BUTTERFLY-LEAFED BRACHYSEMA

(*BRACHYSEMA PAPILIO*)

INTERIM RECOVERY PLAN

2001-2004

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Photo: Greg Keighery

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Government of Western Australia

DEPARTMENT OF Conservation AND LAND MANAGEMENT
Conserving the nature of WA

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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.

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.

CALM 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This Interim Recovery Plan will operate from April 2001 to March 2004 but will remain in force until withdrawn or replaced.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 replaced by a full Recovery Plan after three years.

This IRP was approved by the Director of Nature Conservation on 27 June 2001. The provision of funds identified in this Interim Recovery Plan is dependent on budgetary and other constraints affecting CALM, as well as the need to address other priorities.

Information in this IRP was accurate at April 2001.

SUMMARY

Scientific Name:	***Brachysema papilio***	**Common Name:**	Butterfly-leaved brachysema
Family:	Papilionaceae	**Flowering Period:**	September to October
CALM Region:	Central Forest	**CALM District:**	South West Capes
Shire:	Busselton	**Recovery Team:**	Central Forest Region Threatened Flora and Communities Recovery Team (CFRTFCRT)

Illustrations and/or further information: Brown, A., Thomson-Dans, C. and Marchant, N. (Eds). (1998) *Western Australia's Threatened Flora*. Department of Conservation and Land Management, Western Australia; Crisp. M.D. (1995). Revision of *Brachysema* (Fabaceae: Mirbelieae). *Australian Systematic Botany* 8, 307-353.

Current status: *Brachysema papilio* was declared as Rare Flora in 1994 and ranked in November 1998 as Critically Endangered (CR). It currently meets World Conservation Union (IUCN) Red List Category 'CR' under criteria B1a+biii; B2a+biii; C1 and C2aii (IUCN 2000) as it is only known from a single population, with continued decline in the quality of habitat. The main threats are disease, inappropriate fire regimes, hydrological changes and weed invasion.

Critical habitat: The critical habitat for *Brachysema papilio* comprises the area of occupancy of the known population; as well as areas of Ironstone with remnant vegetation within 200 metres of the known population; the local catchment for the surface and groundwater that provides the wetland habitat of the species; additional occurrences of the ecological community 'Shrubland Association on Southern Swan Coastal Plain Ironstone' and similar habitat ie. tall or low heath on shallow red sandy-clay soil over ironstone in winter wet flats, that do not currently contain the species; and corridors of remnant vegetation that link areas of ironstone in winter wet flats.

Habitat requirements: *Brachysema papilio* is endemic to Western Australia and is apparently confined to a single population located south-west of Busselton. It inhabits very shallow red sandy-clay soil over ironstone in winter wet flats (Brown *et al*. 1998).

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

1. Land managers have been informed of the species' location and the associated legal obligations.
2. CALM's South West Capes District have informed pickers that the area in which *Brachysema papilio* occurs is an exclusion zone not available for commercial wildflower picking.
3. Seed of *Brachysema papilio* is stored at CALM's Threatened Flora Seed Centre (TFSC), including some collected for propagation for a proposed translocation in 2001.
4. The habitat of *Brachysema papilio* is regularly sprayed with phosphite to control the plant pathogen *Phytophthora cinnamomi*.
5. Bollards have been installed to prevent vehicular access to the habitat of *Brachysema papilio*.
6. The known population of *Brachysema papilio* has been surveyed and boundaries mapped with a differential GPS.
7. The Botanic Gardens and Parks Authority (BGPA) currently have 95 *Brachysema papilio* plants in cultivation and received further cuttings from the wild population in November 2000.
8. Testing of eleven *Brachysema papilio* plants for *Phytophthora cinnamomi* susceptibility by CALMScience indicates the species has some resistance to the disease.
9. Three occurrences of the threatened ecological community 'Shrubland Association on Southern Swan Coastal Plain Ironstone' have been purchased. It is intended that *Brachysema papilio* will be translocated into two of the sites.
10. The Central Forest Region Threatened Flora and Communities Recovery Team is overseeing the implementation of this IRP.
11. Staff from CALM's South West Capes District office regularly monitor the population.

