

INTERIM RECOVERY PLAN NO. 149

WONGAN HILLS TRIGGERPLANT (*STYLIDIUM CORONIFORME*)

INTERIM RECOVERY PLAN

2003-2008

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Photograph: Nicole Willers

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Department of Conservation and Land Management
Western Australian Threatened Species and Communities Unit (WATSCU)
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Natural Heritage Trust
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DEPARTMENT OF
Conservation
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FOREWORD

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

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

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

This Interim Recovery Plan will operate from August 2003 to July 2008 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked Critically Endangered, this IRP will be reviewed after five years and the need for a full Recovery Plan will be assessed.

This IRP was approved by the Director of Nature Conservation on 21 September, 2003. The provision of funds identified in this Interim Recovery Plan is dependent on budgetary and other constraints affecting DCLM, as well as the need to address other priorities.

Information in this IRP was accurate at August 2003.

SUMMARY

Scientific Name:	<i>Stylidium coroniforme</i>	Common Name:	Wongan Hills Triggerplant
Family:	Stylidiaceae	Flowering Period:	September – November
Dept Regions:	Wheatbelt, Midwest	Dept Districts:	Merredin, Geraldton
Shires:	Wongan-Ballidu, Perenjori	Recovery Teams:	Wongan/Ballidu Threatened Flora Recovery Team (WBTFRT), Geraldton District Threatened Flora Recovery Team (GDTFRT)

Illustrations and/or further information: A. Brown, C. Thomson-Dans and N. Marchant (Eds) (1998) *Western Australia's Threatened Flora*; H. Stace and D.J. Coates (1995) *Wongan Hills triggerplant recovery plan*; D.J. Coates. (1992b) *Genetic consequences of a bottleneck and spatial genetic structure in the triggerplant Stylidium coroniforme* (Stylidiaceae); R. Erickson and J.H. Willis (1966) *Some additions to Australian Stylidiaceae*.

Current status: *Stylidium coroniforme* was declared as Rare Flora in April 1980. It currently meets World Conservation Union (IUCN, 2000) Red List Category 'EN' under criteria B2ab(iii,v) due to its area of occupancy estimated to be less than 500 km², the severe fragmentation of populations and the continuing decline in the area, extent and quality of habitat and the number of mature individuals. The main threats are poor recruitment, lack of and degraded habitat, accidental destruction and fire.

Distribution and habitat: *Stylidium coroniforme* is currently known from two disjunct areas. The main area of distribution is in Wongan Hills while the other is near Maya, about 140 km to the north. Recent genetic analysis has shown that plants in the two areas represent different taxa and it is likely that the Maya populations will be described as distinct (Coats pers. Comm.). If this happens, the Maya taxon will be proposed as Declared Rare Flora in its own right and the ranking of *Stylidium coroniforme* will need to be reviewed. *S. coroniforme* grows on shallow yellow sand over laterite on open areas in low scrub and heath (Brown *et al.* 1998).

Critical habitat: The critical habitat for *Stylidium coroniforme* comprises the area of occupancy of the known populations; similar habitat within 200 metres of known populations; corridors of remnant vegetation that link populations and additional nearby occurrences of similar habitat that do not currently contain the species but may have done so and may be suitable for translocations.

Habitat critical to the survival of the subspecies, and important populations: Given that this species is listed as Endangered it is considered that all known habitat containing wild and translocated populations is habitat critical and that all populations are important.

Benefits to other species/ecological communities: Recovery actions implemented to improve the quality or security of the habitat of *Stylidium coroniforme* will also improve the status of remnant vegetation in which it is located.

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

Role and interests of indigenous people: There are no known indigenous communities interested or involved in the management of areas affected by this plan.

Social and economic impacts: The implementation of this recovery plan is unlikely to cause significant adverse social and economic impacts. Just two of the 10 known populations are on Private property and may cause some minor impact on farming activities.

Evaluation of the Plans Performance: The Department of Conservation and Land Management, in conjunction with the Recovery Team will evaluate the performance of this IRP. The plan is to be reviewed within five years of its implementation.

