WILLIAMS' SPIDER ORCHID

(*Caladenia williamsiae*)

INTERIM RECOVERY PLAN

2007-2012

May 2007

Department of Environment and Conservation
Kensington

Natural Heritage Trust
Helping Communities Helping Australia
An Australian Government Initiative

Government of Western Australia

Department of Environment and Conservation

FOREWORD

Interim Recovery Plans (IRPs) are developed within the framework laid down in Department of Conservation and Land Management (CALM) Policy Statements Nos. 44 and 50. Note: the Department of CALM formally became the Department of Environment and Conservation (DEC) in July 2006.

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

DEC is committed to ensuring that Threatened taxa and ecological communities 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This IRP will operate from May 2007 to April 2012 but will remain in force until withdrawn or replaced. It is intended that, if the species is still ranked as CR at the end of the five-year term, this IRP will be reviewed and the need for a further recovery actions assessed.

This IRP was given regional approval on 19 August 2008 and was approved by the Director of Nature Conservation on 12 September 2008. 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 May 2007.

IRP PREPARATION

This IRP was prepared by Craig Douglas[1], Marie Strelein[2], Greg Durell[3] and Amanda Fairs[4]

[1] Project Officer, Species and Communities Branch, DEC, Locked Bag 104, Bentley Delivery Centre.
[2] Flora Conservation Officer, Great Southern District, DEC, PO Box 100, Narrogin, WA, 6312.
[3] District Manager, Great Southern District, DEC, PO Box 100, Narrogin, WA, 6312.
[4] Project Officer, Species and Communities Branch, DEC, Locked Bag 104, Bentley Delivery Centre.

ACKNOWLEDGMENTS

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

Andrew Brown	Threatened Flora Coordinator, Species and Communities Branch, DEC
Kim Kershaw	Nature Conservation Coordinator, Albany Work Centre, DEC

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 Andrew Brown

CITATION

This IRP should be cited as:
Department of Environment and Conservation (2007) Williams' Spider Orchid (*Caladenia williamsiae*) Interim Recovery Plan 2007-2012. Interim Recovery Plan No. 277. Department of Environment and Conservation, Western Australia.

SUMMARY

Scientific Name	***Caladenia williamsiae***	**Common Name**	Williams' Spider Orchid
Family	Orchidaceae	**Flowering Period**	August – early September
DEC Region	Wheatbelt	**DEC District**	Great Southern
Shire	Brookton	**Recovery Team**	Great Southern District Threatened Flora Recovery Team
NRM Region	Avon		

Illustrations and/or further information: Department of Environment and Conservation (2007) *Western Australian Herbarium FloraBase 2 – Information on the Western Australian Flora* (accessed 2007). Department of Environment and Conservation, Western Australia. http://www.calm.wa.gov.au/science/; Hopper, S.D. and Brown, A.P. (2001) Contributions to Western Australian Orchidology: 2. New taxa and circumscriptions in *Caladenia* (Spider, Fairy and Dragon Orchids of Western Australia). *Nuytsia* **14(1/2)**: 301 (map) and 303-4.

Current status: *Caladenia williamsiae* was declared as Rare Flora in 2004 under the Western Australian *Wildlife Conservation Act 1950* and was ranked at that time as Critically Endangered (CR) under World Conservation Union (IUCN 2001) Red List criterion D, due to the species being known from less than 50 mature individuals. However, additional mature plants have since been found and the species no longer meets CR based on the above criterion. It is therefore proposed in Recovery Action 2 to recommend to the Threatened Species Scientific Committee (TSSC) that the ranking criteria of *Caladenia williamsiae* be amended from CR D to CR B1ab(v)+2ab(v); C2a(i). The species is listed as Endangered (EN) under the Commonwealth *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act 1999). The main threats are firebreak maintenance, grazing, inappropriate fire regimes, small population size and poor recruitment.

Caladenia williamsiae is known from four small populations totalling 101 mature plants in a Nature Reserve east of Brookton.

