



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

INTERIM RECOVERY PLAN NO. 291

Marianthus paralius

INTERIM RECOVERY PLAN

2009-2014



November 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This plan will operate from July 2009 to June 2014 but will remain in force until withdrawn or replaced. It is intended that, if the taxon is still ranked as Critically Endangered (CR), this IRP will be reviewed after five years and the need for further recovery actions assessed.

This IRP was given regional approval on 13 October 2009 and was approved by the Director of Nature Conservation on 2 November 2009. 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 November 2009.

IRP PREPARATION

This IRP was prepared by Robyn Luu¹ and Andrew Brown².

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ACKNOWLEDGMENTS

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

Andrew Crawford	Principal Technical Officer, Threatened Flora Seed Centre, DEC Science Division
Melissa Hoskins	Acting Nature Conservation Coordinator, DEC's Swan Coastal District
Jacqui Maguire	Land Planning Officer, DEC's Swan Coastal District
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 photograph by Jacqui Maguire.

CITATION

This IRP should be cited as:

Department of Environment and Conservation (2009) *Marianthus paralius* Interim Recovery Plan 2009-2014. Interim Recovery Plan No. 291. Department of Environment and Conservation, Western Australia.

SUMMARY

Scientific Name:	<i>Marianthus paralius</i>	Common Name:	None
Family:	Pittosporaceae	Flowering Period:	September to November
DEC Region:	Swan	DEC District:	Swan Coastal
Shires:	City of Joondalup, Shire of Gingin	NRM Region:	Swan
Recovery Team:	Swan Region Threatened Flora and Communities Recovery Team (SRTFCRT)		

Illustrations and/or further information: Cayzer, L.W. and Crisp, M.D. (2004) Reinstatement and revision of the genus *Marianthus* (Pittosporaceae). *Australian Systematic Botany*, 17, 127-144; Western Australian Herbarium (1998-) *FloraBase – The Western Australian Flora*. Department of Environment and Conservation. <http://florabase.dec.wa.gov.au/>.

Current status: *Marianthus paralius* was declared as Rare Flora under the Western Australian *Wildlife Conservation Act* 1950 on 23 June 2006. It is currently ranked as Critically Endangered (CR) under World Conservation Union (IUCN 2001) criterion D due to its population size estimated to be less than 50 mature plants. 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 mining, lack of tenure security, rabbits, recreational activities, weeds and inappropriate fire regimes.

Description: *Marianthus paralius* is a woody, almost prostrate shrub, approximately 50 cm wide, with red-orange flowers and white stamens. The leaves are thick and ovate. The name *paralius* comes from the Greek *paralios* meaning by the sea, referring to the seaside habitat (Cayzer and Crisp 2004).

Habitat requirements: *Marianthus paralius* is known from two locations north of Perth, one near Iluka and the other near Seabird. The species grows amongst coastal heath in areas of white sand and brown loam, on coastal limestone cliffs.

Habitat critical to the survival of the species, and important populations: Given that *Marianthus paralius* is ranked as Critically Endangered, 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 *M. paralius* 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 *Marianthus paralius* will also improve the status of associated native vegetation, including one Priority 3 taxon and one Priority 3 Threatened Ecological Community.

International obligations: Although 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 the species is not listed under any specific international treaty and this IRP does not affect Australia's obligations under any other international agreements.

Indigenous Consultation: A search of the Department of Indigenous Affairs Aboriginal Heritage Sites Register has identified one site of Aboriginal significance within the vicinity Population 2 of *Marianthus paralius*. This site is listed as Burns Beach Waugal, a mythological site. There are no restrictions of the site and access to the area is open.

Social and economic impacts: Although the implementation of this recovery plan is unlikely to cause significant adverse social and economic impact, both populations occur on land that is recognised as potential sources of limestone and the protection of *Marianthus paralius* may potentially affect development and asset protection measures on these sites.

Affected interests: Stakeholders potentially affected by the implementation of this plan include the Shire of Gingin and City of Joondalup as the managers of the land containing both populations.

