



JOURNAL

M RECOVERY PLAN NO. 51

INTERIM RECOVERY PLAN

IEON'S GREVILLEA

51 (1999)

DEPARTMENT OF PARKS AND WILDLIFE

(GREVILLEA MACCUTCHEONII)

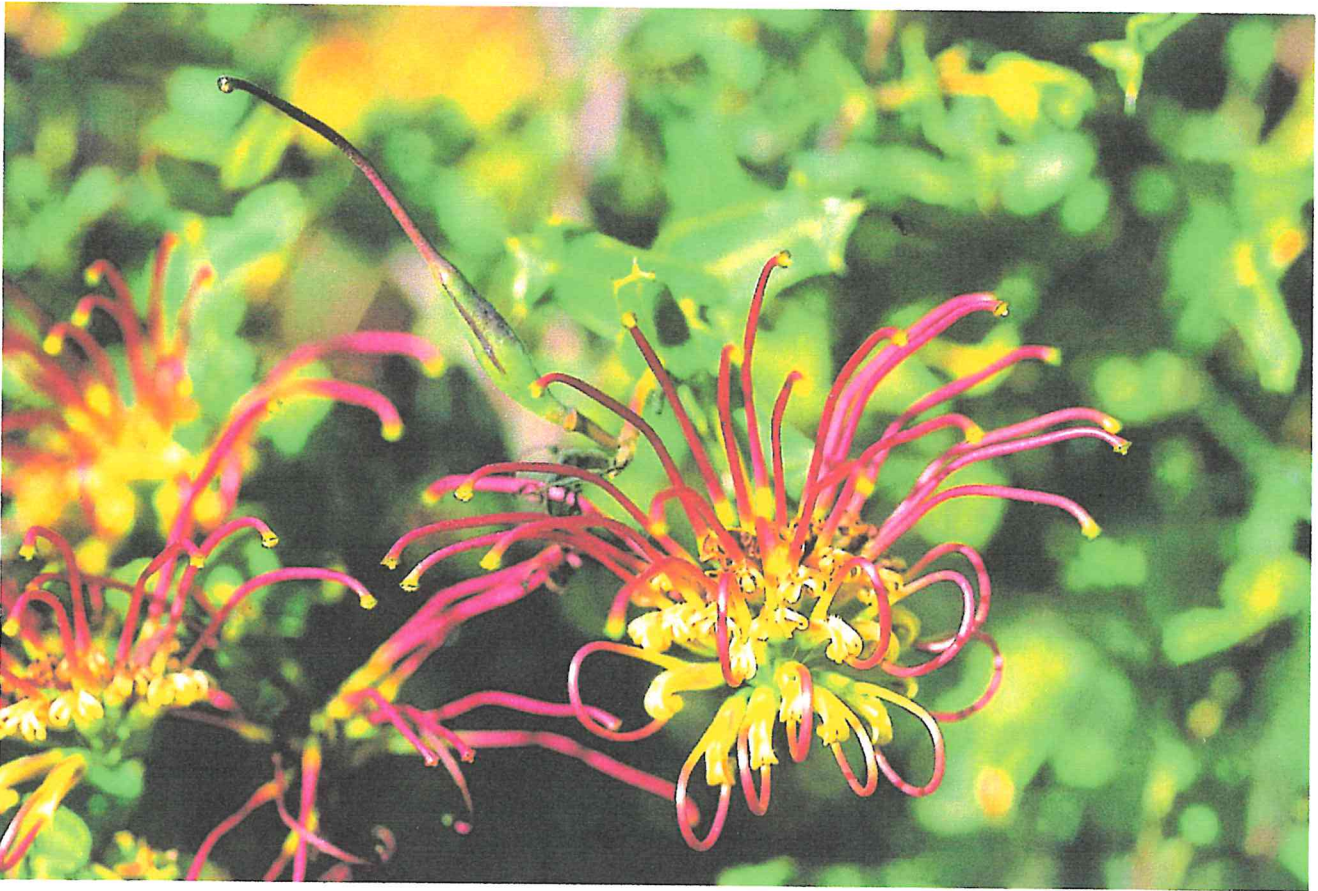
INTERIM RECOVERY PLAN

1999-2002

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Photograph: A. P. Brown

December 1999

Department of Conservation and Land Management
Western Australian Threatened Species and Communities Unit (WATSCU)
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Natural Heritage Trust
Helping Communities Helping Australia



Department of Conservation and Land
Management

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This Interim Recovery Plan will operate from December 1999 to November 2002 but will remain in force until withdrawn or replaced.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 2 February 2000. 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 December 1999.