Description: *Caladenia williamsiae* is an erect tuberous perennial to 20 cm high. The distinctive short, broad leaf is erect, pale green, blotched with red-purple and 7 to 9 cm long by 15 to 18 mm wide. The one to three flowers are up to 3 cm across, yellow green with lines and spots of dull maroon. The petals are straight, horizontal with a slightly down-curved apex, 1.5 to 2.0 cm long by 1.5 to 2 mm wide. The sepals are distinctive as they are linear in basal half and then narrowing abruptly for 5 to 7 mm before expanding into and elongated dull maroon, hairy club. The three-lobed labellum which is prominently yellow-green to cream, with pink to dull maroon radiating stripes, terminates in a uniformly dark maroon recurved apex with four rows of ascending calli to 3 mm long. The column is 7 to 8 by 2 to 3 mm, narrowly winged, dark dull maroon with pale yellow blotches (Hopper and Brown 2001).

Habitat requirements: *Caladenia williamsiae* grows amongst low mallee *Eucalyptus* on lateritic ridges in yellow-brown sandy loam with gravel. The species has also been recorded from an area of open wandoo/jarrah woodland over scattered open shrubs in red loamy soil.

Habitat critical to the survival of the species, and important populations: Given that *Caladenia williamsiae* 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 the *C. williamsiae* includes the area of occupancy of the populations, areas of similar habitat surrounding the populations, these providing potential habitat for population expansion and for pollinators, additional occurrences of similar habitat that may contain undiscovered populations of *C. williamsiae* or be suitable sites 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: *Caladenia williamsiae* occurs with four Priority flora species listed in the table below. A possible collection of *Dryandra nivea* subsp. *uliginosa* (EN) was made from the same reserve but has not been relocated.

Conservation-listed flora species occurring in habitat of *Caladenia williamsiae*

Species name	Conservation Status (Western Australia)	Conservation Status (EPBC Act 1999)
Dryandra nivea subsp. *uliginosa* (?)	Endangered	Endangered
Leucopogon sp. Tutanning	Priority 2	-
Thysanotus parviflorum	Priority 2	-
Beaufortia sp. column	Priority 3	-
Stylidium tenuicarpum	Priority 4	-

DRF – Declared Rare Flora; for a description of the Priority categories see Atkins (2006)

Recovery actions implemented to improve the quality or security of *Caladenia williamsiae* will protect and improve the status of its habitat and associated Priority flora.

International obligations: This plan is fully consistent with the aims and recommendations of the Convention on Biological Diversity, ratified by Australia in June 1993, and will assist in implementing Australia's responsibilities under that convention. *Caladenia williamsiae* is not listed under any specific international treaty and this IRP does not affect Australia's obligations under any other international agreements.

Indigenous Consultation: Involvement of the indigenous community is being sought through the South West Aboriginal Land and Sea Council (SWALSC) and the Department of Indigenous Affairs to determine whether there are any issues or interests identified in the development of the recovery plan. A search of the Department of Indigenous Affairs Aboriginal Heritage Sites register has identified that all populations of *Caladenia williamsiae* occur within a registered site of Aboriginal significance. The site is named Nalya/Brookton (Site ID 5718). Continued liaison between DEC and the indigenous community will identify areas in which collaboration will assist implementation of recovery actions.

Social and economic impact: The implementation of this recovery plan is unlikely to cause significant adverse social and economic impacts as all populations are located in a Nature Reserve. However, the area has been identified as of Aboriginal significance.

Affected interests: The site has been identified as an area of Aboriginal significance and indigenous interest and involvement is currently being sought.

Evaluation of the plan's performance: The Department of Environment and Conservation (DEC), in conjunction with the Great Southern District Threatened Flora Recovery Team (GSDTFRT) 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. During 2004 to 2006 DEC staff and members of the Western Australian Native Orchid Survey and Conservation Group (WANOSCG) undertook extensive surveys of Nature Reserves and road reserves south-east and south-west of Brookton. No further populations of the species were found.
2. *Caladenia williamsiae* has been brought to public attention through the local print media with articles in regional newspapers and through the distribution of an information brochure.
3. *Caladenia williamsiae* is one of the target species of a Lotterywest funded project aimed to recover critically endangered species**.** The project partners include the Western Australian Native Orchid Study and Conservation Group (WANOSCG), the Friends of Kings Park, Wheatbelt Landcare Groups, the University of Western Australia, the Botanic Gardens and Parks Authority and DEC.
4. The GSDTFRT is overseeing the implementation of this IRP and will include the species in its annual report to DEC's Corporate Executive and funding bodies.
5. Staff from DEC's Great Southern District are monitoring all known populations.