Evaluation of the Plan's Performance: The DEC in conjunction with the Swan Region Threatened Flora and Communities Recovery Team (SRTFCRT) 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 stakeholders have been made aware of the existence of this species and its locations.
2. Surveys for *Marianthus paralius* were undertaken in 2004 and 2005.

3. In January 2006, 9476 seeds of *Marianthus paralius* were collected from Population 1 and stored in DEC's Threatened Flora Seed Centre (TFSC) at -18°C.
4. The Botanic Gardens and Parks Authority (BGPA) have attempted with varied success to grow *Marianthus paralius* from seed and cuttings.
5. Staff from DEC's Swan Coastal District regularly monitor populations.
6. The SRTFCRT 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 *Marianthus paralius* for listing under the Commonwealth EPBC Act
3. Map habitat critical to the survival of *Marianthus paralius*
4. Achieve long-term protection of habitat
5. Undertake weed control
6. Prevent recreational user access
7. Collect seed and other material to preserve genetic diversity
8. Monitor populations
9. Implement rabbit control if necessary
10. Conduct further surveys
11. Develop and implement a fire management strategy
12. Develop a translocation proposal and start the translocation process, if necessary
13. Liaise with relevant land managers and Indigenous groups
14. Promote awareness
15. Obtain biological and ecological information
16. Review this IRP and assess the need for further recovery actions

1. BACKGROUND

History

Marianthus paralius, previously known as *Billardiera* sp. Seabird (G.J.Keighery 12977), was formally described during a revision of the genera by Cayzer and Crisp in 2004.

The first collection of *Marianthus paralius*, housed at the WA Herbarium, was made near Seabird by Greg Keighery in 1992 whilst conducting ‘A Floristic Survey of the southern Swan Coastal Plain’ (Gibson *et al.* 1994). A survey to determine the taxon’s conservation status was then conducted in 2004 and included all known and potential habitats along a 10 km stretch of coast from Seabird to Guilderton (Maguire and Sage 2004). A survey of a reserve near Iluka by staff from the City of Joondalup in 2005, resulted in the discovery of a new population, consisting of nine mature plants. This population was approximately 60 km south of the original collection site.

Both populations of *Marianthus paralius* are located on land which has been identified as potential sources of limestone. In addition, they are surrounded by urban areas and are threatened by further residential development. The taxon is currently known from two populations together containing 39 mature individuals.

Description

Marianthus paralius is a woody, almost prostrate shrub, approximately 50 cm wide, with red-orange flowers and white stamens. The leaves are thick and ovate. The name *paralius* comes from the Greek *paralios* meaning by the sea, referring to the seaside habitat (Cayzer and Crisp 2004).

Marianthus paralius is similar to *M. erubescens* but differs in is ovate, sessile leaves, few-flowered inflorescences and ovate fruit with thin oval seeds without ridging (Cayzer and Crisp 2004)).

Distribution and habitat

Marianthus paralius is known from two locations north of Perth, one near Iluka and the other approximately 60 km further north near Seabird. The species grows in white sand and brown loam amongst heath on coastal limestone cliffs. Associated species include *Acacia truncata*, *A. lasiocarpa*, *Acanthocarpus preissii*, *Acrotriche cordata*, *Calandrinia corrigioloides*, *Eremophila glabra*, *Frankenia pauciflora*, *Leucopogon parviflorus*, *Melaleuca cardiophylla*, *M. cordata*, *M. huegelii*, *Nemcia reticulata*, *Olax benthamiana*, *Olearia axillaris*, *Parietaria debilis*, *Rhagodia baccata*, *Scaevola crassifolia*, *Senecio lautus*, *Spyridium globulosum*, *Templetonia retusa*, *Thomasia triphylla* and *Thysanotus patersonii*.