SUMMARY

Scientific Name: *Grevillea maccutcheonii*

Common Name: McCutcheon's Grevillea

Family: Proteaceae

Flowering Period: July-November

CALM Region: Central Forest

CALM District: South West Capes

Shire: Busselton

Recovery Team: Central Forest Region Threatened Flora Recovery Team (CFTFRT)

Illustrations and/or further information: Keighery, G. J. and Cranfield, R. J. (1996). *Grevillea maccutcheonii* (Proteaceae), a new rare Grevillea from Western Australia. *Nuytsia* 11; 33-36; Brown, A., Thomson-Dans, C. and Marchant, N. (eds.). (1998). *Western Australia's Threatened Flora*. Department of Conservation and Land Management, Western Australia.

Current status: *Grevillea maccutcheonii* was declared as Rare Flora in August 1994 and ranked as Critically Endangered (CR) in September 1995. It currently meets World Conservation Union (IUCN) Red List category 'CR' under criteria B1+ 2c, C2a and D (IUCN 1994) due to the small population size and threats from grazing and clearing. *G. maccutcheonii* has specific habitat requirements and is naturally geographically restricted to the ironstone formations near Busselton. This soil type has been massively impacted by vegetation clearing in the past. The main threats include weed invasion, fire and disease.

Habitat requirements: *Grevillea maccutcheonii* was probably originally associated with tall shrubland, but its only remaining habitat is now very degraded. Soils are shallow red brown clay, associated with southern ironstone formations found at the base of the Whicher Range. The single known population grows on a mound of soil on a road reserve, which is approximately a metre high. The mound is probably a result of early road construction works. During winter months water flows along the road reserve, the adjacent paddock floods and the mound becomes surrounded by water.

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

1. All appropriate land managers have been informed of the species' location and the associated legal obligations.
2. Declared Rare Flora (DRF) markers have been installed at the population.
3. Dashboard stickers and posters describing the significance of DRF markers have been produced and distributed.
4. An A4 sized poster that provides a description of the species and information about threats and recovery actions has been developed for *Grevillea maccutcheonii*.
5. The single known population has been fenced to protect plants from road maintenance activities and grazing.
6. Part of the private property adjacent to the population was purchased by CALM in 1999 and is being rehabilitated.
7. Staff from the Botanic Gardens and Parks Authority (BGPA) have collected cutting material, and have successfully propagated plants for storage and future translocation.
8. A total of approximately 350 seeds were collected for CALM's Threatened Flora Seed Centre (TFSC) during 1994, 1995, 1998 and 1999.
9. The Central Forest Region Threatened Flora Recovery Team (CFRTFRT) is overseeing the implementation of this IRP.
10. Staff from CALM's South West Capes District Office regularly monitor the population.

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

Recovery Criteria

Criterion for success: The number of individuals within populations and/or the number of populations have increased.

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

Recovery actions

- | | |
|------------------------------------------------------------------------------------------|---------------------------------------------------|
| 1. Coordinate recovery actions. | 8. Collect seed and cutting material. |
| 2. Undertake weed control. | 9. Promote awareness. |
| 3. Develop and implement a fire management strategy. | 10. Obtain biological and ecological information. |
| 4. Monitor dieback and assess the need for disease treatment, implement disease hygiene. | 11. Propagate plants for translocation. |
| 5. Liaise with relevant land managers. | 12. Start translocation process. |
| 6. Monitor population. | 13. Monitor translocation. |
| 7. Rehabilitate habitat. | 14. Write full Recovery Plan. |

1. BACKGROUND

History

Grevillea maccutcheonii was first collected by G. Robertson prior to 1992. A specimen was given to G. McCutcheon, who recognised it as an undescribed species. Mr Robertson had not seen the species elsewhere in the area. The type specimen was collected from southeast of Busselton, in November 1993, and is lodged at the Western Australian Herbarium.