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

Recovery actions

1. Coordinate recovery actions.
2. Apply phosphite.
3. Monitor the impact of phosphite application.
4. Implement disease hygiene measures.
5. Propagate plants for translocation.
6. Undertake and monitor translocation.
7. Undertake weed control.
8. Develop and implement a fire management strategy.
9. Monitor population.
10. Collect seed.
11. Liaise with relevant land managers.
12. Alter care control and management of habitat.
13. Obtain biological and ecological information.
14. Promote awareness.
15. Write a full Recovery Plan.

1. BACKGROUND

History

Brachysema papilio was discovered by G Keighery[1] in 1991 at the base of the Whicher Range during a floristic survey of the southern Swan Coastal Plain (Gibson *et al*. 1994). No other populations were located during this survey, or extensive surveys since then.

A hot fire burnt through part of the population in 1992 and resulted in the death of some mature individuals. The regeneration of the population has been monitored since the fire.

Brachysema papilio occurs with a number of other Critically Endangered Declared Rare Flora (DRF), as a component of a Critically Endangered ecological community. Dieback disease caused by the plant pathogen *Phytophthora cinnamomi* is known to exist in the habitat however, laboratory testing indicates *B*. *papilio* has some degree of resistance to the disease (refer Section 3: existing recovery actions).

Description

Brachysema papilio has distinctive leaves that are shaped like butterfly's wings, hence the name the 'butterfly brachysema' (Crisp 1995; Keighery 1995). The species is a dense shrub that grows up to 1.5 m across. Its leaves are up to 2 cm long, and are a truncated wing shape with a rigid, sharp point. Flowers are pale red to cream and are held in loose inflorescences (Brown *et al*. 1998).

Brachysema papilio is closely related to *B*. *praemorsum*, but differs in having leaves consistently crescent-shaped, leathery, with a semi-pointed projection on the midvein and lacking a paler marginal band. The flowers are pendulous and shorter (to 22 mm) (Crisp 1995).

Distribution and habitat

Brachysema papilio is endemic to Western Australia and is apparently confined to a single population located south-west of Busselton in the Whicher Range. It dominates the low scrub in which it grows and inhabits very shallow red sandy-clay soil over ironstone in winter wet flats (Brown *et al*. 1998). The plant community in which the species grows, 'Shrubland Association on Southern Swan Coastal Plain Ironstone', was ranked as Critically Endangered in 1995. This plant assemblage occurs on ironstone soils that are highly restricted in distribution and the site in which this taxon occurs is one of 13 only occurrences of this species-rich plant community (English 1999). Associated species include *Hakea varia*, *Loxocarya magna* and *Chamelaucium roycei*. Much of the species diversity in the community comes from annuals and geophytes. Typical and common native species are the shrubs *Kunzea micrantha*, *Pericalymma ellipticum*, *Hakea oldfieldii*, *Hemiandra pungens* and *Viminaria juncea*, and the herbs *Aphelia cyperoides* and *Centrolepis aristata* (Gibson *et al*. 1994).

There are six additional Declared Rare Flora (DRF), three of which are ranked Critically Endangered, that occur on the ironstone soils in the habitat of *Brachysema papilio*. DRF and Priority Flora that occur with *B*. *papilio* are listed in the table below.