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

1. Land managers have been made aware of the location and threatened status of the species.
2. Approximately 28,000 seeds collected from Populations 1, 2, 3, 4 and 5 in December 1993 are stored in DCLM's Threatened Flora Seed Centre at –18°C.
3. The Botanic Garden and Parks Authority currently have four plants from a single clone.

4. Staff from DCLM's Merredin and Geraldton Districts regularly monitor populations of the species.
5. The Wongan/Ballidu Threatened Flora Recovery Team and Geraldton District Threatened Flora Recovery Team are overseeing the implementation of this IRP and will include information on progress in their annual reports to DCLM's Corporate Executive and funding bodies.

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

Recovery criteria

Criteria for success: The number of individuals within populations and/or the number of populations have increased by 10% or more.

Criteria for failure: The number of individuals within populations and/or the number of populations have decreased by 10% or more.

Recovery actions

1. Coordinate recovery actions
2. Conduct recruitment trials
3. Undertake weed control
4. Collect and store seed
5. Liaise with land managers
6. Care, control and management of habitat
7. Promote community awareness
8. Install DRF markers
9. Monitor populations
10. Conduct surveys
11. Obtain biological and ecological information
12. Review this IRP and revise it or prepare a full Recovery Plan if necessary

1. BACKGROUND

History

Stylidium coroniforme was first collected from the Wongan Hills area in 1964 by M. Rogers. By 1980 the single known population had declined to one plant. Fortunately more populations were later found in the same general area and in 1989 a further two populations were found near Maya some 100 km north of the Wongan Hills. Recent molecular evidence suggests that these may represent a different species (Coates, pers. comm.). A three year Recovery Plan was written for the species in 1995 (Stace and Coates, 1995) with major recovery actions undertaken including, propagation of the species, rehabilitation of a gravel pit in which it occurs and progress towards changing the care, control and management of a Water Reserve that supports several populations. Some seed has been collected and stored at the Threatened Flora Seed Centre (TFSC) and a small living collection exists at the Botanic Garden and Parks Authority (BGPA).

Since 1998, five new populations have been discovered, one of them (Population 6a to 6e) on a Nature Reserve. While Population 1 appears to be relatively stable, Populations 2 to 5 are in decline. Populations 6 to 10 have insufficient historical data to ascertain population expansion or decline.

Stylidium coroniforme is a short-lived species that appears following disturbance events such as fire and light grading with a decline in plant numbers several years post disturbance (Brown *et al.* 1998).

Description

Stylidium coroniforme is a small, perennial, stocky, closely branching plant, with several loose rosettes of linear greyish-green leaves. Leaves are 3-4 cm long, becoming wider in the upper third and ending in a white point at the apex. Under favorable conditions a flowering stem, 10 to 15 cm tall, arises from each rosette. Each stem holds a number of short-stalked flowers in a pyramidal raceme up to 12 cm long. The corolla is creamy pink with red spots at the throat and dark red lines on the outer surface of the petals (Erickson and Willis, 1966; Brown *et al.* 1998).

Stylidium coroniforme is closely related to short fruited *S. limbatum* as they share the same long ovary, racemose scape and marginate leaves. The corolla resembles that of *S. dichotomum*, which has a bare throat and cushion-like stigma. The name of the species is in reference to the attractively crown-like arrangement of inflorescences, encircling each cluster of rosettes (Erickson and Willis, 1966).

Distribution and habitat

Stylidium coroniforme is currently known from two disjunct areas. The main area of distribution is in Wongan Hills while the other is near Maya about 140 km to the north. Recent genetic analysis suggests that plants in the two areas represent different taxa and it is likely that the taxon represented in the Maya populations will be described as distinct (Coates pers. comm.). If this happens, the Maya taxon will be proposed as Declared Rare Flora in its own right and the ranking of *Stylidium coroniforme* will need to be reviewed. *Stylidium coroniforme* grows on shallow yellow sand over laterite on open areas in low scrub and heath (Brown *et al.* 1998).

There are ten populations currently known. The two populations near Maya occur on road and rail reserves. Of the six populations known from the Wongan Hills, four occur on a Water Reserve, two on private property, one on a Nature Reserve and one on an Experimental Farm Reserve.