Despite intensive survey of the southern Swan Coastal Plain, and floristic records for the area dating back to the turn of the century, the site of the original collection is the only known location of the species. Comprehensive surveys of the flora and vegetation in the area, conducted between 1992 and 1994 by CALM (Gibson *et al.* 1994), also failed to locate other populations of the species, and it is likely that the recorded population contains the only remaining individuals of the taxon.

In 1993, *Grevillea maccutcheonii* was known from 27 plants, five on a road verge and 22 on the adjoining private property. During a survey of the population in September 1994 none of the plants were located on the private property site and the area was being grazed by cattle. The landowner volunteered to remove the cattle, and the site, which has since been purchased by CALM, continues to be monitored for regeneration of the species.

Road grading activities in 1995 reduced the population to four mature plants. Sixteen seedlings germinated over 1996/7, with four requiring translocation from areas of high threat (eg drain flow) to more secure ground. Three transplanted seedlings died, together with one that had not been transplanted. A mature plant died in January 1998 and an additional young plant died in April 1999, both from unknown causes. This resulted in a total of 14 individual plants.

A further five seedlings were located in June 1999 at the site of the dead mature plant following soil disturbance designed to stimulate germination. Of these, three are healthy but the remaining two are less vigorous. Steps have been taken to protect the seedlings from fungal attack and insect predation.

There is currently a total of 14 plants and four seedlings at the road reserve site. A substantial translocation of approximately 200 plants (propagated largely from cuttings by the BGPA) is planned for the year 2000.

Description

Grevillea maccutcheonii is a dense tall shrub to two metres tall. It has large, handsome red flowers and distinctive flattened three-lobed leaves that encircle the stem. The species is distantly related to *G. manglesioides* but differs in having completely glabrous vegetative and floral organs, and rigid, stem-clasping leaves and larger flowers. Flowering has been recorded between May and December, peaking in July to November.

Distribution and habitat

Grevillea maccutcheonii probably grew in tall shrubland, but the only remaining habitat is now very degraded. Soils are shallow red brown clay, associated with southern ironstone formations found at the base of the Whicher Range. The single known population grows on a mound of soil, which is approximately one metre high. The mound is probably a result of early road construction works. During winter months much of the road verge becomes a water channel, the adjacent paddock is flooded and the mound is surrounded by water.

Biology and ecology

Very little is known about the species. Seed is probably dehisced soon after maturity (typical for grevilleas). Longevity of the seed is unknown, as is the plant's life span. One large plant is split to its base and possibly approaching senescence.

The species may be a disturbance opportunist as seedlings have germinated on the road reserve in grader spoil.

Susceptibility of *Grevillea maccutcheonii* to the plant pathogen *Phytophthora cinnamomi* is unknown, but the Proteaceae in general are highly susceptible. *Phytophthora* has been recorded from nearby private property, 500 m south of the population. The occurrence of waterlogged soils and earth moving activity associated with road maintenance may predispose the plants to the infection.

One of the three year old *Grevillea maccutcheonii* plants died in 1999 from unknown causes. The plant had not been growing vigorously and had possibly not been able to penetrate the ironstone cap to access groundwater. Routine testing by CALMScience for *Phytophthora* presence proved negative. An unknown fungus was, however, detected within the stem of the dead plant. The identification and disease causing potential of this fungus are currently being investigated.

Apart from plants in BGPA and several private native gardens, *Grevillea maccutcheonii* is not known to be in cultivation. However, its compact habit, beautiful foliage, colourful flowers and extended flowering period would make it an attractive native plant for the nursery trade.

Threats

Because of the small population size and threats from grazing and clearing *Grevillea maccutcheonii* was declared as Rare Flora in August 1994, and ranked as Critically Endangered in September 1995. It currently meets World Conservation Union (IUCN) Red List category 'CR' under criteria B1+ 2c, C2a and D (IUCN 1994) due to the small population size and declining quality of the habitat. *Grevillea maccutcheonii* has specific habitat requirements and is restricted to the ironstone soils near Busselton. This soil type has been massively impacted by vegetation clearing in the past.

