INTERIM RECOVERY PLAN NO. 41

SCOTT RIVER BORONIA
(*BORONIA EXILIS*)

INTERIM RECOVERY PLAN

1999-2002

by

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Photograph: Diana Papenfus

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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This Interim Recovery Plan will operate from August 1999 to July 2002 but will remain in force until withdrawn or replaced.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 10 October 1999. 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 August 1999.

SUMMARY

Scientific Name: ***Boronia exilis***
Common Name: Scott River boronia
Family: Rutaceae
Flowering Period: September
CALM Region: Central Forest
CALM District: South West Capes
Shire: Augusta – Margaret River
Recovery Team: Central Forest Region Threatened Flora Recovery Team (CFRTFRT)

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; Western Australian Herbarium (1999). FloraBase - Information on the Western Australian Flora. Department of Conservation and Land Management, Western Australia. http://www.calm.wa.gov.au/science/; Wilson, P. G. (1998). New names and new taxa in the genus *Boronia* (Rutaceae) from Western Australia, with notes on seed characters. *Nuytsia* 12: 119-154.

Current status: *Boronia exilis* was declared as Rare Flora in November 1997 and was ranked in November 1998 as Critically Endangered (CR). It currently meets World Conservation Union (IUCN) Red List category 'CR' under criterion B2c+3d (IUCN 1994) as it has a highly restricted distribution, fluctuating numbers of mature individuals and continued decline in the quality of the habitat from dieback disease. The main threats are disease, inappropriate fire regimes, road maintenance activities, weed invasion, the limited distribution of the populations, mining activities, commercial wildflower picking, and trampling.

Habitat requirements: It is thought that *Boronia exilis* is naturally rare, being found only in the Scott River area in seasonally wet heath or sedgelands on grey silty sand, with ironstone soils. The habitat at Population 4 is described as low *Banksia attenuata, B. ilicifolia* and *Eucalyptus marginata* woodland, over mixed Proteaceae and Myrtaceae scrub, and low sedgelands with pockets of low open Proteaceae, Myrtaceae heath (Williams *et al.* 1999).

Existing Recovery Actions: The following recovery actions have been or are currently being implemented:
1. A fence has been erected around Population 4 by the land manager.
2. DRF markers have been placed at Subpopulation 1b.
3. The Central Forest Region Threatened Flora Recovery Team is overseeing the implementation of this IRP.

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.
2. Confirm existing populations and conduct further survey.
3. Liaise with land managers.
4. Develop and implement a fire management strategy.
5. Monitor populations.
6. Collect seed and cutting material.
7. Install signs and DRF markers.
8. Negotiate to alter purpose of reserve at Population 1.
9. Promote awareness.
10. Monitor dieback and implement disease hygiene measures.
11. Obtain biological and ecological information.
12. Start translocation process.
13. Include general recommendations for *Boronia exilis* in Management Plan for Park.
14. Write full Recovery Plan.

1. BACKGROUND

History

The first known collection of *Boronia exilis* was made in 1881 by Miss Bunbury, from 'Port Augusta near Geographe Bay', and is housed at the National Herbarium of Victoria. *B. exilis* was not collected again until 1965, when A. C. Beauglehole surveyed east of Karridale. Neither population has been relocated, despite searching. During searching of the Scott Rover area in 1996, D. Papenfus was only able to locate the taxon at one site, which now represents Subpopulation 1c. The species is thought to exist in four other populations, however these populations have not been relocated since the initial collections. Confirmation of the current status of these populations is essential for the management of the species.

In 1990 Mattiske Consulting Pty Ltd completed a flora and vegetation survey for a mine site in the Scott River area. During this survey a specimen of *Boronia exilis* was collected (Population 4), the collection was verified by the WA Herbarium and subsequently vouchered for the WA Herbarium collection. This collection has not since been relocated. The collection does not appear on the WA Herbarium database and there is no accurate location information available. This report and a further report on the flora of the Scott National Park, by Mattiske Consulting Pty Ltd does, however, identify and map habitat types (Plant Community Code 3.2, 4.1, 4.3 and 4.5 – Mattiske Consulting Pty Ltd 1996a, 1996b). This may provide a means through which subsequent surveys may relocate this population. The above-mentioned mine site is being closed down and access to these sites for further survey may be possible in the near future.

Part Population 1 and its habitat was burnt in a fire in 1994. In 1996, survey indicated low numbers of plants of *Boronia exilis.* This suggests that regeneration of the species is not stimulated by fire (Papenfus 1997).

