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

INTERIM RECOVERY PLAN NO. 303

BREMER MARIANTHUS

(*Marianthus aquilonaris*)

INTERIM RECOVERY PLAN

2010-2014

June 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. 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 IRPs, and by ensuring that conservation action commences as soon as possible and, in the case of Critically Endangered (CR) taxa, always within one year of endorsement of that rank by the Minister.

This IRP, which was prepared using Specific Nature Conservation Project funding, will operate from June 2010 to May 2015 but will remain in force until withdrawn or replaced.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 in June 2010 and was approved by the Director of Nature Conservation in July 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 June 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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Emma Adams	Conservation Officer, DEC Esperance 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 Emma Adams.

CITATION

This IRP should be cited as:

Department of Environment and Conservation (2010) *Marianthus aquilonaris* Interim Recovery Plan 2010-2015. Interim Recovery Plan No. 303. Department of Environment and Conservation, Western Australia.

SUMMARY

		Common Name:	Bremer Marianthus
Scientific Name:	***Marianthus aquilonaris***		
Family:	Pittosporaceae	**Flowering Period:**	September to December
DEC Region:	South Coast	**DEC District:**	Esperance
Shire:	Dundas	**NRM Region:**	South Coast
Recovery Team:	Esperance District Threatened Flora Recovery Team (EDTFRT)		

Illustrations and/or further information: Wege and Gibson, (2009); Western Australian Herbarium (1998−) *FloraBase − The Western Australian Flora*. Department of Environment and Conservation. http://florabase.dec.wa.gov.au/.

Current status: *Marianthus aquilonaris* was declared as Rare Flora under the Western Australian *Wildlife Conservation Act 1950* in 2002 under the name *Marianthus* sp. Bremer, and is ranked as Critically Endangered (CR) under World Conservation Union (IUCN 2001) criteria B1ab(iii,v)+2ab(iii,v); C2a(ii) due to its extent of occurrence being less than 100 km^2, its area of occupancy being less than 10 km^2, a continuing decline in the area, extent and/or quality of its habitat and number of mature individuals and there being less than 250 mature individuals known at the time of ranking. However, as more plants have since been found it no longer meets these criteria and a recommendation will be made to the Threatened Species Scientific Committee (TSSC) that they be changed to CR B1ab(iii,v)+2ab(iii,v). 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/exploration, track maintenance and inappropriate fire regimes.

Description: *Marianthus aquilonaris* is an erect, straggly shrub to 1.6 m high with hairy stems, alternate, elliptic to oblong leaves, a glabrous calyx and a pale blue and white corolla. Flowers appear between September and October.

Habitat requirements: *Marianthus aquilonaris* is found in the Bremer Range northwest of Esperance, growing on orange to grey-brown sandy loam, rocky red-orange clay loam, laterite and quartzite, on rock outcrops and slopes.

Habitat critical to the survival of the species, and important populations: Given that *Marianthus aquilonaris* is ranked as CR, 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. aquilonaris* 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 aquilonaris* will also improve the status of associated native vegetation, including five Priority taxa and one Priority 1 Ecological Community.

International obligations: *Marianthus aquilonaris* is not listed under any specific international treaty and this IRP does not affect Australia's obligations under any other international agreements. The plan is never-the-less 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.

Indigenous Consultation: A search of the Department of Indigenous Affairs Aboriginal Heritage Sites Register has identified a site of Aboriginal significance adjacent to populations of *Marianthus aquilonaris*. This site is listed as Lake Johnson and contains artefacts, however, there are no restrictions at 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: Both populations occur on land that is a potential source of minerals and the protection of *Marianthus aquilonaris* may affect future development in the area.

Affected interests: Stakeholders potentially affected by the implementation of this plan are the holders of mineral exploration licences on land where *Marianthus aquilonaris* occurs, and holders of licences for land adjacent to where the taxon occurs which require access through the *M. aquilonaris* site.