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

Pop. No. & Location	DEC District	Shire	Vesting	Purpose	Manager
1. S of Seabird	Swan Coastal	Gingin	Unallocated Crown Land	Recreation and Landscape Protection	Shire of Gingin
2. S of Burns Beach	Swan Coastal	City of Joondalup	Crown Reserve	Recreation and Purposes Incidental Thereto	City of Joondalup

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

Biology and ecology

There is currently little knowledge on the biology and ecology of *Marianthus paralius*, and recovery actions refer to a need for research.

Threats

Marianthus paralius was declared as Rare Flora under the Western Australian *Wildlife Conservation Act 1950* on 23 June 2006 and is currently ranked as Critically Endangered (CR) under World Conservation Union (IUCN 2001) criterion D due to its population size estimated to be less than 50 mature plants. 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 mining, lack of tenure security, rabbits, recreational activities, weeds and inappropriate fire regimes.

- **Mining** is a potential threat to Population 1 as a mining lease exists over a portion of the Unallocated Crown Land (UCL) on which the species occurs.
- **Lack of tenure security** is a threat to Population 1 as it occurs on UCL, placing the population at risk from inappropriate land use.
- Evidence of **rabbits** (*Oryctolagus cuniculus*) has been observed at Population 2. Grazing of plants by rabbits is likely to reduce recruitment at these sites. In addition, digging, erosion, the addition of nutrients and introduction of weed seeds resulting from rabbit activity encourages weed invasion.
- **Recreational activities** resulting in habitat degradation from 4WD's, motorbikes and trampling is a threat to both populations of *Marianthus paralius*.
- **Weeds** are considered a minor threat to Population 2. Weeds suppress early plant growth by competing for soil moisture, nutrients and light. They also increase the fire hazard due to the easy ignition of high fuel loads, which are produced annually by many grass weed species.
- **Inappropriate fire regimes** are a threat to both populations. It is not known how the species responds following fire and it should be prevented from occurring in the area if possible, except where it is used experimentally as a recovery tool. Fire may also facilitate weed invasion and should be followed up with appropriate weed control.

The intent of this plan is to provide actions that will deal with immediate threats to *Marianthus paralius*. 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
1. S of Seabird	Unallocated Crown Land	2004 30 (10)	Healthy	Mining, lack of tenure security, recreational activities, inappropriate fire regimes
2. S of Burns Beach	Shire Reserve	2006 9	Healthy	Rabbits, recreational activities, weeds, inappropriate fire regimes

Note: () = number of seedlings.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Development and/or land clearing in the immediate vicinity of *Marianthus paralius* 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 *Marianthus paralius* is ranked as Critically Endangered, 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 *M. paralius* 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 *Marianthus paralius* will also improve the status of associated native vegetation. One Priority flora taxon occurs in association with *M. paralius*. This taxon is listed in the table below:

Table 3. Conservation-listed flora species occurring in habitat of *Marianthus paralius*

Species name	Conservation Status (WA)	Conservation Status (EPBC Act 1999)
<i>Hibbertia spicata</i> subsp. <i>leptotheча</i>	Priority 3	None

For a description of the Priority categories see Atkins (2008).

Marianthus paralius co-occurs within a Priority Ecological Community (PEC). This PEC is described as mostly heaths on shallow sands over limestone close to the coast. It contains no single dominant but important species include *Spiridium globulosum*, *Rhagodia baccata* and *Olearia axillaris*.

Table 4: Priority Ecological Community (PEC) in which *Marianthus paralius* occurs within

Community Name	Conservation status (WA)	Conservation Status (EPBC Act 1999)
Coastal shrublands on shallow sands, southern Swan	Priority 3	None
Coastal Plain (community type 29a)		

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

International obligations

Although 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, *Marianthus paralius* is not listed under any specific international treaty and this IRP does not affect Australia's obligations under any other international agreements.

Indigenous Consultation

A search of the Department of Indigenous Affairs Aboriginal Heritage Sites Register has identified one site of Aboriginal significance within the vicinity Population 2 of *Marianthus paralius*. This site is listed as Burns Beach Waugal, a mythological site. Although there are no restrictions of the site and access to the area is open 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

Although the implementation of this recovery plan is unlikely to currently cause significant adverse social and economic impact, both populations occur on land that is recognised as potential sources of limestone and the protection of *Marianthus paralius* may potentially affect future development and asset protection measures on these sites.