DRF and Priority flora found near *Brachysema papilio*
(Source: Western Australian Herbarium, 1998)

TAXON	STATUS	RANK
Andersonia ferricola ms	Priority	1
Schoenus pennisetis	Priority	1
Hakea oldfieldii	Priority	3
Isopogon formosus subsp. *dasylepis*	Priority	3
Stylidium mimeticum	Priority	3
Synaphea whicherensis	Priority	3
Darwinia sp. Williamson	DRF	Critically endangered
Lambertia echinata subsp. *occidentalis*	DRF	Critically endangered
Petrophile latericola ms	DRF	Critically endangered

[1] Greg Keighery, Principal Research Scientist, CALMScience

Dryandra nivea subsp. *uliginosa*	DRF	Endangered
Dryandra squarrosa subsp. *argillacea*	DRF	Endangered
Chamelaucium roycei ms	DRF	Vulnerable

This IRP will be implemented in conjunction with the IRP for the 'Shrubland Association on Southern Swan Coastal Plain Ironstone community' IRP (English 1999) and the IRPs for *Darwinia* sp. Williamson (Stack *et al*. 1999a), *Lambertia echinata* subsp. *occidentalis* (Stack *et al*. 1999b) and *Petrophile latericola* (Phillimore *et al*. in prep).

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 that the potential to be reintroduced (*Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)).

The critical habitat for *Brachysema papilio* comprises:

- the area of occupancy of the known population,
- areas of Ironstone with remnant vegetation, within 200 metres of the known population (these provide potential habitat for natural range extension),
- the local catchment for the surface and ground waters that provide the wetland habitat of the species (the species occurs in winter wet areas and is dependent on maintenance of local hydrology),
- additional occurrences of the ecological community 'Shrubland Association on Southern Swan Coastal Plain Ironstone' and similar habitat ie. tall or low heath on shallow red sandy-clay soil over ironstone in winter wet flats, that do not currently contain the species (these represent potential translocation sites).
- corridors of remnant vegetation that link areas of ironstone in winter wet flats (these provide potential habitat for natural range extension)

Biology and ecology

Monitoring of *Brachysema papilio* after a hot fire in 1992, indicated that recruitment can occur from seed and rootstocks (Keighery 1995).

Laboratory testing of *Phytophthora cinnamomi* susceptibility indicates that the species has some resistance to the disease (refer Section 3: Existing recovery actions). However, tests were performed only on juvenile forms and under laboratory conditions. The resistance of more mature plants and those in the wild may differ from plants under controlled conditions.

Threats

Brachysema papilio was declared as Rare Flora in 1994 and ranked in November 1998 as Critically Endangered (CR). It currently meets World Conservation Union Red List Category 'CR' under criteria B1a+biii; B2a+biii; C1 and C2aii (IUCN 2000) as it is only known from about 100 plants in a single location, with continuing decline in the quality of habitat The main threats are disease, inappropriate fire regimes, hydrological changes and weed invasion.

- **Disease** caused by the plant pathogen *Phytophthora cinnamomi* (Pc) is known to exist in the habitat of *Brachysema papilio*, however, initial laboratory testing indicates *Brachysema papilio* has some degree of resistance. Even if *B. papilio* is resistant to the disease *in situ*, *Phytophthora* may have indirect impacts on the species through altering the composition and structure of the community. Such changes can result in altered levels of shade, soil moisture retention and competition and other factors. There have been deaths of *Phytophthora* indicator species including the DRF species *Dryandra nivea* subsp. *uliginosa* in the habitat of *Brachysema papilio* and the protection of the community as a whole is considered a priority. It is also likely that canker (probably *Armillaria luteobubalina*) is present at the site.

- **Inappropriate fire regimes** may affect the viability of the population. *Brachysema papilio* appears to regenerate from both seed and rootstock following fire. Too frequent fire could, however, deplete soil stored seed and reserves held in rootstocks of individual plants, and also exacerbate the impact of disease on the habitat.

- **Changes to hydrology** may in future become a threat to the population (Tille and Lantzke 1990). Extensive clearing for agriculture in the area is likely to have caused an increase in surface runoff and recharge of the groundwater.

Waterlogging and salinity will require monitoring. Hirschberg (1989) measured levels of salinity in the groundwater in the South West Capes area, and found the groundwater near the population ranged between 200-400 per litre total dissolved solids, which is reasonably fresh. Adjacent land development such as mining have the potential to alter hydrological processes, and therefore to threaten the population.