Description

Boronia exilis is thought to be part of the *Boronia juncea* complex but is taller and has pale pink/white flowers (Wilson 1998, cited in Williams *et al*. 1999). *B. exilis* is an erect slender-stemmed perennial to approximately 1 m high. Its upper leaves are slender and almost round in cross-section, to 1.5 cm long. The pink flowers are borne in clusters of 3 to 9 at the end of

branches. Each flower has four 4 mm long deep red, woolly sepals and four broadly ovate pink petals to 7 mm long. The specific name *exilis* is Latin and means slender and weak, referring to the stems of this species. *B. exilis* is similar to *B. juncea*, and particularly to the subsp. *laniflora*. It is most easily distinguished by its strongly fringed staminal filaments, which in *B. juncea* are hairless (Wilson 1998).

Distribution and habitat

Boronia exilis is apparently confined to the Scott River area and is only known from one recently verified population. Four other populations that were recorded in the past have not been relocated. The species appears to have a restricted range and very specific habitat. *B. exilis* is found in seasonally wet heath or sedgelands on grey silty sand, over ironstone. The habitat described as 'the Scott River Ironstone heaths' is an Endangered ecological community (English and Blyth 1997). The habitat at Population 4 is described as low *Banksia attenuata*, *B. ilicifolia* and *Eucalyptus marginata* woodland, mixed Proteaceae and Myrtaceae scrub, and low sedgelands with pockets of low open Proteaceae / Myrtaceae heath (Williams *et al.* 1999).

Surveys by CALM staff and Mattiske Consulting Pty Ltd through the Scott National Park and in other parts of the Scott Coastal Plain have revealed several areas of apparently suitable habitat. These areas warrant further investigation.

Biology and ecology

While the biology of the commercially-grown *Boronia megastigma* is well researched, the biology of many other *Boronia* species is poorly known. Most species are easily grown from seed. They require a presowing treatment of soaking seed in hot water for 12-24 hours then immersion in running water for over one week. This suggests a chemical inhibition to germination. *Boronia* species also strike readily from cuttings taken from firm young growth (Elliot and Jones 1982). *Boronia* species are also thought to be sensitive to waterlogging and diseases that commonly result from waterlogging, and *Boronia exilis* grows in an area that is seasonally inundated. *Boronia* seeds have an elisasome (an extension from the seed) that is normally associated with ant dispersal. Many species are also very fragrant and are pollinated by moths and other insects.

As mentioned, very few plants of *Boronia exilis* were located two years after a fire burnt part Population 1. This suggests that adult plants are killed by fire and that the fire did not stimulate germination. Further research is needed to determine the limiting factor in regeneration. *Boronia exilis* is also thought to be sensitive to *Phytophthora cinnamomi* infection (personal communication B. Shearer[1]), and appears to be closely associated with a specific habitat type. This apparent close association with low-lying heath / sedgelands on restricted ironstone soils suggests that the species is naturally rare.

Many other aspects of the biology and ecology of *Boronia exilis* are not known and require further research. These include the species' response to disturbance, fruiting and flowering times, germination triggers, pollination and distribution vectors, disease and fire response. These issues will be investigated in recovery action 11 – Obtain biological and ecological information.

[1] Dr Bryan Shearer, CALMScience, CALM, Como

Threats

Boronia exilis was declared as Rare Flora in November 1997 and was ranked in November 1998 as Critically Endangered (CR). It currently meets IUCN Red List category 'CR' under criterion B2c+3d (IUCN 1994) as it has a highly restricted distribution, fluctuating numbers of mature individuals and continued decline in the quality of the habitat from dieback disease. The main threats are inappropriate fire regimes, disease, road maintenance activities, restricted distribution, mining activities, commercial wildflower picking, trampling and weed invasion.

- **Inappropriate fire regimes** would adversely affect the viability of populations as field evidence suggests that recruitment is not stimulated by fire (see History).

- **Disease:** The threat of dieback disease caused by the plant pathogen *Phytophthora* spp. is high in the seasonally-inundated habitat in which the species occurs. The response of *Boronia exilis* to *Phytophthora* spp. is as yet unknown, but it is thought to be susceptible (personal communication B. Shearer[1]).

- **Road maintenance activities** threaten both plants and habitat, particularly at *Boronia exilis* Subpopulations 1a, 1b, and 1c. Maintenance activities such as construction of drainage channels, mowing and grading of roadside vegetation has historically caused damage to Critically Endangered species and their habitat. It is important that liaison with the relevant authorities continues so that disturbance to the plants and their habitat is minimised.

- **Limited distribution** threatens *Boronia exilis* as one disturbance event may eliminate the only known population. Further survey is needed to relocate historically recorded populations, and to investigate other possible habitat for additional populations.