Biology and ecology

Seed of *Stylidium coroniforme* germinates after habitat disturbance with young plants recorded following fire, roadworks and gravel extraction and the slashing of associated vegetation during power line maintenance. Following germination, plants mature and set seed quickly, with individual plants living between 5 and 15 years. Seed then persists in the soil for a number of years awaiting another disturbance event.

Bombyllid and syrphid flies and a range of native bees have been reported to be pollen vectors for the species. They are attracted by colourful petals. Nectar guides are present and there is a copious nectar flow at the throat of the flower (Stace & Coates, 1995).

Staff from the Botanical Garden and Parks Authority (BGPA) have successfully propagated this species using division and cuttings (personal communication A. Shade¹). The species has also been successfully cultured from leaf tissue, resulting in minimal disturbance to wild plants. The minute seeds germinate readily on a moist medium in autumn (Stace & Coates, 1995).

The details above refer to the Wongan Hills populations of *Stylidium coroniforme*. The new taxon represented by the recently discovered Maya populations will require research to clarify its biological and ecological needs and relevant recovery actions.

Threats

Stylidium coroniforme was declared as Rare Flora in April 1980. It currently meets World Conservation Union (IUCN, 2000) Red List Category 'EN' under criteria B2ab(iii,v) due to the area of occupancy estimated to be less than 500 km², the severe fragmentation of populations and the continuing decline in the area, extent and quality of habitat and the number of mature individuals. The main threats are poor recruitment, lack of and degraded habitat, accidental destruction and fire.

- **Inappropriate fire regimes** may affect the viability of populations. It is thought that the species germinates from soil-stored seed following fire but frequent fire may kill plants before they reach maturity and replenish the seed bank. Until the ideal fire frequency for optimal response of *Stylidium coroniforme* has been determined, fire should, as much as possible, be prevented from occurring in the area of populations.
- **Trampling by stock** is a threat to Populations 1 and 9 where fences are in poor repair. In addition to direct physical damage, the presence of stock will degrade habitat through grazing and trampling of associated vegetation, erosion and the introduction of weeds. Any reduction of plant diversity through stock damage may result in the reduction of pollinators.
- **Salinisation** is threatening Population 9 where nearby vegetation is showing the impact of rising saline water tables. The effects of this on *Stylidium coroniforme* is unknown but will almost certainly be detrimental.
- **Maintenance activities** such as track, powerline and water pipe maintenance threaten Populations **2, 3, 4 and 5**. Threats include grading, chemical spraying and earth movement. These activities are likely to cause direct damage to existing plants and encourage weed invasion but may also have the positive effect of stimulating germination of soil-stored seed.
- **Poor recruitment** currently affects Populations 2, 5 and 7.
- **Weed competition** threatens Population 9, mainly along the existing firebreak which is the northern boundary of the population. Weeds suppress plant growth by competing for light, soil moisture, nutrients and pollinators. They also exacerbate grazing pressure and increase the fire hazard due to the easy ignition of high fuel loads, which are produced annually by many grass weed species.
- **Grazing** by kangaroos and rabbits is resulting in direct plant loss and the introduction and encouragement of weeds through droppings and warren construction. Rabbits and kangaroos are selectively grazing young plants, thus impacting on recruitment.
- **Track use** threatens Populations 2 and 5 both through direct physical contact and habitat modification (soil compaction and erosion).

¹ Amanda Shade, Horticulturalist, Botanic Garden and Parks Authority

- **Off-track vehicle use** threatens Population 2. Trail bikes are used recreationally in the area and have the potential for direct physical contact, soil compaction and erosion.
- **Mining** for gravel or sand is a potential threat to populations 2 and 7. If mining were to commence it would damage or destroy existing plants.

Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants	Condition	Threats
1. Rogers	Private Property	1994 28 (1) [2] 1995 23 (1) [5] 2001 25 (1) [11]	Moderate	Grazing by stock, road maintenance, inappropriate fire, poor recruitment
2. Wongan Hills	Water Reserve	1994 123 (4) 1995 37 2000 5 [5]	Poor	Track use and maintenance, mining for gravel or sand, off-track vehicle use, inappropriate fire, poor recruitment
3a. Maya	Main Road Reserve	1994 18 [1]* 1995 14 [2]* 2000 6 (3) [several]* 2001 6*	Poor	Road maintenance, inappropriate fire, poor recruitment
3b. Maya	Railway Reserve	1994 * 2000 * 2001 *	Poor	Rail maintenance, inappropriate fire, poor recruitment
4a. Maya	Main Road Reserve	1994 105 [11]* 1995 75 (10) [29]* 2000 47* 2001 48*	Moderate	Road maintenance, inappropriate fire, poor recruitment
4b. Maya	Railway Reserve	1994 * 1995 * 2000 * 2001 *	Moderate	Road and rail maintenance, inappropriate fire, poor recruitment
5. Wongan Hills	Water Reserve	1994 151 1995 108 2000 46 [3] 2002 20 [29]	Poor	Track use and maintenance, powerline maintenance, inappropriate fire, poor recruitment
6a. Elphin	Nature Reserve	1999 65 2001 204 [2]	Healthy	Firebreak/track maintenance, inappropriate fire
6b. Elphin	Nature Reserve	2000 1	Healthy	Inappropriate fire, poor recruitment
6c. Elphin	Nature Reserve	2000 1	Healthy	Inappropriate fire, poor recruitment
6d. Elphin	Nature Reserve	2000 70	Healthy	Inappropriate fire, poor recruitment
6e. Elphin	Nature Reserve	2000 6 (1)	Healthy	Inappropriate fire, poor recruitment
7. Wongan Hills	Water Reserve	2000 1 2001 2	Healthy	Mining for gravel, inappropriate fire, poor recruitment
8a. Wongan Hills	Water Reserve	2000 1	Healthy	Inappropriate fire
8b. Wongan Hills	Water Reserve	2001 1700	Healthy	Inappropriate fire, water runoff
9. Wongan Hills	Experimental Farm Reserve	2001 800	Healthy	Grazing by stock and other fauna, salinisation, weed competition, inappropriate fire
10. Elphin	Private Property	2001 50	Healthy	Inappropriate fire

Number in () = number of juveniles. Number in [] = number of dead plants. * = total for all subpopulations combined.

Critical habitat

Critical habitat is habitat identified as being critical to the survival of a listed threatened species or listed threatened ecological community. Habitat is defined as the biophysical medium or media occupied (continuously, periodically or occasionally) by an organism or group of organisms or once occupied (continuously, periodically or occasionally) by an organism, or group of organisms, and into which organisms of that kind have the potential to be reintroduced. (*Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)).

The critical habitat for *Stylidium coroniforme* comprises:

- the area of occupancy of known populations;
- areas of similar habitat within 200 metres of known populations, i.e. shallow yellow sand over laterite on open areas in low scrub and heath (these provide potential habitat for natural range extension);

- corridors of remnant vegetation that link populations (these are necessary to allow pollinators to move between populations and are usually road and rail verges);
- additional occurrences of similar habitat that do not currently contain the species but may have done so in the past (these represent possible translocation sites).

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

Given that this species is listed as Endangered it is considered that all habitat is important to the survival of the species and that all populations are important.

Benefits to other species/ecological communities

Recovery actions implemented to improve the quality or security of the habitat of *Stylidium coroniforme* populations will improve the status of remnant vegetation in which populations are located.

International Obligations

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

Role and interests of indigenous people

There are no known indigenous communities interested or involved in the management of areas affected by this plan.

Social and economic impacts

The implementation of this recovery plan is unlikely to cause significant adverse social and economic impacts. Just two of the 10 known populations are on Private property and may cause some minor impact on farming activities.

Evaluation of the Plan's Performance

The Department of Conservation and Land Management in conjunction with the Wongan/Ballidu Threatened Flora Recovery Team will evaluate the performance of this Interim Recovery Plan. The plan is to be reviewed within five years of its implementation. Any changes to management / recovery actions will be documented accordingly.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Developments or on-ground works in the immediate vicinity of the population or within the defined critical habitat of *Stylidium coroniforme* require assessment. No developments should be approved unless the proponents can demonstrate that they will not have a significant impact on the species, its habitat or potential habitat or the local surface and ground water hydrology such that drainage in the habitat of the species would be altered

2. RECOVERY OBJECTIVE AND CRITERIA

Objectives

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

Criteria for success: The number of individuals within populations and/or the number of populations have

increased by 10% or more.