- **Weed invasion** is currently a minor threat to the population. Weeds suppress early plant growth by competing for soil moisture, nutrients and light. They also exacerbate grazing pressure and increase the fire hazard due to the easy ignition of large amounts of fuel which are produced annually by many grass weed species. Weed levels will be monitored.

Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants	Condition	Threats
1. ESE Busselton	State Forest	1992 100+ 1993 50+ 1994 50 (100) 1996 50+ 1997 100+ 1999 100+	Healthy	Disease, hydrological changes, inappropriate fire regimes, weed invasion

Note: Numbers in brackets = number of seedlings.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Developments in the immediate vicinity of the population or within the defined critical habitat of *Brachysema papilio* require assessment. No developments should be approved unless the proponents can demonstrate that they will have no significant impact on the species, its habitat or potential habitat, the local hydrology, and that the development does not have the potential to spread or amplify the impact of dieback disease caused by the plant pathogen *Phytophthora cinnamomi* in the habitat.

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

3. RECOVERY ACTIONS

Existing recovery actions

The Department of Minerals and Energy was formally notified of the presence of *Brachysema papilio* in October 1994. The adjacent private property owners were notified in February 1999. These notifications detailed the Declared Rare status of the species and the associated legal obligations. The mining company with a tenement over an area containing the population was notified of the presence of the species in June 1999. A Notice of Intent to mine the private property adjacent to the population was issued in November 2000. CALM will continue to liaise with both the proponent and the Department of Environmental Protection (DEP) regarding State environmental assessment of the proposal.

CALM's South West Capes District has informed pickers and provided maps that indicate the area in which *Brachysema papilio* occurs is an exclusion zone not available for commercial wildflower picking. This will help to ensure that pickers do not enter the area.

Approximately 460 seeds of *Brachysema papilio* were collected in December 1995, 205 seeds in December 1995 and 160 seeds in December 1997. These are stored in CALM's TFSC at -18°C. The initial germination rates of the seed were 80%,

55% and 100% respectively. After one year in storage the germination rate of the seed was 80% and 88% (pers. comm. A. Cochrane[2]).

Experimental application of phosphite to the habitat of *Brachysema papilio* commenced in 1996. A 4.2 hectare area of the Ironstone community was sprayed in May, June and again in spring in 1996. Follow-up spraying occurred in April and December 1998, and May 2000. CALM District staff are assessing the effectiveness of this treatment by monitoring the local key dieback indicator species; *Lambertia echinata* subsp. *occidentalis* and *Dryandra nivea* subsp. *uliginosa* (pers comm. R. Smith[3])

Bollards were installed across the access track in 1999 to prevent vehicular access to the habitat of *Brachysema papilio*.

The population of *Brachysema papilio* was surveyed and boundaries mapped with a differential GPS in 1999 and 2000. This information is stored in the CALM District Geographic Information System database.

The BGPA currently have 95 *Brachysema papilio* plants, representing six clones, in cultivation. Three clones were received as cutting material, and the other three were germinated from seed. The species strikes well from cuttings with a success rate ranging from 42% to 80% (pers comm. A. Shade[4]). Cuttings from a further 20 individuals from the population were forwarded to the BGPA in November 2000 for propagation. Seed was collected in December 2000 for propagation into plants for translocations planned for 2001.

Laboratory testing of eleven *Brachysema papilio* plants for susceptibility to *Phytophthora cinnamomi* by CALMScience staff resulted in the death of 18% of plants following inoculation. This suggests that the species has some immunity to *Phytophthora cinnamomi* (pers comm. C. Crane[5]).

Three occurrences of the threatened ecological community 'Shrubland Association on Southern Swan Coastal Plain Ironstone' encompassing an area of approximately 30 hectares in total have been purchased. Translocations of two ironstone species to two of these sites was undertaken in 2000. It is also intended that the sites be used for a translocation of *Brachysema papilio* in 2001.

The Central Forest Region Threatened Flora and Communities Recovery Team (CFRTFCRT) is overseeing the implementation of this IRP and will include information on progress in its annual report to CALM's Corporate Executive and funding bodies.