Evaluation of the Plan's Performance: The DEC in conjunction with the Esperance District Threatened Flora Recovery

Team (EDTFRT) 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.

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

1. Land managers and lease holders have been made aware of this species and its location.
2. In December 2004, 8320 seeds of *Marianthus aquilonaris* collected from Population 1 were stored in DEC's Threatened Flora Seed Centre (TFSC) at –18°C.
3. Staff from DEC's Esperance District regularly monitor populations.
4. The EDTFRT 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 ten 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 ten percent or more over the term of the plan.

Recovery actions

1. Coordinate recovery actions
2. Map habitat critical to the survival of *Marianthus aquilonaris*
3. Achieve long-term protection of habitat
4. Stimulate recruitment, if required
5. Install DRF markers
6. Collect seed and other material to preserve genetic diversity
7. Monitor populations
8. Conduct further surveys
9. Develop and implement a fire management strategy
10. Liaise with relevant land managers and Indigenous groups
11. Promote awareness
12. Obtain biological and ecological information
13. Start the translocation process, if necessary
14. Propose ranking criteria change for *Marianthus aquilonaris*
15. Review this IRP and assess the need for further recovery actions

1. BACKGROUND

History

The first collection of *Marianthus aquilonaris*, housed at the WA Herbarium, was made by Neil Gibson and Mike Lyons during a floristic survey of the Bremer Range and Parker Ranges in 1994 (Gibson and Lyons 1998). In 2002 a new population was discovered on a track near the original population site by a volunteer and a DEC officer.

Marianthus aquilonaris was originally known by the phrase name M*arianthus* sp. Bremer. Although a taxonomic review in 2005 determined M*arianthus* sp. Bremer and *M. mollis* to be synonomous, subsequent further examination of vouchered collections showed that Bremer Range populations were morphologically distinct from those near Ravensthorpe and the two taxa were reinstated.

In 2009, M*arianthus* sp. Bremer was formally named *Marianthus aquilonaris* (Wege and Gibson, 2009).

Despite detailed surveys in similar habitat elsewhere *Marianthus aquilonaris* is currently known from just two populations comprising 3900 mature individuals.

Description

Marianthus aquilonaris is an upright, multi-stemmed *shrub*, 0.3–1.6 m high, 0.15–1 m wide; *stems* with a dense indumentum of ± glandular hairs to 0.2 mm long and scattered pilose hairs 0.5–2 mm long, becoming glabrous with age through abrasion. *Adult leaves* alternate, elliptic to oblong, flat in T.S., 7–22(–25) mm long and 2.3–7(–9) mm wide with a L:W ratio of 2.1–4.1, apex acuminate to acute, margins entire, base attenuate with a petiole 1–2.5 mm long, yellow-green usually with a reddish border, glabrous with the exception of sparse pilose and shorter, ± glandular hairs on the margins of young leaves, margins becoming minutely papillose with age through abrasion. *Inflorescences* axillary, flowers solitary, ± nodding; peduncles suberect to spreading, 3–12(–19) mm long, with a dense covering of ± glandular hairs to 0.2 mm long and very sparse pilose hairs. *Sepals* 3–7 mm long, acute, pilose and glandular. *Petals* 5, cohering at the base then recurving, spathulate, 11–19.5 mm long and 2–4.3 mm wide with a L:W ratio of 3.3–7.1, apex acuminate, margins entire, pale blue to almost white with fine purple striations at anthesis, pilose along central upper surface. *Stamens* 5; filaments 5–9.5 mm long, flared towards the base; anthers dorsifixed, white. *Pistil* 4.5–7.5 mm long; ovary bilocular, with a medium dense indumentum of pilose hairs and shorter, ± glandular hairs; style curved or straight, hairy towards base. *Fruit* capsular, obloid to ellipsoid, 7.5–12 mm long, 6–8 mm wide, with sparse to medium pilose and glandular hairs. *Seeds* broadly elliptic to reniform, *c*. 1.5–1.6 mm long, 1.4 mm wide, dark red-brown, shiny, wrinkled, arillate (Wege and Gibson, 2009).