IRP objective: The objective of this IRP is to abate identified threats and maintain or enhance viable *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. Propose criteria change
3. Monitor populations
4. Conduct further surveys
5. Collect seed and other material to preserve genetic diversity
6. Obtain biological and ecological information
7. Promote awareness
8. Develop and implement a fire management strategy
9. Map habitat critical to the survival of *Caladenia williamsiae*
10. Prepare a translocation proposal
11. Review the Plan and the need for further recovery actions

1. BACKGROUND

History

Caladenia williamsiae was first collected by Judy Williams (in whose honour the species is named) in 1999 and verified as a new species in 2000 by Andrew Brown. The species was formally described by Stephen Hopper and Andrew Brown in 2001 (Hopper and Brown, 2001). The type specimen was collected from red loamy soil in open wandoo/jarrah woodland over scattered open shrubs. Recent surveys have shown that this habitat appears marginal as other populations occur on lateritic ridges in yellow-brown sandy-loam with gravel supporting low mallee *Eucalyptus* over mid-dense scrub of *Allocasuarina, Dryandra* and *Hakea* (Andrew Brown personal communication[1]).

In 2003, Department of Environment and Conservation (DEC) staff, with assistance from flora volunteers, surveyed for *Caladenia williamsiae* and located Populations 2 and 3.

In 2005, a DEC volunteer discovered Population 4.

Caladenia williamsiae is known from four populations totalling approximately 101 mature plants in a reserve east of Brookton.

Description

Caladenia williamsiae is an erect tuberous perennial to 20 cm high. The distinctive short, broad leaf is erect, pale green, blotched with red-purple and 7 to 9 cm long by 15 to 18 mm wide. The one to three flowers are up to 3 cm across, yellow green with lines and spots of dull maroon. The petals are straight, horizontal with a slightly down-curved apex, 1.5 to 2.0 cm long by 1.5 to 2 mm wide. The sepals are distinctive as they are linear in basal half and then narrowing abruptly for 5 to 7 mm before expanding into and elongated dull maroon, hairy club. The three-lobed labellum which is prominently yellow-green to cream, with pink to dull maroon radiating stripes, terminates in a uniformly dark maroon recurved apex with four rows of ascending calli to 3 mm long. The column is 7 to 8 by 2 to 3 mm, narrowly winged, dark dull maroon with pale yellow blotches (Hopper and Brown, 2001).

The short broad leaf of *Caladenia williamsiae*, its small greenish-yellow flowers with four rows of calli on the labellum and sepals abruptly narrowed above the clubs are characteristics not seen elsewhere in *Caladenia* subgenus *Calonema* and makes *Caladenia williamsiae* easily identifiable (Hopper and Brown 2001).

Distribution and habitat

Caladenia williamsiae has a severely restricted geographic range with an area of occupancy less than 100m^2 in a reserve east of Brookton.

Habitat is shallow yellow-brown sandy-loam with gravel on lateritic ridges supporting low mallee *Eucalyptus* over mid-dense scrub of *Allocasuarina, Dryandra* and *Hakea*. The species also occurs more rarely in red loamy soils in open wandoo/jarrah woodland over scattered open shrubs.

Species associated with *Caladenia williamsiae* include *Eucalyptus wandoo, E. accedens, E. drummondii, Hypocalymma angustifolium, Hibbertia exasperata, Xanthorrhoea preisii, Trymalium ledifolium, Dryandra nobilis, Allocasuarina huegeliana, A. humilis, Petrophile divaricata, Hakea gilbertii, H. lissocarpha, Leptospermum erubescens, Melaleuca seriata, Dryandra nivea, Stylidium tenuicarpum, Beaufortia* sp. column *Banksia sphaerocarpa* and *Leucopogon conostephioides.*

Summary of population land vesting, purpose and management

Pop. No. & Location	DEC District	Shire	Vesting	Purpose	Manager
1. E of Brookton (Nature Reserve)	Great Southern	Brookton	Conservation Commission of Western Australia	Conservation of Flora and Fauna	DEC