Criteria for failure: The number of individuals within populations and/or the number of populations have decreased by 10% or more.

3. RECOVERY ACTIONS

Existing recovery actions

All land managers have been notified of the location and threatened status of *Stylidium coroniforme*. The notification details the Declared Threatened status of the species and the legal responsibility to protect it.

Using funding contributed by Main Roads a rehabilitation project has been undertaken in the gravel pit where Population 2 occurs. This has included access restrictions such the closing of access tracks with padlocked gates, press releases to raise public awareness of the rehabilitation work and collection of seed from local native species. Some of this seed was grown to seedling stage by DCLM's Narrogin Plant Nursery, with 10,000 seedlings anticipated for planting into the gravel pit.

Populations 3 and 4 have been fenced and DRF markers installed.

Approximately 200 seeds were collected from six plants in Population 1 in December 1992. A further collection of approximately 28,000 seeds was made from Populations 1, 2, 3, 4 and 5 in December 1993. All seeds are stored in DCLM's Threatened Flora Seed Centre (TFSC) at -18°C . Staff of the TFSC test the viability of seed soon after collection and again after one year in storage. The initial germination rate of *Stylidium coroniforme* seed ranged from 74 to 87%. After one year in storage the germination rate ranged from 67 to 75% with seeds that did not germinate still appearing viable (unpublished data A. Cochrane²).

The Botanical Garden and Parks Authority (BGPA) has had success propagating this species by plant division (50% success) and cuttings (85%). However, none of these plants survived for longer than 12 months and it is speculated that the quality of the resulting plants may be poor. The BGPA currently have 19 plants of *Stylidium coroniforme* derived from tissue culture (Personal communication A. Shade).

Staff from DCLM's Merredin and Geraldton Districts regularly monitor all populations of this species.

The Wongan/Ballidu Threatened Flora Recovery Team (WBTFRT) and Geraldton District Threatened Flora Recovery Team (GDTFRT) are overseeing the implementation of this IRP and will include information on progress in their respective annual reports to DCLM's Corporate Executive and funding bodies.

Future recovery actions

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

1. Recovery coordination

The WBTFRT and GDTFRT will coordinate recovery actions for *Stylidium coroniforme* and other Declared Rare flora in their respective areas and will include information on progress in their annual reports to DCLM's Corporate Executive and funding bodies.

Action:	Coordinate recovery actions
Responsibility:	DCLM (Merredin and Geraldton Districts) through the WBTFRT and GDTFRT
Cost:	\$800 per year

2. Recruitment trials

² Anne Cochrane, Manager, DCLM's Threatened Flora Seed Centre

Research will be conducted to identify what needs to be done to achieve a more favourable recruitment regime. Factors such as soil seed-bank dynamics and the role of disturbance, fire, competition, rainfall and grazing in germination and seedling survival will be investigated. These trials will be conducted near existing populations whose plant numbers have markedly declined, particularly Populations 2, 5 and 7.

Action: Conduct recruitment trials
Responsibility: DCLM (Merredin District) through the WBTFRT
Cost: \$10,000 in first and second years, \$2,000 in subsequent years

3. Weed control

As weeds are a threat to Population 9 weed control will be undertaken in consultation with the current land managers. Control will include hand weeding and localised application of herbicide. All weed control will be followed by a report on the method, timing and success of the treatment and any effect on *Styloidium coroniforme* and associated native plant species.

Action: Undertake weed control
Responsibility: DCLM (Merredin District) through the WBTFRT
Cost: \$1,500 per year

4. Seed collections

Preservation of germplasm is essential to preserve genetic diversity and guard against extinction if wild populations of *Styloidium coroniforme* are lost. Such collections are also needed to propagate plants for translocations. Seed has been collected from Populations 1 to 5 with 67-75% viability after one year in storage. Collections are also required from other populations.

Action: Collect and store seed
Responsibility: DCLM (TFSC, Merredin and Geraldton Districts) through the WBTFRT and GDTFRT
Cost: \$3,000 for the first two years and \$1000 in subsequent years

5. Liaison

Land managers have been officially notified of the occurrence of the species. DCLM staff will continue to liaise with them to ensure the populations are not damaged or destroyed accidentally.