Staff from CALM's South West Capes District office regularly monitor the population.

Future recovery actions

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

1. Coordinate recovery actions

The CFRTFCRT will continue to oversee the implementation of recovery actions for *Brachysema papilio* and will include information on progress in its annual report to CALM's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: CALM (Central Forest Region) through the CFRTFCRT
Cost: $700 per year.

2. Apply phosphite

Phytophthora cinnamomi is known to occur within the threatened ecological community in which *Brachysema papilio* occurs. CALM will continue to apply phosphite through its aerial spraying program to provide protection to the plant community as a whole. Application to the entire community will have the added benefit of protecting a number of other threatened plant species and will help prevent the disease from further impacting the threatened community.

[2] Anne Cochrane, Manager, CALM Threatened Flora Seed Centre
[3] Russell Smith, Ecologist, Phosphite Program, CALM Bunbury
[4] Amanda Shade, Horticulturalist, Botanic Garden and Parks Authority
[5] Colin Crane, Senior Technical Officer, CALM Kensington

Action: Apply phosphite
Responsibility: CALM (South West Capes District, Dieback Disease Coordinator) through the CFRTFCRT
Cost: $1,600 per year.

3. Monitor the impact of phosphite application

The impact of the application of phosphite on *Brachysema papilio* and on the control of *Phytophthora cinnamomi* will be monitored.

Action: Monitor the impact of phosphite application
Responsibility: CALM (South West Capes District, Dieback Disease Coordinator) through the CFRTFCRT
Cost: $600 per year.

4. Implement disease hygiene measures

The area that contains *Brachysema papilio* is inundated over the winter months, and this favours the establishment and spread of *Phytophthora* species. Many flora species in the plant community are presumed susceptible to this disease. It is necessary to maintain disease hygiene measures, to reduce the likelihood of introducing or amplifying the impacts of the disease. Access to the area will be restricted, especially when the soil is moist. A sign advising of the dieback risk will be posted at this site.

Action: Implement disease hygiene measures
Responsibility: CALM (South West Capes District) through the CFRTFCRT
Cost: $1,400 in the first year.

5. Propagate plants for translocation

The propagation of plants in readiness for translocation is essential as the known wild population of *Brachysema papilio* is under threat. Seed and/or cuttings will be required for germination and propagation at the BGPA for planting in the following year.

Action: Propagate plants for translocation
Responsibility: CALM (South West Capes District) and the BGPA through the CFRTFCRT
Cost: $2,800 in the first and second years.

6. Undertake and monitor translocation

Although translocations are generally undertaken under full Recovery Pans, the many threats to the wild population of this species indicates a translocation is needed within the time frame of this IRP. This will be coordinated by the CFRTFCRT. Information on the translocation of threatened animals and plants in the wild is provided in CALM Policy Statement No. 29 *Translocation of Threatened Flora and Fauna*. All translocation proposals require endorsement by the Director of Nature Conservation.

Brachysema papilio will be translocated into two previously selected sites. Two other critically endangered species, *Grevillea maccutcheonii* and *Lambertia echinata* subsp. *occidentalis,* have already been translocated into these sites. The areas contain a similar soil type and vegetation to the habitat of the known population. Monitoring of the translocation is essential and will be undertaken according to the timetable that will be developed for the Translocation Proposal.

Action: Undertake and monitor translocation
Responsibility: CALM (South West Capes District, CALMScience) through the CFRTFCRT
Cost: $13,600 in first year and $5,200 in subsequent years.

7. Undertake weed control

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

1. Selection of appropriate herbicides after determining which weeds are present.
2. Controlling invasive weeds by hand removal or spot spraying around *Brachysema papilio* plants when weeds first emerge.
3. Scheduling weed control to include spraying at other threatened flora populations within the district.

The tolerance of associated native plant species to herbicides at the site of *Brachysema papilio* is not known and weed control programs will be undertaken in conjunction with research (Recovery Action 13).

Action: Undertake weed control
Responsibility: CALM (South West Capes District, CALMScience) through the CFRTFCRT
Cost: $500 per year.