[1] Andrew Brown, Threatened Flora Coordinator, DEC

Pop. No. & Location	DEC District	Shire	Vesting	Purpose	Manager
2. E of Brookton (Nature Reserve)	Great Southern	Brookton	Conservation Commission of Western Australia	Conservation of Flora and Fauna	DEC
3. E of Brookton (Nature Reserve)	Great Southern	Brookton	Conservation Commission of Western Australia	Conservation of Flora and Fauna	DEC
4. E of Brookton (Nature Reserve)	Great Southern	Brookton	Conservation Commission of Western Australia	Conservation of Flora and Fauna	DEC

Populations in **bold text** are considered to be Important Populations

Biology and ecology

Little is known about the specific biology of *Caladenia williamsiae* but it is likely to be similar to other spider orchids in subgenus *Calonema*.

Caladenia species are deciduous plants that survive the dry, hot conditions of summer as a dormant tuber. The tuber resprouts in autumn with the onset of cooler and moister conditions.

Caladenia williamsiae flowers in August and September. While no specific information is available on the species its dull yellow-green and maroon colouration and clubbed sepals indicate that it is likely to be pollinated by sexually attracted male thynnid wasps (Stoutamire, 1983).

Caladenia williamsiae seed capsules are mature by November. The seed of *Caladenia* species is very small and easily dispersed by the wind.

Seeds germinate at the start of the winter wet season and seedlings develop until the onset of dry conditions. Seeds that fail to germinate by then die (Batty *et al*, 2001).

The role of fire in the ecology of *Caladenia williamsiae* is unclear and requires investigation. Whilst many *Caladenia* species flower best following hot summer fires (Jones, 1988), it is unlikely that *C. williamsiae* is dependent on fire for flowering.

Caladenia williamsiae occurs in association with a symbiotic mycorrhizal fungus. All terrestrial orchids have a complex relationship with mycorrhizal fungi which are important for seed germination and the growth of adult plants (Rasmussen, 1995). Mycorrhizal fungi are likely to be important in mediating the uptake of nutrients, water, carbohydrates and vitamins (Arditti, 1992).

Threats

Caladenia williamsiae was declared as Rare Flora in 2004 under the Western Australian *Wildlife Conservation Act 1950* and was ranked at that time as Critically Endangered (CR) under World Conservation Union (IUCN 2001) Red List criterion D, due to the species being known from less than 50 mature individuals. However, additional mature plants have since been found and the species no longer meets CR based on the above criteria. It is therefore proposed in Recovery Action 2 to recommend to the Threatened Species Scientific Committee (TSSC) that the ranking criteria of *Caladenia williamsiae* be amended from CR D to CR B1ab(v)+2ab(v); C2a(i). The species is listed as Endangered (EN) under the Commonwealth *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act 1999). The main threats are firebreak maintenance, grazing, inappropriate fire regimes, small population size and poor recruitment.

- **Firebreak maintenance** threatens Populations 2 and 3 as plants are located along their edge. Relevant land managers should be informed of the location of these populations and the requirements for protection.
- **Grazing.** Rabbit and/or kangaroo grazing is a threat to all populations. Disturbance of soil by grazers and increased nutrient levels from droppings may also impact plants and encourage weeds. Grazing of seedlings may limit natural recruitment, and grazing of adult plants during the growing season may remove flowers and disrupt the production of replacement tubers.
- **Inappropriate fire regimes** The role of fire in the ecology of *Caladenia williamsiae* is unknown. However, fire may kill the species during its active growing period and should be excluded from populations between April and October.

- **Small population size and poor recruitment**. As *Caladenia williamsiae* populations are small and all occur in a single Nature Reserve, the likelihood of the species falling victim to chance episodic or environmental events is high.

