information
Responsibility: DEC (Science Division, Geraldton District) through the GDTFRT
Cost: $10,000 per year

15. Review this IRP and assess the need for further recovery actions

If *Stylidium amabile* is still listed as threatened 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 IRP and assess the need for further recovery actions
Responsibility: DEC (SCB, Geraldton District) through the GDTFRT
Cost: $2,000 in year 5

Table 3. Summary of Recovery Actions

Recovery Action	Priority	Responsibility	Completion Date
Coordinate recovery actions	High	DEC (Geraldton District) through the GDTFRT	Ongoing
Monitor recruitment trials	High	DEC (Science Division, Geraldton District) through the GDTFRT	2014
Monitor populations	High	DEC (Geraldton District) through the GDTFRT	Ongoing
Upgrade fencing at both populations	High	DEC (Geraldton District) through the GDTFRT	2010
Implement rabbit control	High	DEC (Geraldton District) through the GDTFRT; relevant land managers	Ongoing
Conduct further surveys	High	DEC (Geraldton District) through the GDTFRT	Ongoing
Collect seed	High	DEC (Geraldton District, TFSC) through the GDTFRT	2014
Develop and implement a fire management strategy	High	DEC (Geraldton District) through the GDTFRT; relevant authorities	Developed by 2010 with implementation ongoing
Nominate *Stylidium amabile* for listing under the Commonwealth EPBC Act	High	DEC (SCB)	2010
Map habitat critical to the survival of *Stylidium amabile*	High	DEC (SCB, Geraldton District) through the GDTFRT	2011
Develop, undertake and monitor translocations	High	DEC (Science Division, Geraldton District) through the GDTFRT	2014
Liaise with relevant land managers and Indigenous groups	High	DEC (Geraldton District) through the GDTFRT	Ongoing
Promote awareness	Medium	DEC (Geraldton District, SCB, and Strategic Development and Corporate Affairs Division) through the GDTFRT	Ongoing
Obtain biological and ecological information	Medium	DEC (Science Division, Geraldton District) through the GDTFRT	2014
Review this IRP and assess the need for further recovery actions	Medium	DEC (SCB, Geraldton District) through the GDTFRT	2014

4. TERM OF PLAN

This IRP will operate from February 2010 to January 2015 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 will be determined.

5. REFERENCES

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Wege, J. and Coates, D. (2007) Observations on the rare triggerplant *Stylidium coroniforme* (Stylidiaceae) and the description of two allied taxa of conservation concern. *Nuytsia* 17(1): 433-434

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6. TAXONOMIC DESCRIPTION

Stylidium amabile

Wege, J. and Coates, D. (2007) Observations on the rare triggerplant *Stylidium coroniforme* (Stylidiaceae) and the description of two allied taxa of conservation concern. *Nuytsia* 17(1): 433-434.

Caespitose perennial herb, 6−23 cm high. *Glandular trichomes* 0.15−0.3 mm long, stalks translucent, heads red to red-black, ellipsoid. Eglandular trichomes absent. *Stems* partly buried or slightly elevated above the soil, thickened, branched or unbranched, bearing persistent leaf bases. *Leaves* rosulate, oblanceolate, apex conspicuously mucronate, margin white with minute prominences, midribs usually conspicuous, 1.2−6 cm long, 1.8−4 mm wide, glabrous. *Scapes* 4−28 cm high, 0.8−2 mm wide, glabrous at base, glandular along inflorescence axis. *Inflorescence* c. 9−55-flowered, paniculate; units 2−3.5 cm long, 1−5-flowered; bracts ovate, apex mucronate, margin ± hyaline, 2.5−7 mm long, 1−3 mm wide, glandular; bracteoles situated at base of hypanthium, 3−5.5 mm long, glandular; pedicels to 1 mm long, glandular. *Hypanthium* cylindric, straight to slightly arcuate, compressed in T.S. and with one cell of ovary infertile, 8−23 mm long, 0.9−2.2 mm wide, glandular. *Calyx lobes* free, apex subacute, margin ± hyaline, 2.5−3.7 mm long, 0.5−1.2 mm wide, glandular. *Corolla* pale pink to whitish with 2 sets of pink throat markings and a white throat, tube 2−3.5 mm long, lobes laterally-paired; anterior lobes elliptic, anterior margin strongly arcuate, 3.5−5.5 mm long, 2−3 mm wide; posterior lobes elliptic, often slightly falcate, 3.5−5.8 mm long, 2−3.2 mm wide; abaxial surface glandular. *Labellum* boss cream to yellow, orbicular to ovate, 0.8−1.2 mm long, 0.8−1.2 mm wide, glabrous; margin red, papillose; lateral appendages red, 1.3−2.5 mm long, papillose. *Throat appendages* 2, filiform, white with pink tips, 0.9−2.2 mm long. *Column* white at base, pink-red above, 11−14 mm long; anthers locules transversely fixed relative to column, red, subtending hairs present; stigma entire, shortly stalked, elliptic, 0.6−1 mm long, 0.5−0.6 mm wide. *Capsule* cylindric, tapering to apex, c. 10−25 mm long. *Seeds* brown, 0.8−1.1 mm long, 0.4−0.6 mm wide, papillose. Flowering during September and October. Fruiting in November and December.