8. Develop and implement a fire management strategy

Fire appears to kill most adult plants, with recruitment occurring from seed and rootstocks. Frequent fire may prevent the accumulation of sufficient soil stored seed and deplete and the reserves held in rootstocks of individual plants. As the habitat was burnt in 1992, there will therefore be no planned burns in the area for the life of this IRP. A fire management strategy will be developed that describes fire control measures, and timing and fire frequency.

Action: Develop and implement a fire management strategy
Responsibility: CALM (South West Capes District) through the CFRTFCRT
Cost: $2,300 in first year and $1,000 in subsequent years.

9. Monitor population

Annual monitoring of factors such as habitat degradation (including the impact of Pc), population stability (expansion or decline), weed invasion, pollination activity, seed production, recruitment, longevity and predation is essential. Salinity and groundwater levels, and depth and timing of inundation in the community will be monitored as part of the implementation of the recovery actions outlined in the IRP for the community 'Shrublands on southern Swan Coastal Plain Ironstones' (English 1999). Some *Brachysema papilio* plants on the extremities of the population have brown foliage that may be occurring as a result of sun exposure or ageing. The foliage health will also be monitored.

Action: Monitor population
Responsibility: CALM (South West Capes District) through the CFRTFCRT
Cost: $1,200 per year.

10. Collect seed

Preservation of germplasm is essential to guard against extinction if the wild population is lost. Seed collections are also needed to propagate plants for translocations. A small quantity of seed has been collected from the population but additional seed is required. Cuttings have been collected to increase the living genetic material at the BGPA.

Action: Collect seed
Responsibility: CALM (South West Capes District, TFSC) through the CFRTFCRT
Cost: $2,500 in first and second years.

11. Liaise with relevant land managers

Staff from CALM's South West Capes District will continue to liaise with relevant land managers to ensure the population is not accidentally damaged or destroyed. Due to the susceptibility of the habitat of this species to dieback caused by *Phytophthora* spp., the need for the application of dieback hygiene procedures will be included in information provided to land managers. This will stress the need to restrict the movement of soil into the habitat of the population.

A Notice of Intent to mine the private property adjacent to the population was issued in November 2000. CALM will liaise with both the proponent and the DEP regarding State environmental assessment of the proposal. It is anticipated the proposal will also be assessed under the new Commonwealth *Environmental Protection and Biodiversity Conservation Act* 1999.

Action: Liaise with relevant land managers
Responsibility: CALM (South West Capes District) through the CFRTFCRT
Cost: $1,100 per year.

12. Alter care control and management of habitat

Negotiations will continue to place the care, control and management of the area of State Forest that contains *Brachysema papilio* with the Conservation Commission as Class A reserve for the purpose of Conservation of Flora and Fauna.

Action: Alter care control and management of habitat
Responsibility: CALM (South West Capes District) through the CFRTFCRT
Cost: $500 in first and second years.

13. Obtain biological and ecological information

Increased knowledge of the biology and ecology of the species will provide a scientific basis for management of *Brachysema papilio* in the wild. Investigations will include:

1. Investigation of the impacts of dieback disease and control techniques on *Brachysema papilio* and its habitat.
2. Study of the soil seed bank dynamics and the role of various factors including disturbance (such as fire and weeds), competition, rainfall, and grazing in recruitment and seedling survival.
3. Determination of reproductive strategies, phenology and seasonal growth.
4. Investigation of the mating system and pollination biology.
5. Investigation of population genetic structure, levels of genetic diversity and minimum viable population size.

Action: Obtain biological and ecological information
Responsibility: CALM (CALMScience, South West Capes District) through the CFRTFCRT
Cost: $19,200 per year.

14. Promote awareness

The importance of biodiversity conservation and the protection of *Brachysema papilio* will be promoted to the public. Awareness will be encouraged in the community through a publicity campaign utilising the local print and electronic media and poster displays. Formal links with local naturalist groups and interested individuals will also be encouraged. An information sheet, that includes a description of the plant, its habitat type, threats, management actions and photos will be produced.