Affected interests

Stakeholders potentially affected by the implementation of this plan include the Shire of Gingin and City of Joondalup.

Evaluation of the Plan's Performance

The DEC in conjunction with the Swan Region Threatened Flora and Communities Recovery Team (SRTFCRT) will evaluate the performance of this IRP. In addition to annual reporting on progress and evaluation against the criteria for success and failure, the plan will be reviewed following five years of implementation.

2. RECOVERY OBJECTIVE AND CRITERIA

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

The Shire of Gingin and the City of Joondalup have been officially notified about populations of *Marianthus paralius* that occur on lands that they manage or own. These notifications detail the current status of the species as Declared Rare Flora (DRF) and the associated legal obligations in regards to their protection.

Surveys for *Marianthus paralius* have been undertaken. The first collection of the taxon was made during ‘A Floristic Survey of the southern Swan Coastal Plain’ (Gibson *et al.* 1994). A survey to determine the taxon’s conservation status was then conducted in 2004 by DEC staff (Maguire and Sage 2004). A further survey in 2005 by City of Joondalup staff resulted in the discovery of a new population.

In January 2006, 9476 seeds of *Marianthus paralius* were collected from Population 1 and stored in DEC’s Threatened Flora Seed Centre (TFSC) at -18°C. The TFSC test the viability of the seed initially and after one year in storage. The germination rate of *M. paralius* seed was found to be 76%.

The Botanic Gardens and Parks Authority (BGPA) have attempted, with varied success, to grow *Marianthus paralius* from seed and cuttings. Seed was collected from a mature plant growing in the Botanic Gardens in January 2006 with the following pre-treatments trialled:

1. Seeds were soaked in a solution of 10% smoke water and 1% gibberellic acid (in a ration of 50:50) for 24 hours. Germination was recorded as good.
2. Seeds were soaked in 10% smoke water for 24 hours. Some germination did occur but not as good as the smoke/gibberellic acid combination (treatment 1).
3. Seeds were soaked in 1% gibberellic acid for 24 hours. Again, some germination did occur but was not as good as the smoke/gibberellic acid combination (treatment 1).

BGPA has attempted on several occasions to grow *Marianthus paralius* from cuttings. One clone was taken twice during spring/summer, with strike rates of 5% and 10%. The other clone was taken twice in spring, with strike rates of 47% and 77%. The poor quality of the material of the first clone may have contributed to the poor strike rate compared to the higher strike rate for the second clone.

Staff from DEC’s Swan Coastal District regularly monitor populations.

The SRTFCRT 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 them 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 SRTFCRT will oversee the implementation of recovery actions for *Marianthus paralius* and will include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: DEC (Swan Coastal District) through the SRTFCRT
Cost: \$3,000 per year

2. Nominate *Marianthus paralius* 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 *Marianthus paralius* for listing under the Commonwealth EPBC Act
Responsibility: DEC (Species and Communities Branch)
Cost: \$1,400 in year 1

3. Map habitat critical to the survival of *Marianthus paralius*

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

Action: Map habitat critical to the survival of *Marianthus paralius*
Responsibility: DEC (SCB, Swan Coastal District) through the SRTFCRT
Cost: \$3,000 in year 2

4. Achieve long-term protection of habitat

DEC will seek to have land containing Populations 1 and 2 included in the reserve system.

Action: Achieve long-term protection of habitat
Responsibility: DEC (Swan Coastal District, Land Acquisition Branch); Department for Planning and Infrastructure (DPI); Department of Mines and Petroleum (DMP), through the SRTFCRT
Cost: \$1,500 per year

5. Undertake weed control

Weeds are a minor threat to Population 2 and the following actions will be implemented:

1. Determine which weeds are present and map them.
2. Select an appropriate technique for removal; herbicide, mowing or hand weeding.
3. Control invasive weeds by hand removal and/or spot spraying around *Marianthus paralius* plants when weeds first emerge.
4. Revegetate using site specific species in order to maintain low weed levels.
5. Monitor the success of the treatment on weed death, and the tolerance of *Marianthus paralius* and associated native plant species to the treatment.
6. Report on the method and success of the treatment, and its effect on *Marianthus paralius* and associated species.