- **Weed invasion** is a major 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 high fuel loads that are produced annually by many grass weed species. Narrow linear populations such as road reserves are severely affected by weed invasion from adjacent cleared land.
- **Inappropriate fire regimes** would impact the viability of populations as seeds of *Grevillea maccutcheonii* probably germinate following fire. If this is the case, the soil seed bank would rapidly be depleted if fires recurred before regenerating or juvenile plants reached maturity and replenished the soil seed bank. In addition, fires generally stimulate weed invasion, and weeds have already infested the habitat of the known population. However, it is likely that occasional fires are required for the species to propagate from soil stored seed.
- **Disease** may be a serious threat to the population. *Phytophthora cinnamomi* is a plant pathogen that causes the roots to rot and results in plants dying of drought stress. The susceptibility of seedlings of *G. maccutcheonii* to dieback caused by *Phytophthora cinnamomi* is presently being tested by CALMScience.
- **Chemical drift** from herbicide and fertiliser applications from adjacent farmland may affect the species' growth and survival.

- **Road maintenance activities** threaten the population and its habitat. Threats include actions such as grading road reserves, spraying of chemicals, constructing drainage channels and mowing the roadside vegetation to improve visibility. These disturbance events also often encourage weed invasion into adjacent habitat, as well as causing damage to actual plants.
- **Competition:** There are several native species growing along the road reserve with *Grevillea maccutcheonii*, the dominant species being *Melaleuca incana*, *Viminaria juncea*, *Hakea* sp. Williamson, *Kunzea* aff. *micrantha*, *Loxocarya magna*, *Juncus microcephalus*, *Acacia* sp. and *Dryandra nivea* subsp. *uliginosa*. These species are pruned as necessary to reduce competition.

Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants	Condition	Threats
1A. SE Busselton	Shire road reserve	1993 8	Poor	Weed invasion, road maintenance activities, disease, chemical drift, competition, inappropriate fire regimes
		1994 5		
		1996 3, (10)		
		1998 14		
		1999 14, (4)		
1B. SE Busselton	Private Property	1993 22	Poor	Weed invasion, disease, chemical drift, inappropriate fire regimes
		1994 0		

Numbers in brackets are seedlings.

2. RECOVERY OBJECTIVE AND CRITERIA

Objective

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

Criterion for success: The number of individuals within populations and/or the number of populations have increased.

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

3. RECOVERY ACTIONS

Existing recovery actions

All appropriate people have been made aware of the location of *Grevillea maccutcheonii*. The local Shire and private property owners have been formally notified of the presence of the population on their lands. These notifications indicate the Declared Rare status of the taxon and the associated legal responsibilities.

Declared Rare Flora (DRF) markers have been installed at the population. These alert people working in the area to the presence of significant flora, helping to prevent accidental damage during maintenance operations. Awareness of the significance of these markers is being promoted to relevant bodies such as the Shire. To this end, dashboard stickers and posters have been produced and distributed. These illustrate DRF markers, inform of their purpose and provide a contact telephone number to use if such a marker is encountered.

An A4 sized poster that provides a description of the species and information about threats and recovery actions has been developed for *Grevillea maccutcheonii*. It is hoped that the poster will result in the discovery of new populations.

The single known population has been fenced to protect plants from road maintenance activities and grazing.

An area of 3.4 hectares of private property was purchased by CALM in 1999. This site is adjacent to the road reserve population of *Grevillea maccutcheonii* and has been fenced.

Staff of the BGPA have successfully grown the species from cutting material, and have 33 plants in the nursery and five plants growing in their garden. Additional plants have been grown from cuttings and there are now 200 plants available for translocation in 2000.

A total of approximately 350 seeds were collected for CALM's Threatened Flora Seed Centre (TFSC) during 1994, 1995, 1998 and 1999. Initially the germination rate was 77% and after one year in storage germination was 80%.

The Central Forest Region Threatened Flora Recovery Team (CFRTFRT) 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 recovery actions are implemented on lands other than those managed by CALM, permission has been or will be sought from the appropriate land managers prior to actions being undertaken.

1. Coordinate recovery actions

The CFRTFRT will continue to oversee the implementation of the recovery actions for *Grevillea maccutcheonii*.