Due to the potential susceptibility of the habitat of this species to dieback caused by *Phytophthora* spp., the need for the application of dieback hygiene procedures will be included in information provided to people entering the habitat of *Brachysema papilio.*

Action: Promote awareness
Responsibility: CALM (South West Capes District, Corporate Relations, WATSCU) through the CFRTFCRT
Cost: $1,200 in first year and $800 in subsequent years.

15. Write a full Recovery Plan

At the end of the second year of implementation of this Interim Recovery Plan, the need for further recovery will be assessed. If the species is still ranked Critically Endangered, a full Recovery Plan will be developed to describe actions required for long-term maintenance. A Recovery Plan will be prepared with the benefit of knowledge gained over the time frame of this Interim Recovery Plan.

Action: Write a full Recovery Plan
Responsibility: CALM (WATSCU, South West Capes District) through the CFRTFCRT
Cost: $20,700 in third year.

4. TERM OF PLAN

This Interim Recovery Plan will operate from April 2001 to March 2004 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 replaced by a full Recovery Plan after three years.

5. ACKNOWLEDGMENTS

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

Colin Crane	Senior Technical Officer, CALMScience Division
Anne Cochrane	Manager, CALM Threatened Flora Seed Centre, CALMScience Division
Amanda Shade	Horticulturalist, Botanic Garden and Parks Authority
Russell Smith	Ecologist, Phosphite Program, CALM Central Forest Region, Bunbury
Greg Voigt	Operations Officer, CALM South West Capes District, Busselton
Andrew Webb	Technical Officer, CALMScience Division
Kim Williams	Program Leader Nature Conservation, CALM Central Forest Region, Bunbury

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7. TAXONOMIC DESCRIPTION

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Shrubs with wiry stems forming tangled clumps ascending to 1.5 m, often climbing through other shrubs; pilose to villous with white hairs on young growth, axes and calyces; leaves glabrescent. *Seedling leaves* opposite or a few subalternate, similar to adults but proportionately narrower, initially c. 5 mm long and broad, progressively increasing in size. *Adult leaves* spreading or ascending, opposite, mostly obcrescent-shaped, tending to transverse-narrow-rhombic or obtriangular, rigidly mucronate (almost pungent), often with a small (to 3 mm long) triangular lobe at apex, with margins undulate crenulate and recurved, rounded or cordate at base, 5-18 x 10-28 mm, coriaceous, paler beneath; petiole 1-3 mm long; stipules setaceous, recurved to curled, to 5 mm long. *Inflorescence* axillary or terminal on short axillary branchlets, racemose with 1(2) pairs of opposite flowers; rachis recurved, very slender and wiry, 15-30 mm long; bracts leaf-like or reduced to a trilobed structure 3 mm long; accessory inflorescences absent. *Flowers* pendulous, 18-22 mm long; pedicel filiform, 6-10 mm long. *Calyx* broad-campanulate, 12-13 mm long; lower three lobes 2-4 times longer than tube, narrow-

triangular, long-acute, incurved; upper two lobes united about halfway, triangular, acuminate. *Petals* cream to red, probably darkening with age; *standard* reflexed, narrow-oblong, retuse, with large rounded auricles, concave, constricted above auricles, c. 15 mm long including the 6 mm claw, c. 6 mm broad across auricles; claw with a flared base; *wings* narrow-elliptic, prominently auriculate, c. 18 x c. 4 mm including the c. 5 mm claw; *keel* half elliptic, rounded at apex, prominently auriculate, c. 20 x c. 6 mm including the c. 5 mm claws. *Stamens* incurved; anthers uniform, versatile, elliptic. *Disc* loosely sheathing the stipe of the ovary, crenulate, c. 0.5 mm high. *Ovary* stipitate, villous; ovules c. 12. *Pod* more or less enclosed by persistent calyx and petals, banana-shaped, 13-15 x c. 5 mm, villous; *seed* not seen.