Action: Undertake weed control
Responsibility: DEC (Swan Coastal District, Science Division) through the SRTFCRT
Cost: \$2,000 per year, as required

6. Prevent recreational user access

Some barrier fencing is already installed for Population 2. However, to prevent access to both populations by recreational users, in particular 4WD's, additional barriers may be required. Signs indicating the significance of the area may also need to be erected.

Action: Prevent recreational user access
Responsibility: DEC (Swan Coastal District), Shire of Gingin, City of Joondalup, through the SRTFCRT
Cost: \$3,000 in year one; \$1,000 per year thereafter

7. Collect seed and other material to preserve genetic diversity

Seed has already been collected from Population 1 however additional collections are required by DEC's TFSC from both populations to ensure the genetic diversity of the species is captured. Cuttings will also be collected to establish a living collection of genetic material.

Action: Collect seed and other material to preserve genetic diversity
Responsibility: DEC (Swan Coastal District, TFSC), BGPA through the SRTFCRT
Cost: \$2,500 per year

8. 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 at least annually.

Action: Monitor populations
Responsibility: DEC (Swan Coastal District) through the SRTFCRT
Cost: \$3,500 per year

9. Implement rabbit control if necessary

The level of threat posed by rabbits may vary from year to year and 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 if necessary
Responsibility: DEC (Swan Coastal District) through the SRTFCRT; relevant land managers
Cost: \$3,000 in years 1, 3 and 5

10. Conduct further surveys

It is recommended that areas of potential habitat be surveyed for the presence of *Marianthus paralius* during its flowering period between September and November.

All surveyed areas will be recorded and the presence or absence of the species documented so as to increase survey efficiency and reduce unnecessary duplication. 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 (Swan Coastal District) through the SRTFCRT
Cost: \$3,000 in years 1, 3 and 5

11. Develop and implement a fire management strategy

Where possible, fire will be prevented from occurring in the area 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 (Swan Coastal District) through the SRTFCRT
Cost: \$2,500 in first year and \$1,000 in subsequent years

12. Develop a translocation proposal and start the translocation process, if necessary

If surveys fail to locate more populations a translocation proposal will be developed for the long-term conservation of this species and suitable translocation sites selected. Information on the translocation of threatened plants and animals in the wild is provided in DEC's Policy Statement No. 29 *Translocation of Threatened Flora and Fauna* (CALM 1995). All translocation proposals require endorsement by DEC's Director of Nature Conservation. Monitoring of translocations is essential and will be included in the timetable developed for the Translocation Proposal.

Action: Develop a translocation proposal and start the translocation process, if necessary
Responsibility: DEC (Swan Coastal District) through the SRTFCRT
Cost: \$2,200 in year 5

13. Liaise with relevant land managers and Indigenous groups

Staff from DEC's Swan Coastal District will liaise with appropriate land managers to ensure that populations of *Marianthus paralius* 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 *M. paralius*.

Action: Liaise with relevant land managers and Indigenous groups
Responsibility: DEC (Swan Coastal District) through the SRTFCRT
Cost: \$500 per year

14. Promote awareness

The importance of biodiversity conservation and the protection of *Marianthus paralius* 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 photos, a description of the plant, its habitat type, threats and management actions will be produced. Formal links with local naturalist groups and interested individuals will also be encouraged.