Action: Coordinate recovery actions
Responsibility: CALM (South West Capes District) through the CFRTFRT
Cost: \$4,500 per year

2. Undertake weed control

Weeds are a threat to the population. 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 *Grevillea maccutcheonii* plants when weeds first emerge.
3. Scheduling weed control to include spraying at other threatened flora populations within the district.

The tolerance of *Grevillea maccutcheonii* and associated native plant species to herbicides is not known and weed control programs will be undertaken in conjunction with research (see recovery action 10).

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

3. Develop and implement a fire management strategy

Fire may kill adult plants of the species, and regeneration is likely to be largely from seed. However, too frequent fire may prevent the accumulation of sufficient soil stored seed to allow regeneration of the population. A fire management strategy will be developed to determine fire control measures and fire frequency.

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

4. Monitor dieback and assess the need for disease treatment, implement disease hygiene

The susceptibility of *Grevillea maccutcheonii* to *Phytophthora cinnamomi* is not known and is being investigated. Dieback hygiene (outlined in CALM 1992a) will therefore be adhered to, wherever possible, for activities such as grading of road shoulders by the Local Authority, installation and maintenance of firebreaks, and even walking into the population undertaken in wet soil conditions. Selective (hand spraying) or broad scale treatment with phosphite will be undertaken at the site if the species is found to be susceptible to dieback. Research conducted from 1992 to 1997 indicates that phosphite application is a very effective tool in controlling the impact of dieback disease (Murray, 1997).

Action: Monitor dieback and assess the need for disease treatment, implement disease hygiene
Responsibility: CALM (South West Capes District) through the CFRTFRT
Cost: \$800 in first and third years, and \$400 in second year.

5. 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.

Action: Liaise with relevant land managers
Responsibility: CALM (South West Capes District) through the CFRTFRT
Cost: \$500 per year

6. Monitor population

Monitoring of factors such as weed invasion, habitat degradation, salinity levels and population stability (expansion or decline), pollinator activity, seed production, recruitment, and longevity are essential. The population will be inspected at least annually.

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

7. Rehabilitate habitat

The habitat of *Grevillea maccutcheonii* will be rehabilitated through reintroduction of local plant species. Site rehabilitation will extend beyond the current boundary of the *G. maccutcheonii* population to discourage weed invasion and to provide a buffer for extant plants.

Action: Rehabilitate habitat
Responsibility: CALM (South West Capes District) through the CFRTFRT
Cost: \$9,000 in second year.

8. Collect seed and cutting material

A small quantity of seed has been collected from Population 1. Additional seed will be collected as required. Cuttings will also be collected to establish a living collection of genetic material at BGPA.

Action: Collect seed and cutting material
Responsibility: CALM (South West Capes District, TFSC), BGPA through the CFRTFRT
Cost: \$3,000 per year

9. Promote awareness

The importance of biodiversity conservation and the protection of the Critically Endangered *Grevillea maccutcheonii* will be promoted to the public. Formal links with local naturalist groups and interested individuals will also be encouraged.

Action: Promote awareness
Responsibility: CALM (WATSCU, South West Capes District, Corporate Relations) through the CFRTFRT
Cost: \$600 per year

10. Obtain biological and ecological information

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

1. Study of the soil seed bank dynamics and the role of various factors including disturbance, competition, rainfall and grazing on recruitment and seedling survival.
2. Determination of reproductive strategies, phenology and seasonal growth.
3. Investigation of the mating system and pollination biology.
4. Investigation of population genetic structure, levels of genetic diversity and minimum viable population size.
5. Investigation of the impacts of dieback disease and control techniques on *G. maccutcheonii* and its habitat.
6. The impact of changes in the level of salinity in the habitat.

Action: Obtain biological and ecological information
Responsibility: CALM (CALMScience, South West Capes District) through the CFRTFRT
Cost: \$15,600 per year

11. Propagate plants for translocation

The propagation of plants in readiness for translocation is essential as the only known population is under threat in the wild.