Distribution and habitat

Marianthus aquilonaris is known only from the Bremer Range with its extent of occurrence likely to be less than 0.5 km^2. The species grows on orange to grey-brown sandy loam, rocky red-orange clay loam, laterite and quartzite, on rock outcrops and slopes. Habitat is open woodland with a sparse understorey. Associated species include *Eucalyptus capillosa* subsp. *polyclada*, *E. tortilis*, *E. livida*, *Acrotriche patula*, *Eremophila saligna*, *Alyxia buxifolia*, *Scaevola spinescens*, *Lepidosperma resinosum*, *Leucopogon* sp., *Melaleuca* sp., *Dodonaea* sp., *Hibbertia* sp., *Acacia* sp., *Calothamnus* sp., *Allocasuarina* sp. and *Astroloma* sp.

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

Pop. No. & Location	DEC District	Shire	Vesting	Purpose	Manager
1a. NW of Esperance	Esperance	Dundas	Unvested	Unallocated Crown Land	DoP
1b. NW of Esperance	Esperance	Dundas	Unvested	Unallocated Crown Land	DoP
1c. NW of Esperance	Esperance	Dundas	Unvested	Unallocated Crown Land	DoP
2. NW of Esperance	Esperance	Dundas	Unvested	Unallocated Crown Land	DoP

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

Biology and ecology

Marianthus aquilonaris appears to be a disturbance opportunist as it was found growing in abundance in areas that had been recently burnt (Craig 2003).

Threats

Marianthus aquilonaris was declared as Rare Flora under the Western Australian *Wildlife Conservation Act 1950* in 2002 under the name *Marianthus* sp. Bremer, and is ranked as Critically Endangered (CR) under World Conservation Union (IUCN 2001) criteria B1ab(iii,v)+2ab(iii,v); C2a(ii) due to its extent of occurrence being less than 100 km^2, its area of occupancy being less than 10 km^2, a continuing decline in the area, extent and/or quality of its habitat and number of mature individuals, and there being less than 250 mature individuals known at the time of ranking. 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/exploration, track maintenance and inappropriate fire regimes.

- **Mining/exploration** is a threat to *Marianthus aquilonaris* with mineral exploration leases existing over land containing both populations.
- **Vehicles and track maintenance** threaten populations of *Marianthus aquilonaris* and its habitat. A track bisecting populations of the species is used to access sites for mineral exploration and a number of plants were destroyed when the track was upgraded for access by a drill rig. Threats include grading and widening the track, spraying of chemicals, and construction and maintenance of drainage channels.
- **Inappropriate fire regimes** are a threat to both populations of *Marianthus aquilonaris*. Although the species appears to respond well to fire, fire should be prevented from occurring in the area, except where it is used to promote recovery.

The intent of this plan is to provide actions that will deal with immediate threats to *Marianthus aquilonaris*. 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. NW of Esperance	Unallocated Crown Land	1994 100 2003 1000+ 2004 1000 2009 2500+	Healthy	Mining/exploration, track maintenance, inappropriate fire regimes
1b. NW of Esperance	Unallocated Crown Land	2004 500 2009 600	Moderate	Mining/exploration, track maintenance, inappropriate fire regimes
1c. NW of Esperance	Unallocated Crown Land	2004 1000 2009 800	Moderate	Mining/exploration, track maintenance, inappropriate fire regimes
2. NW of Esperance	Unallocated Crown Land	2004 30 2009 0	Senesced	Mining/exploration, track maintenance, inappropriate fire regimes

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 aquilonaris* will require assessment. On-ground works should not be approved unless the proponents can demonstrate that their actions will not have a 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 aquilonaris* is ranked as CR, 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. aquilonaris* 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 aquilonaris* will also improve the status of associated native vegetation. Five Priority flora taxa that occur within a 10 km radius of the species are listed in the table below:

Table 3. Conservation–listed flora species occurring within a 10 km radius of *Marianthus aquilonaris*

Species name	Conservation Status (WA)	Conservation Status (EPBC Act 1999)
Allocasuarina globosa	Priority 1	-
Acacia kerryana	Priority 2	-
Microcybe pauciflora subsp. *grandis*	Priority 3	-
Eucalyptus rhomboidea	Priority 4	-
Eucalyptus georgei subsp. *georgei*	Priority 4	-

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

Marianthus aquilonaris occurs within a Priority Ecological Community (PEC). This PEC is described as the Bremer Range vegetation complexes of *Eucalyptus rhomboidea* and *E. eremophila* woodland on the side slopes of low ridges; *E. flocktoniae* woodland (with *E. salubris*, *E. salmonophloia*, *E. dundasii* and *E. tenuis*) on broad flat ridges and side slopes; *E. flocktoniae* and/or *E. longicornis* woodland on saline soils on ridges and flats adjacent to large salt lake systems; *E. longicornis* and/or *E. salmonophloia* or, *E. georgei* subsp. *georgei* or, *E. dundasii* woodland, on low areas; *E. livida* woodland on lateritic tops or *Allocasuarina* thickets on greenstone ridges of lateritic breakaways; *Acacia duriuscula*, *Allocasuarina globosa*, *E. georgei* subsp. *georgei* and *E. oleosa* thickets on greenstone ridges with skeletal soils.

Table 4: The Priority Ecological Community (PEC) in which *Marianthus aquilonaris* occurs

Community Name	Conservation status (WA)	Conservation Status (EPBC Act 1999)
Plant assemblages of the Bremer Range System	Priority 1	

For a description of categories see DEC (2007)

International obligations

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

Indigenous Consultation

A search of the Department of Indigenous Affairs Aboriginal Heritage Sites Register has identified a site of Aboriginal significance adjacent to populations of *Marianthus aquilonaris*. This site is listed as Lake Johnson and contains artefacts, however, there are no restrictions to 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 (see action 10).

Social and economic impacts

Both populations occur on land that is a potential source of minerals and the protection of *Marianthus aquilonaris* may affect future development in the area.

Affected interests

Stakeholders potentially affected by the implementation of this plan are the holders of mineral exploration licences for land where *Marianthus aquilonaris* occurs, and holders of licences for land adjacent to where the taxon occurs which require access through the *M. aquilonaris* site.

Evaluation of the Plan's Performance

DEC in conjunction with the Esperance District Threatened Flora Recovery Team (EDTFRT) 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 ten 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 ten percent or more over the term of the plan.

3. RECOVERY ACTIONS

Existing recovery actions

The Department of Mines and Petroleum and mining companies with mining tenements/exploration licenses in the area of populations have been advised of the need to protect *Marianthus aquilonaris*.

In December 2004, 8320 seeds of *Marianthus aquilonaris* collected from Population 1 were stored at DEC's Threatened Flora Seed Centre (TFSC) at –18°C. The germination rate has yet to be tested.

Staff from DEC's Esperance District regularly monitor populations.

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

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

2. Map habitat critical to the survival of *Marianthus aquilonaris*

Although alluded to in Section 1, habitat critical to the survival of *Marianthus aquilonaris* has not yet been mapped. 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 *Marianthus aquilonaris*
Responsibility: DEC (Species and Communities Branch (SCB), Esperance District) through the EDTFRT
Cost: $3,000 in year 2

3. Achieve long-term protection of habitat

DEC will seek to have land containing Populations 1 and 2 placed in the reserve system in order to achieve long-term protection of the species and its habitat.