The intent of this plan is to provide actions that will deal with immediate threats to *Caladenia williamsiae*. 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. Demographic

Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants		Current Condition	Threats
1. E of Brookton	Nature Reserve	2000	11	Healthy	Grazing, small population size and poor recruitment,
		2001	6		
		2003	14		
		2006	5		
2. E of Brookton	Nature Reserve	2003	102	Healthy	Grazing, firebreak maintenance, small population size and poor recruitment
		2006	64		
3. E of Brookton	Nature Reserve	2003	27	Moderate	Grazing, firebreak maintenance, grazing, small population size and poor recruitment
		2005	38		
		2006	25		
4. E of Brookton	Nature Reserve	2005	2	Healthy	Grazing, small population size and poor recruitment
		2006	7		

Populations in **bold text** are considered to be Important Populations

Guide for decision-makers

Section 1 provides details of current and possible future threats. Developments and/or land clearing in the immediate vicinity of populations of *Caladenia williamsiae* require assessment. No developments or clearing should be approved unless the proponents can demonstrate that their actions will not have an 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 *Caladenia williamsiae* 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 the *C. williamsiae* includes the area of occupancy of the populations, areas of similar habitat surrounding the populations, these providing potential habitat for population expansion and for pollinators, additional occurrences of similar habitat that may contain undiscovered populations of *C. williamsiae* or be suitable sites 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

Caladenia williamsiae occurs with four Priority flora species listed in the table below. A possible collection of *Dryandra nivea* subsp. *uliginosa* (EN) was made from the same reserve but has not been relocated.

Conservation-listed flora species occurring in habitat of *Caladenia williamsiae*

Species name	Conservation Status (Western Australia)	Conservation Status (EPBC Act 1999)
Dryandra nivea subsp. *uliginosa* (?)	Endangered	Endangered
Leucopogon sp. Tutanning	Priority 2	-
Thysanotus parviflorum	Priority 2	-
Beaufortia sp. column	Priority 3	-
Stylidium tenuicarpum	Priority 4	-

DRF – Declared Rare Flora; for a description of the Priority categories see Atkins (2005)

Recovery actions implemented to improve the quality or security of *Caladenia williamsiae* will protect and improve the status of its habitat and associated Priority flora.

International obligations

This plan is fully consistent with the aims and recommendations of the Convention on Biological Diversity, ratified by Australia in June 1993, and will assist in implementing Australia's responsibilities under that convention. *Caladenia williamsiae* is not listed under any specific international treaty and this IRP does not affect Australia's obligations under any other international agreements.

Indigenous Consultation

Involvement of the indigenous community is being sought through the South West Aboriginal Land and Sea Council (SWALSC) and the Department of Indigenous Affairs to determine whether there are any issues or interests identified in the development of the recovery plan. A search of the Department of Indigenous Affairs Aboriginal Heritage Sites register has identified that all populations of *Caladenia williamsiae* occur within a registered site of Aboriginal significance. The site is named Nalya/Brookton (Site ID 5718).

Continued liaison between DEC and the indigenous community will identify areas in which collaboration will assist implementation of recovery actions.

Social and economic impact

The implementation of this recovery plan is unlikely to cause significant adverse social and economic impacts as all populations are located in a Nature Reserve. However, the area has been identified as of Aboriginal significance.

Affected interests

The site has been identified as an area of Aboriginal significance and indigenous interest and involvement is currently being sought.

Evaluation of the plan's performance

DEC, in conjunction with the Great Southern District Threatened Flora Recovery Team (GSDTFRT) 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 IRP is to abate identified threats and maintain or enhance viable *in situ* populations to ensure the long-term preservation of the species in the wild.

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.

3. RECOVERY ACTIONS

Existing recovery actions

During 2004 to 2006 DEC staff and members of the Western Australian Native Orchid Survey and Conservation Group (WANOSCG) undertook extensive surveys of Nature Reserves and road reserves south east and south west of Brookton. No further populations of the species were found.

Caladenia williamsiae has been brought to public attention through the local print media with articles in regional newspapers such as the Brookton telegraph (2001) and Narrogin Observer (2000). In 2006 an information brochure providing a description of the species and information about threats and recovery actions was developed. This was distributed to volunteer organisations, relevant authorities, the Western Australian Herbarium, local libraries and schools.

Caladenia williamsiae is one of the target species of a Lotterywest funded project aimed to recover critically endangered species**.** The project partners include WANOSCG, the Friends of Kings Park, Wheatbelt Landcare Groups, the University of Western Australia, the Botanic Gardens and Parks Authority and DEC.

The GSDTFRT is overseeing the implementation of this IRP and will include it in its annual report to DEC's Corporate Executive and funding bodies.