Action: Propagate plants for translocation
Responsibility: CALM (South West Capes District) and BGPA through the CFRTFRT
Cost: \$2,100 in first and second years

12. Start translocation process

Translocation is essential for the conservation of this species, as the total number of extant plants is low, and the only known population is not secure from threats. A substantial translocation is planned for the year 2000. This will be coordinated by the CFRTFRT. 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: Start translocation process
Responsibility: CALM (CALMScience, South West Capes District) through the CFRTFRT
Cost: \$12,800 in first year

13. Monitor translocation

The monitoring of experimental translocations is essential and will occur over the flowering period of this species.

Action: Monitor translocation
Responsibility: CALM (CALMScience, South West Capes District) through the CFRTFRT
Cost: \$5,400 in second and third years

14. Write full Recovery Plan

At the end of the three-year term 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 action 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 full Recovery Plan
Responsibility: CALM (WATSCU, South West Capes District) through the CFRTFRT
Cost: \$18,100 in third year

4. TERM OF PLAN

This Interim Recovery Plan will operate from December 1999 to November 2002 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:

Anne Cochrane	Manager, CALM Threatened Flora Seed Centre
Rebecca Evans	Project Officer, previously CALM Threatened Species and Communities Unit
Neil Gibson	Senior Research Scientist, CALMScience
Greg Keighery	Principal Research Scientist, CALMScience
Graham McCutcheon	Previously CALM Bunbury
Leonie Monks	Research Scientist, CALMScience
Gary Robertson	Local Tutunup farmer
Amanda Shade	Horticulturalist, Botanic Gardens and Parks Authority
Meredith Soutar	Officer, CALM South West Capes District
Greg Voigt	Operations Officer, CALM South West Capes District
Andrew Webb	Officer, previously CALM Central Forest Region
Kim Williams	Program Leader Nature Conservation, CALM Central Forest Region

Thanks also to the staff of the W.A. Herbarium for providing access to Herbarium databases and specimen information, and CALM's Wildlife Branch for their extensive assistance.

6. REFERENCES

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7. TAXONOMIC DESCRIPTION

Keighery G. J. and Cranfield R. J. (1996) *Grevillea maccutcheonii* (Protease), a New Rare *Grevillea* from Western Australia. *Nuytsia* 11 (1), 33-36.

Grevillea maccutcheonii is an erect spreading densely branched, domed shrub to 2m tall x 2m wide, not lignotuberous or suckering. *Branchlets* terete, glabrous, reddish green, young growth red. *Immature leaves* entire or with a single apical lobe. *Mature leaves* sessile, pandurate, 12-33 mm long (mean 19), 6-22 mm wide (mean 11), with a central sinus, base stem-clasping, amplexicaule, rigid, glabrous, with a distinct white margin, margin flat, 3-lobed, one lobe apical, the others shortly below on either side, each lobe terminating in a black pungent point c. 1 mm long, shiny green above, dull green below, mid vein prominent when dry on both surfaces. *Inflorescence* terminal, racemose 26-42 flowered, lower flowers more widely spaced than upper flowers; peduncle glabrous, 10-12 mm long; rachis glabrous, markedly decurved, usually simple, rarely two-branched; unit inflorescence 2-4 cm long, loosely hemispherical and secund to subsecund, acropetal. *Inflorescence bract* leaf-like, narrowly cordate. *Floral bracts* ovate c. 1 mm long, 1 mm wide, margin hairy, caducous when buds are small. *Pedicels* 2-3 long, glabrous, green, torus oblique. *Flowers* reddish green, acroscopic. *Perianth* 6-8 mm long, narrowly ovate-oblong below the curve, c. 3 mm wide, green, glabrous outside, inside margins of tepals with a line of hairs and bearded in the throat above the ovary. *Nectary* prominent, yellow, broadly lunate. *Pistil* 20-24 mm long, glabrous; stipe 2-3 mm long; ovary obliquely ovoid, 1-2 mm long, green; style red; pollen presenter at 90 degrees, almost round, green; stigma almost central. *Fruits* brown, narrowly and obliquely ovoid, 13-16 mm long, 5-6 mm wide, surface smooth, pericarp uniform and c. 0.5 mm thick. *Seeds* narrowly oblong, 7-8 mm long, 2-3 mm wide, outer face markedly convex, margin revolute, inner face channelled, eliasome lacking.