Action: Achieve long-term protection of habitat
Responsibility: DEC (Esperance District) through the EDTFRT
Cost: $1,500 per year

4. Stimulate recruitment, if required

Observational evidence suggests that suitable natural disturbance events (physical or fire) may be the most effective means of germinating *Marianthus aquilonaris* in the wild. If required, different disturbance techniques should be investigated (i.e. soil disturbance and fire), to determine the most successful and appropriate method. Records will need to be maintained for future research. Any disturbance trials will need to be undertaken in conjunction with weed control.

Action: Stimulate recruitment, if required
Responsibility: DEC (Esperance District) through the EDTFRT
Cost: $3,500 in years 1 and 3; $1,000 in years 2, 4 and 5

5. Install DRF markers

DRF markers on tracks will warn track maintenance workers of the presence of the rare flora and help to prevent accidental damage to the plants or habitat. DRF markers are required along tracks at both populations.

Action: Install DRF markers
Responsibility: DEC (Esperance District) through the EDTFRT
Cost: $2,000 in year 1

6. Collect seed and other material

Seed has been collected from Population 1 by DEC's TFSC. However, collections are required from Population 2. Cuttings will also be collected to establish a living collection of genetic material.

Action: Collect seed and other material
Responsibility: DEC (Esperance District, TFSC), BGPA through the EDTFRT
Cost: $4,500 per year

7. 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. The populations will be inspected annually.

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

8. Conduct further surveys

It is recommended that areas of potential habitat be surveyed for the presence of *Marianthus aquilonaris* during the flowering period in September to December.

All surveyed areas will be recorded and the presence or absence of the species documented to increase 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 (Esperance District) through the EDTFRT
Cost: $3,000 in years 1, 3 and 5

9. Develop and implement a fire management strategy

If possible, 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 (Esperance District) through the EDTFRT
Cost: $2,500 in first year and $1,000 in subsequent years

10. Liaise with relevant land managers and Indigenous groups

Staff from DEC's Esperance District will liaise with appropriate land managers to ensure that populations of *Marianthus aquilonaris* are not accidentaly damaged or destroyed. Input and involvement will be sought from Indigenous groups that have an active interest in areas that are habitat for *M. aquilonaris.*

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

11. Promote awareness

The importance of biodiversity conservation and the protection of *Marianthus aquilonaris* 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 (Esperance District, SCB, Strategic Development and Corporate Affairs Division) through the EDTFRT
Cost: $1,500 in year 1 and $1,000 in years 2-5

12. Obtain biological and ecological information

Increased knowledge of the biology and ecology of *Marianthus aquilonaris* will provide a scientific basis for its management in the wild. 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 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, Esperance District) through the EDTFRT

Cost: $10,000 per year

13. Start the translocation process, if necessary

Translocation may be deemed desirable for the conservation of this species if surveys fail to locate new populations and existing populations are reduced in size due to threatening processes. A translocation proposal will be developed 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) and meet the standards set in Guidelines for the Translocation of Threatened Australian Plants (Vallee *et al* 2004). 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: Start the translocation process, if necessary
Responsibility: DEC (Esperance District) through the EDTFRT
Cost: $2,500 in year 5

14. Propose ranking criteria change for *Marianthus aquilonaris*

A recommendataion will be made to the Western Australian Threatened Species scientific Committee (WATSSC that ranking criteria be amended from CR B1ab(iii,v)+2ab(iii,v); C2a(ii) to CR B1ab(iii,v)+2ab(iii,v). The species no longer meets C2a(ii) as it is now known from two populations and 3900 mature individuals.

Action: Propose ranking criteria change for *Marianthus aquilonaris*
Responsibility: DEC (SCB, Esperance District) through EDTFCRT
Cost: $1,000 in year 1

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

If *Marianthus aquilonaris* is still ranked as CR 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, Esperance District) through the EDTFRT
Cost: $2,000 in year 5