Staff from DEC's Great Southern District are monitoring all known populations.

Future recovery actions

Where recovery actions are implemented on lands other than those managed by DEC, permission has been or will be sought from the appropriate land managers prior to actions being undertaken. The following recovery actions are roughly in order of descending priority, influenced by their timing over the term of the plan. However this should not constrain addressing any of the priorities if funding is available for 'lower' priorities and other opportunities arise.

1. Coordinate recovery actions

The Great Southern District Threatened Flora Recovery team (GSDTFRT) will coordinate recovery actions for *Caladenia williamsiae* and other Declared Rare Flora in their District. They will include information on progress in their annual report to DEC's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: GSDTFRT
Cost: $1,400 annually.

2. Propose ranking criteria change

Propose to the next meeting of the Threatened Species Scientific Committee (TSSC) that the ranking criteria of *Caladenia williamsiae* be amended from CR D to CR B1ab(v)+2ab(v); C2a(i). The species no longer meets criteria for CR D as there are now more than 50 mature plants known.

Action: Propose ranking criteria change
Responsibility: DEC (Species and Communities Branch and Great Southern District) through the GSDTFRT
Cost: $1,000 in first year.

3. Monitor populations

Annual monitoring of populations to evaluate population health, population stability (expansion or decline), pollination activity, seed production, recruitment, longevity, threats and predation is essential.

Action: Monitor populations
Responsibility: DEC (Great Southern District) through GSDTFRT
Cost: $2,100 annually.

4. Conduct further surveys

It is recommended that areas of potential habitat be surveyed for the presence of *Caladenia williamsiae*. This will be done during the species flowering period between August and September, with assistance from local naturalists, community volunteers, wildflower societies and naturalists clubs.

Action: Conduct further surveys
Responsibility: DEC (Great Southern District) through GSDTFRT
Cost: $6,100 in year 1 and $4,100 in years 3 and 5.

5. Collect seed and other material to preserve genetic diversity

Preservation of genetic material is essential to guard against extinction of the species if the wild populations are lost and it is recommended that seed and other material be collected and stored. Collections should aim to sample the maximum range of genetic diversity possible. This should be determined by an appropriate molecular technique such as genetic fingerprinting. The *Germplasm Conservation Guidelines for Australia* produced by the Australian Network for Plant Conservation (ANPC, 1995) should be used to guide this process.

Action: Collect seed and other material to preserve genetic diversity
Responsibility: DEC (Great Southern District) and BGPA through GSDTFRT
Cost: $3,400 in years 1, 3 and 5.

6. Obtain biological and ecological information

Improved knowledge of the biology and ecology of *Caladenia williamsiae* will provide a scientific basis for management of wild populations. An understanding of the following is necessary for effective management:

1. Identify the fungal symbiont associated with *Caladenia williamsiae.*
2. Investigate longevity of plants and time taken to reach maturity.
3. Investigate the species' response to disturbance e.g. fire, grazing.
4. Investigate the species' pollination biology and identification of pollinators.
5. Investigate seed longevity and viability.
6. Investigate conditions necessary for germination.

Actions: Obtain biological and ecological information
Responsibility: DEC (Science Division, Great Southern District), BGPA through the GSDTFRT
Cost: $13,000 per year in years 1 to 3; $18,000 in year 4.

7. Promote awareness

The importance of biodiversity conservation and the protection of *Caladenia williamsiae* will be promoted to the public through an information campaign using local print and electronic media and by setting up poster displays. An information brochure that provides a description of the species and information about threats and recovery actions has been developed for *Caladenia williamsiae* and will be distributed to local land owners, relevant authorities and volunteer organisations. Promotion and awareness raising activities may result in the discovery of new populations. Formal links with local naturalist groups and interested individuals should also be encouraged.

To minimise the risk of destruction, it is recommended that the exact location of *Caladenia williamsiae* be kept from the general public. Such information should, however, be provided to relevant government authorities.

Action: Promote awareness
Responsibility: DEC (Great Southern District, Species and Communities Branch (SCB) and Strategic Development and Corporate Affairs Division) through the GSDTFRT
Cost: $1,000 annually.