- **Mining activities:** A mineral sands project currently occurs in the Scott River area in the vicinity of historically recorded populations. Liaison with the mining company with regard this operation and any future exploration is necessary to protect the species and its habitat. Two populations are thought to either exist on the current mine site or to be close to the operational area (Populations 3 and 4). Mining activities would also exacerbate other threats such as weed invasion and spread of disease.

- **Commercial wildflower picking** occurs in the Scott River area. As the species is similar to other *Boronia* species in the area, pickers may inadvertently collect *Boronia exilis.*

- **Trampling** by tourists threatens Population 1 and its habitat, as the site is a recreation reserve.

- **Weed invasion** is a minor threat to Subpopulation 1a, due to the proximity of the plants to the road. Weeds not only compete with adult plants for light, moisture and nutrients, but they also reduce the chance of regeneration from soil stored seed. Weeds also increase fuel loads and exacerbate the fire risk.

Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants	Condition	Threats
1a. Brennan Bridge	Shire road reserve	1996 100	Habitat is healthy	Inappropriate fire regimes, road maintenance activities, weed invasion, disease, limited distribution, commercial wildflower picking, and trampling by tourists.
1b. Brennan Bridge	Shire reserve	Unknown	Habitat is healthy	Inappropriate fire regimes, road maintenance activities, weed invasion, disease, limited distribution, commercial wildflower picking, and trampling by tourists.
1c. Brennan Bridge	Shire reserve	Unknown	Habitat is healthy	Inappropriate fire regimes, road maintenance activities, weed invasion, disease, limited distribution, commercial wildflower picking, and trampling by tourists.
2. North-north east of Augusta	National Park	Unknown	Unknown	Inappropriate fire regimes, road maintenance activities, weed invasion, disease and limited distribution.
3. North east of Augusta	Nature Reserve	Unknown	Unknown	Inappropriate fire regimes, weed invasion, disease, limited distribution, and mining activities.
4. North east of Augusta	Private property	Unknown	Unknown	Inappropriate fire regimes, road maintenance activities, weed invasion, disease, limited distribution, and mining activities.
5. North east of Augusta	State Forest	Unknown	Unknown	Inappropriate fire regimes, disease, limited distribution, and commercial wildflower picking.

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

The owner of the mineral lease has erected a fence been around the ironstone community that is thought to contain Population 4.

DRF markers have been placed at Subpopulation 1b. Additional markers will be required at Populations 1a and 1c and possibly other populations if relocated.

The Central Forest 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.

Future recovery actions

Note 1: The responsible authority is frequently listed as the relevant CALM District. This refers largely to implementing recovery actions as directed by the Recovery Team.

Note 2: In general, the relevant CALM District, WATSCU and the Recovery Team share the primary responsibility for identifying funding sources and securing funds for recovery actions.

Note 3: Where appropriate, the completion date for actions is given as year 1, year 2 or year 3, meaning the years for which this IRP operates.

Note 4: 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 recovery actions being undertaken.

1. Coordinate recovery actions

The CFTFRT will continue to oversee the implementation of the recovery actions for *Boronia exilis*.

Action: Coordinate recovery actions
Responsibility: CALM (South West Capes District) through the CFRTFRT
Cost: $6,200 per year.

2. Confirm existing populations and conduct further survey

Only one subpopulation of *Boronia exilis* has been recently verified, and therefore confirmation of the two other subpopulations and four populations is required. Accurate documentation of population locations, plant numbers, condition of habitat and distribution is essential. This action will be implemented during the species flowering period (September) and will be conducted in conjunction with surveys for additional populations. It is also essential that specimens are taken to confirm each population, and then lodged with the WA Herbarium for future reference.

Surveys for additional populations will be undertaken during the species' flowering period in likely habitat such as the vegetation on the Scott Ironstone soil type as described by Tille and Lantzke (1990).) G. Keighery and D. Papenfus have also recommended several possible sites and these areas will be the main focus of the initial survey for new populations. Local volunteers such as members of naturalists clubs and wildflower societies will be encouraged to be involved in surveys supervised by CALM staff.

Action: Confirm existing populations and conduct further survey
Responsibility: CALM (South West Capes District) through the CFTFRT
Cost: $4,000 per year.

3. Liaise with land managers

Staff from CALM's South West Capes District will continue to liaise with relevant land managers to ensure that the populations are not accidentally damaged or destroyed. This will also include notification of the species location and the land manager's obligations under the *WA Wildlife Conservation Act* 1950.