Action: Liaise with land managers
Responsibility: DCLM (Merredin and Geraldton Districts) through the WBTFRT and GDTFRT
Cost: \$500 per year

6. Care, control and management of habitat

Staff from DCLM's Merredin and Geraldton Districts will liaise with land managers and landowners to ensure that populations of *Styloidium coroniforme* and the closely related new taxon are not accidentally damaged or destroyed. In addition, ways of improving the security of populations and their habitat will be investigated. This may include conservation covenants, the Land for Wildlife scheme, and possibly land purchase. Protection from clearing will also be sought for remnant vegetation adjacent to Population 2, to allow recovery actions relating to that area (Actions 7 and 12) to take place.

Action: Care, control and management of habitat
Responsibility: DCLM (Merredin and Geraldton Districts) through the WBTFRT and GDTFRT
Cost: \$1,000 per year

7. Fire management strategy

Styloidium coroniforme is an opportunistic species that germinates from soil-stored seed following fire and soil disturbance. However, frequent fire will kill plants before they reach maturity and may result in the

accumulation of insufficient soil stored seed for regeneration. Except for recovery purposes, fire should be excluded from the area of populations. A fire management strategy will be developed to determine fire control measures and optimum fire frequency.

Action: Develop and implement a fire management strategy
Responsibility: DCLM (Merredin and Geraldton Districts) through the WBTFRT and GDTFRT
Cost: \$2,000 in the first year and \$1,000 in subsequent years

8. Community awareness

The importance of biodiversity conservation and the need for the long-term protection of wild populations of *Stylidium coroniforme* will be promoted through poster displays. Formal links with local naturalist groups and interested individuals will also be encouraged. A two sided information sheet will be produced that includes a description of the plant, its habitat, threats, recovery actions and photos.

Action: Promote community awareness
Responsibility: DCLM (Merredin and Geraldton Districts) through the WBTFRT and GDTFRT
Cost: \$4,000 in first year, \$1,000 in subsequent years

9. Declared Rare Flora markers

Declared Rare Flora (DRF) markers are required on all road reserve populations. These serve to alert people working in the vicinity to the presence of DRF and the need to avoid work that may damage the species or its habitat.

Action: Install DRF markers
Responsibility: DCLM (Merredin and Geraldton Districts) through the WBTFRT and GDTFRT
Cost: \$3,000 in first year

10. Monitoring

Annual monitoring of weed invasion, plant diseases such as *Phytophthora cinnamomi*, rising salinity, population stability (expansion or decline), pollination activity, seed production, recruitment, longevity and predation is essential.

Action: Monitor populations
Responsibility: DCLM (Merredin and Geraldton Districts) through the WBTFRT and GDTFRT
Cost: \$2,500 per year

11. Surveys

Surveys by Departmental staff and community volunteers will be conducted during the flowering period of the species (October to February).

Action: Conduct surveys
Responsibility: DCLM (Merredin and Geraldton Districts) through the WBTFRT and GDTFRT
Cost: \$4,000 per year

12. Biology and ecology

Better knowledge of the biology and ecology of *Stylidium coroniforme* will provide a scientific basis for management of wild populations. Note; as the Maya populations are known to represent a closely related but distinct taxon separate assessment of their biology and ecology is required. An understanding of the following is necessary for effective management:

1. Pollination biology and reproductive strategies.
2. Pollinator requirements.

3. Population genetic structure, levels of genetic diversity and minimum viable population size.
4. The impact of salinity on *Stylidium coroniforme* and its habitat.

Action: Obtain biological and ecological information
Responsibility: DCLM (Science Division, Merredin and Geraldton Districts) through the WBTFRT and GDTFRT
Cost: \$11,600 per year in the second third and fourth years

13. Review this IRP and revise it or prepare a full Recovery Plan if necessary

This species is currently ranked Endangered and it is unlikely that a Full Recovery Plan will be required. However, at the end of the fourth year of the five-year term of this IRP the need to rewrite this IRP or to replace it with a full Recovery Plan (RP) will be determined.