8. Develop and implement a fire management strategy

Fire is likely to influence the persistence of *Caladenia williamsiae* populations. Inappropriate fire regimes can result in plant deaths and may impact on seedling recruitment and mortality. An appropriate fire management strategy will be developed that will include protective measures from prescribed burning and wildfire.

Action: Develop and implement a fire management strategy
Responsibility: DEC (Great Southern District) through the GSDTFRT, and relevant authorities
Cost: $2,900 in year 1, and $1,700 per year in years 2 to 5.

9. Prepare a translocation proposal

Although the populations of *Caladenia williamsiae* occur within a Nature Reserve, its restricted distribution makes the species particularly vulnerable to chance threatening processes. It is recommended that a translocation proposal for the species be prepared.

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.

Action: Prepare a translocation proposal
Responsibility: DEC (Great Southern District) through the GSDTFRT
Cost: $2,800 in year 2.

10. Map habitat critical to the survival of *Caladenia williamsiae*

It is a requirement of the EPBC Act that spatial data relating to critical habitat for the species be determined. Although critical habitat is described in Section 1, the areas described have not yet been mapped and this will be addressed under this action. If additional populations are located, then critical habitat will also be determined and mapped for them.

Action: Map habitat critical to the survival of *Caladenia williamsiae*
Responsibility: DEC (Great Southern District, SCB) through GSDTFRT
Cost: $3,100 in year 1.

11. Review the Plan and the need for further recovery actions

At the end of the five-year term of this IRP, the Plan will be reviewed and the need for further recovery actions assessed.

Action: Review the Plan and need for further recovery actions
Responsibility: DEC (SCB, Great Southern District) through GSDTFRT
Cost: $1,500 in year 5.

Summary of recovery actions

Recovery Actions	Priority	Responsibility	Completion date
Coordinate recovery actions	High	GSDTFRT	Ongoing
Propose ranking criteria change	High	DEC (SCB and Great Southern District) through the GSDTFRT	2008
Monitor populations	High	DEC (Great Southern District) through GSDTFRT	Ongoing
Conduct further surveys	High	DEC (Great Southern District) through GSDTFRT	Ongoing
Collect seed and other material to preserve genetic diversity	High	DEC (Great Southern District) and BGPA through GSDTFRT	Ongoing
Obtain biological and ecological information	High	DEC (Science Division, Great Southern District), BGPA through the GSDTFRT	2010
Promote awareness	High	DEC (Great Southern District, SCB and Strategic Development and Corporate Affairs Division) through the GSDTFRT	Ongoing
Develop and implement a fire management strategy	High	DEC (Great Southern District) through the GSDTFRT, and relevant authorities	Developed by 2008 with implementation

			ongoing
Prepare a translocation proposal	High	DEC (Great Southern District) through the GSDTFRT	2008
Map habitat critical to the survival of *Caladenia williamsiae*	Moderate	DEC (Great Southern District, SCB) through GSDTFRT	2008
Review the Plan and the need for further recovery actions	Moderate	DEC (SCB, Great Southern District) through GSDTFRT	2012

4. TERM OF PLAN

This IRP will operate from May 2007 to April 2012 but will remain in force until withdrawn or replaced. If *Caladenia williamsiae* is still ranked CR after five years, the need for further recovery actions and an update of this IRP will be assessed.

5. REFERENCES

Atkins, K. (2006). *Declared Rare and Priority Flora List for Western Australia.* Department of Environment and Conservation, Perth, Western Australia.

Arditti J. (1992). *Fundamentals of Orchid Biology*. John Wiley & Sons, Canada.

Australian Network for Plant Conservation (1997) *Germplasm Conservation Guidelines for Australia, An introduction to the principles and practices for seed and germplasm banking of Australian Species*. Canberra, Australian Network for Plant Conservation Germplasm Working Group.

Batty, A.L., Dixon, K.W., Brundrett, M. and Sivasithamparam, K. (2001b). Constraints to symbiotic germination of terrestrial orchid seed in mediterranean bushland. *New Phytologist* 152:511-520.

Department of Conservation and Land Management (1992) Policy Statement No. 44 *Wildlife Management Programs*. Department of Conservation and Land Management, Perth, Western Australia.