Action: Promote awareness
Responsibility: DEC (Swan Coastal District, SCB, Strategic Development and Corporate Affairs Division) through the SRTFCRT
Cost: \$1,600 in year 1 and \$1,000 in years 2-5

15. Obtain biological and ecological information

Improved knowledge of the biology and ecology of *Marianthus paralius* will provide a scientific basis for its management in the wild and will ideally include:

1. Study of the soil seed bank dynamics and the role of 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, Swan Coastal District) through the SRTFCRT
Cost: \$10,000 per year

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

If *Marianthus paralius* 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, Swan Coastal District) through the SRTFCRT
Cost: \$2,000 in year 5

Table 5. Summary of Recovery Actions

Recovery Action	Priority	Responsibility	Completion Date
Coordinate recovery actions	High	DEC (Swan Coastal District) through the SRTFCRT	Ongoing
Nominate <i>Marianthus paralius</i> for listing under the Commonwealth EPBC Act	High	DEC (SCB)	2010
Map habitat critical to the survival of <i>Marianthus paralius</i>	High	DEC (SCB, Swan Coastal District) through the SRTFCRT	2011
Achieve long-term protection of habitat	High	DEC (Swan Coastal District, Land Acquisition Branch); DPI; DOMP, through the SRTFCRT	Ongoing
Undertake weed control	High	DEC (Swan Coastal District) through the SRTFCRT	As needed
Prevent recreational user access	High	DEC (Swan Coastal District), Shire of Gingin, City of Joondalup, through the YDTFCRT	2014
Collect seed and other material to preserve genetic diversity	High	DEC (Swan Coastal District, TFSC), BGPA through the SRTFCRT	2014
Monitor populations	High	DEC (Swan Coastal District) through the SRTFCRT	Ongoing
Implement rabbit control if necessary	High	DEC (Swan Coastal District) through the SRTFCRT; relevant land managers	As needed
Conduct further surveys	High	DEC (Swan Coastal District) through the SRTFCRT	Ongoing
Develop and implement a fire management strategy	High	DEC (Swan Coastal District) through the SRTFCRT	Developed by 2010 with implementation ongoing
Develop a translocation proposal and start the translocation process, if necessary	Medium	DEC (Science Division, Swan Coastal District) through the SRTFCRT	Developed by 2014 with implementation ongoing
Liaise with relevant land managers and Indigenous groups	Medium	DEC (Swan Coastal District) through the SRTFCRT	Ongoing
Promote awareness	Medium	DEC (Swan Coastal District, SCB, and Strategic Development and Corporate Affairs Division) through the SRTFCRT	Ongoing
Obtain biological and ecological information	Medium	DEC (Science Division, Swan Coastal District) through the SRTFCRT	2014
Review this IRP and assess the need for further recovery actions	Medium	DEC (SCB, Swan Coastal District) through the SRTFCRT	2014

4. TERM OF PLAN

This IRP will operate from July 2009 to June 2014 but will remain in force until withdrawn or replaced. If the species is still listed as threatened after five years, the need for further recovery actions will be determined.

5. REFERENCES

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6. TAXONOMIC DESCRIPTION

Marianthus paralius

Cayzer, L.W. and Crisp, M.D. (2004) Reinstatement and revision of the genus *Marianthus* (Pittosporaceae). *Australian Systematic Botany*, 17, 127-144.

Shrubs, woody, almost prostrate, eventually scandent, stems with numerous lenticels; leaves 30–35 x 24–28 mm, wide ovate, thick, petioles 1–2 mm long. *Inflorescences* one to three flowers in sessile umbels, subtended by a leaf like bract; peduncles to 9 mm long, pedicels 4 mm long; flowers held upright above the leaves. *Sepals* less than 3 mm long, basally thickened; *petals* 20–25 mm long, connivent, tube downcurving, red becoming maroon, apices laxly reflexing; *stamens* unequal, exserted; anthers 19–21 mm long, ovoid, almost rectangular, white; pollen fawn-pink; filaments 16–17 mm long, prominently flared in the lower half and around the ovary. *Ovary* stipitate, glabrous; style almost twice length of ovary. *Fruit* septi- and loculicidally dehiscent, 8 x 4 mm wide, stalked, ovate-cylindrical. *Seeds* few (fewer than 4) per loculus, thin, oval, minutely pitted, not striate or ridged. *Flowering* Spring.