Action: Review this IRP and revise it or prepare a full Recovery Plan if necessary
Responsibility: DCLM (WATSCU, Merredin and Geraldton Districts) through the WBTFRT and GDTFRT
Cost: \$20,300 in the fifth year (if required)

4. TERM OF PLAN

This Interim Recovery Plan will operate from August 2003 to July 2008 but will remain in force until withdrawn or replaced. If the taxon is ranked higher than Endangered after five years, the need to rewrite this IRP or to replace it with a full RP will be determined.

5. ACKNOWLEDGMENTS

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

Alanna Chant	Conservation Officer, DCLM's Geraldton District
Anne Cochrane	Manager, DCLM's Threatened Flora Seed Centre
Allen Lowrie	Botanist (<i>Stylidium</i> specialist)
Amanda Shade	Horticulturalist, Botanic Garden and Parks Authority

WE would like to extend our thanks also to the staff of the W.A. Herbarium for providing access to Herbarium databases and specimen information, and to DCLM's Wildlife Branch for assistance.

6. REFERENCES

- Brown, A., Thomson-Dans, C. and Marchant, N. (Eds). (1998) *Western Australia's Threatened Flora*. Department of Conservation and Land Management, Western Australia.
- DCLM (1981) *A Guide to the Gazetted rare Flora of Western Australia*. Department of Conservation and Land Management, Western Australia.
- DCLM (1998) Wildlife Management program No. 26, *Declared Rare and Poorly Known Flora in the Geraldton District*. Department of Conservation and Land Management, Western Australia.
- DCLM (1993) Wildlife Management program No. 9, *Declared Rare Flora and other Plants in Need of Special Protection in the Merredin District*. Department of Conservation and Land Management, Western Australia.
- DCLM (1992) Policy Statement No. 44 *Wildlife Management Programs*. Department of Conservation and Land Management, Western Australia.
- DCLM (1994) Policy Statement No. 50 *Setting Priorities for the Conservation of Western Australia's Threatened Flora and Fauna*. Department of Conservation and Land Management, Western Australia.
- DCLM (1995) Policy Statement No. 29 *Translocation of Threatened Flora and Fauna*. Department of Conservation and Land Management, Western Australia.

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

Erickson, R. & Willis, J.H. (1966) *Some additions to Australian Stylidiaceae*. Victorian naturalist 83, 107-112

Richmond, G.S. and Ghisalberti, E.L. (1995) Cultural, food, medicinal uses and potential applications of *Myoporum* species (Myoporaceae). *Economic Botany*, 49(3), 276-285.

Stace and Coates (1995) *Wongan Hills triggerplant recovery plan*. Department of Conservation and Land Management Western Australia.

World Conservation Union (2000) *IUCN red list categories prepared by the IUCN Species Survival Commission, as approved by the 51st meeting of the IUCN Council*. Gland, Switzerland.

7. TAXONOMIC DESCRIPTION

Patrick, S.J. (1999) Wildlife Management program No. 26, *Declared Rare and Poorly Known Flora in the Geraldton District*, 102-103.

Stylidium coroniforme is a perennial plant with a dense, basal cluster of leaf rosettes. The leaves are numerous, grey-green in colour, with conspicuous white margins and a white rib down the underside. They are up to 3 cm long, narrow at the base and widening to c. 5 mm wide towards the apex, ending in a long narrow point. There is one flowering stem arising from each rosette. The flowering stems are 10-15 cm tall, dark-coloured with glandular hairs. Each stem has many short-stalked flowers in a pyramidal raceme up to 12 cm long, each flower with three small bracts at the base. The flowers are c. 1 cm across, yellow at first, becoming creamy white, with four oval petals which are all similar in size, with red spots at the throat and dark red lines on the outer surface. There are two narrow hair-like throat appendages and finger-like projections on the end of the trigger. The ovary is c. 1.5 cm long, the fruit to 2 cm long.

This species is distinctive in its very long ovary, racemose flowering spike and conspicuously margined leaves. *Stylidium limbatum* has similar leaves but a short ovary. *S. dichotomum* has a similar flower but the throat in that species has no appendages and the end of the trigger is cushion-like.