Department of Conservation and Land Management (1994) Policy Statement No. 50 *Setting Priorities for the Conservation of Western Australia's Threatened Flora and Fauna*. Department of Environment and Conservation, Perth, Western Australia.

Department of Conservation and Land Management (1995) Policy Statement No. 29 *Translocation of Threatened Flora and Fauna* Department of Conservation and Land Management, Perth, Western Australia.

Department of Environment and Conservation (2007) *Western Australian Herbarium FloraBase 2 – Information on the Western Australian Flora*. Department of Environment and Conservation, Western Australia. http://www.calm.wa.gov.au/science/.

Hopper, S.D. and Brown, A.P. (2001) Contributions to Western Australian Orchidology: 2. New taxa and circumscriptions in *Caladenia* (Spider, Fairy and Dragon Orchids of Western Australia). *Nuytsia* **14(1/2)**: 27-308.

Jones, D.L. (1988). *Native Orchids of Australia*. Reed Books, NSW.

Rasmussen H.N. (1995). *Terrestrial orchids from seed to mycotrophic plant*. Cambridge University Press, Great Britain.

Soutamire, W.P. (1983). Wasp-pollinated species of *Caladenia* (Orchidaceae) in South-western Australia. *Aust. J. Bot*. 31:383-394.

World Conservation Union (2001) *IUCN Red List Categories: Version 3.1*. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK.

6. TAXONOMIC DESCRIPTION

Excerpt from: Hopper, S.D. and Brown, A.P. (2001) Contributions to Western Australian Orchidology: 2. New taxa and circumscriptions in *Caladenia* (Spider, Fairy and Dragon Orchids of Western Australia). *Nuytsia* **14(1/2)**: 301 (map) and 303-4.

Plant usually solitary. *Leaf* erect, broadly linear, 7-9 cm x 15-18 mm, pale green, basal third irregularly blotched with red-purple. *Scape* 15-20 cm tall. *Flowers* 1 or 2(3), approx. 3 cm across, predominantly yellow green with variable suffusions, lines and spots of dull maroon; floral odour unknown. *Sepals and petals* stiffly held, the

sepals linear in basal half, then abruptly narrowing for 5-7 mm before expanding to an osmosphore; osmosphore elongate, tumescent, dull maroon, 3-4 mm long, consisting of minute densely packed globular sessile glandular cells. *Dorsal sepal* erect and incurved, 1.5-2 cm x 1-1.5 mm. *Lateral sepals* straight with apex spreading obliquely downwards, 1.5-2.0 cm x 2-2.5 mm. *Petals* straight, horizontal with a slightly down-curved apex, 1.5-2.0 cm x 1.5-2 mm. *Labellum* 3-lobed, prominently 2-coloured, yellow-green to cream, with pink to dull maroon radiating stripes, terminating in a uniformly dark maroon recurved apex, stiffly articulate on a claw approx. 1.5 mm wide; lamina narrowly cordate with an acute apex in outline when flattened, 6-8 x 3-4 mm, basal third curving from erect to oblique, middle third ascending, apical third sharply recurved, margins at widest point scarcely curved upwards and terminated by ascending calli; lateral lobes erect to obliquely ascending with entire margins near the claw, becoming fimbriate with slender slightly clubbed linear cream to dull maroon calli to 3 mm long which are abruptly decrescent near midlobe; midlobe margins with short slender slightly forward-facing obtuse sometimes hooked calli decrescent towards the apex. *Lamina calli* in 2 pairs of rows (with a clear gap between them) extending at least ¾ the length of the labellum, dark maroon, slightly falcate and capitate, the longest approx. 1 mm tall, decrescent towards apex and becoming sessile. *Column* 7-8 x 2-3 mm, narrowly winged, dark dull maroon with pale yellow blotches. *Anther* approx. 1.5 x 1.5 mm, yellow-maroon. *Pollinia* not seen. *Stigma* approx. 1.5 mm wide, dark dull maroon. *Capsule* not seen.

The short broad leaf of *Caladenia williamsiae*, its small greenish-yellow flowers with four rows of calli on the labellum and sepals abruptly narrowed above the osmosphore are characteristics not seen elsewhere in *Caladenia* subgenus *Calonema* and makes *C. williamsiae* easily identifiable.