Table 5. Summary of Recovery Actions

Recovery Action	Priority	Responsibility	Completion Date
Coordinate recovery actions	High	DEC (Esperance District) through the EDTFRT	Ongoing
Map habitat critical to the survival of *Marianthus aquilonaris*	High	DEC (SCB, Esperance District) through the EDTFRT	2012
Achieve long-term protection of habitat	High	DEC (Esperance District) through the EDTFRT	Ongoing
Stimulate recruitment, if required	High	DEC (Esperance District) through the EDTFRT	2015
Install DRF markers	High	DEC (Esperance District) through the EDTFRT	2011
Collect seed and other material to preserve genetic diversity	High	DEC (EsperanceDistrict, TFSC), BGPA through the EDTFRT	2015
Monitor populations	High	DEC (Esperance District) through the EDTFRT	Ongoing
Conduct further surveys	High	DEC (Esperance District) through the EDTFRT	Ongoing
Develop and implement a fire management strategy	High	DEC (Esperance District) through the EDTFRT	Developed by 2011 with implementation ongoing
Liaise with relevant land managers and Indigenous groups	High	DEC (Esperance District) through the EDTFRT	Ongoing
Promote awareness	Medium	DEC (Esperance District, SCB, and	Ongoing

		Strategic Development and Corporate Affairs Division) through the EDTFRT	
Obtain biological and ecological information	Medium	DEC (Science Division, Esperance District) through the EDTFRT	2015
Start the translocation process, if necessary	Medium	DEC (Science Division, Esperance District) through the EDTFRT	2015
Propose ranking criteria change for *Marianthus aquilonaris*	Medium	DEC (SCB, Esperance District) through the EDTFRT	2011
Review this IRP and assess the need for further recovery actions	Medium	DEC (SCB, Esperance District) through the EDTFRT	2015

4. TERM OF PLAN

This IRP will operate from June 2010 to May 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

Atkins, K. (2008) *Declared Rare and Priority Flora List for Western Australia.* Department of Environment and Conservation, Perth, Western Australia.

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6. TAXONOMIC DESCRIPTION

Marianthus aquilonaris

Excerpt from Wege, J.A. and Gibson, N. (2009) A new, rare *Marianthus* (Pittosporaceae) from Bremer Range in Western Australia. *Nuytsia* 19(2): 295-302

Marianthus aquilonaris is an upright, multi-stemmed *shrub*, 0.3–1.6 m high, 0.15–1 m wide; *stems* with a dense indumentum of ± glandular hairs to 0.2 mm long and scattered pilose hairs 0.5–2 mm long, becoming glabrous with age through abrasion. *Adult leaves* alternate, elliptic to oblong, flat in T.S., 7–22(–25) mm long and 2.3–7(–9) mm wide with a L:W ratio of 2.1–4.1, apex acuminate to acute, margins entire, base attenuate with a petiole 1–2.5 mm long, yellow-green usually with a reddish border, glabrous with the exception of sparse pilose and shorter, ± glandular hairs on the margins of young leaves, margins becoming minutely papillose with age through abrasion. *Inflorescences* axillary, flowers solitary, ± nodding; peduncles suberect to spreading, 3–12(–19) mm long, with a dense covering of ± glandular hairs to 0.2 mm long and very sparse pilose hairs. *Sepals* 3–7 mm long, acute, pilose and glandular. *Petals* 5, cohering at the base then recurving, spathulate, 11–19.5 mm long and 2–4.3 mm wide with a L:W ratio of 3.3–7.1, apex acuminate, margins entire, pale blue to almost white with fine purple striations at anthesis, pilose along central upper surface. *Stamens* 5; filaments 5–9.5 mm long, flared towards the base; anthers dorsifixed, white. *Pistil* 4.5–7.5 mm long; ovary bilocular, with a medium dense indumentum of pilose hairs and shorter, ± glandular hairs; style curved or straight, hairy towards base. *Fruit* capsular, obloid to ellipsoid, 7.5–12 mm long, 6–8 mm wide, with sparse to medium pilose and glandular hairs. *Seeds* broadly elliptic to reniform, *c*. 1.5–1.6 mm long, 1.4 mm wide, dark red-brown, shiny, wrinkled, arillate.