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

4. Develop and implement fire management strategy

Very few adult or juvenile *Boronia exilis* plants were located in a survey in 1996 despite a fire in a population in 1994. This suggests that fire kills adult plants and does not stimulate germination. Until more is known about the fire response of the species, no planned burns will occur in the short term in areas that have been burnt recently where subpopulations of *B. exilis* have been recorded. 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: $1,400 in the first year, and $900 in subsequent years.

5. Monitor populations

Monitoring of factors such as weed invasion, habitat degradation, disease, population stability (expansion or decline), pollinator activity, seed production, recruitment, and longevity is essential. Each population will be inspected annually.

Due to previous difficulties in locating and identifying *Boronia exilis* populations, accurate documentation of the species' flowering period, regeneration, and population boundaries over several seasons is essential for future management. Weeds have been identified as a minor threat to Population 1, but are currently not currently considered to threaten the population. Careful monitoring is required to ensure that weeds do not become a threat in the future.

Action: Monitor populations
Responsibility: CALM (South West Capes District) through the CFRTFRT
Cost: $900 per year.

6. Collect seed and cutting material

No seed or cutting material has as yet been collected. Seed and cutting material will be collected when population location, flowering and fruiting times have been more clearly defined. This material will be collected to establish a living collection of genetic material at Kings Park and Botanic Garden (KPBG), to store the genetic diversity as seed within the Threatened Flora Seed Centre (TFSC), and to provide material to propagate plants for future translocations.

Action: Collect seed and cutting material
Responsibility: CALM (South West Capes District, TFSC) and KPBG, through the CFRTFRT
Cost: $2,900 in the first year and $4,900 in the second and third years.

7. Install signs and DRF markers

Signs that indicate that the picking of wildflowers is illegal will be placed on the main road near Subpopulation 1c. When the location of populations 2-5 has been clarified, DRF markers and other signs will be installed as appropriate.

Action: Install signs and DRF markers
Responsibility: CALM (South West Capes District) through the CFRTFRT
Cost: $1,200 in the first year.

8. Negotiate to alter purpose of reserve at Population 1

Population 1 is currently on land that is under the care, control and management of the Shire of Augusta-Margaret River for the purpose of recreation. CALM will negotiate with the Shire to have the purpose of the reserve altered to include conservation, e.g. conservation and recreation.

Action: Negotiate to alter purpose of reserve at Population 1
Responsibility: CALM (South West Capes District) through the CFRTFRT
Cost: $500 in the first year.

9. Promote awareness

The importance of biodiversity conservation and the protection of the Critically Endangered *Boronia exilis* will be promoted to the public. An information sheet that includes a description of the plant, its habitat type, threats and management actions, and photos will be produced. Formal links with local naturalist groups and interested individuals will also be encouraged.

The information sheet will also be used to inform commercial wildflower pickers of the species habit, key identification features and typical habitat. A map that defines areas not available for commercial picking will be developed to ensure that pickers do not enter the areas where *Boronia exilis* has been recorded,

Action: Promote awareness
Responsibility: CALM (South West Capes District, Corporate Relations) through the CFRTFRT
Cost: $600 in the second year.

10. Monitor dieback and implement disease hygiene measures

Boronia exilis and its habitat are thought to be susceptible to dieback disease caused by *Phytophthora* spp. Dieback will therefore be mapped and monitored at known populations. Disease hygiene measures will be established and maintained to reduce the likelihood of introducing or amplifying the impact of the disease.

Signs will be placed at known populations indicating that the areas are dieback disease risk sites. CALM staff entering these areas will comply with the hygiene standards as outlined in the Dieback Disease Hygiene Manual (CALM 1992a) and will provide information about disease hygiene to others using the areas wherever possible. Careful monitoring of the sites will continue to ascertain if further control methods are required, including the possible use of phosphite to control spread and impact of the disease.

Action: Monitor dieback and implement dieback hygiene measures
Responsibility: CALM (South West Capes District, WATSCU) through the CFRTFRT
Cost: $1, 500 in the first year.

11. Obtain biological and ecological information

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

1. Investigation of the impacts of dieback disease and control techniques on *Boronia exilis* and its habitat.
2. Study of the soil seed bank dynamics and the role of various factors including fire, mechanical disturbance, competition, and rainfall on 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 CFRTFRT
Cost: $17,200 per year.

12. Start translocation process

Translocation is essential for the conservation of the species, as the total number of extant plants is low, and the only population that has been recently relocated is not secure from threats including fire and disease. Although translocations are generally undertaken under full Recovery Plans, it is possible to develop a Translocation Proposal and start propagating plants within the time frame of an Interim Recovery Plan. 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: $2,600 in the third year.

13. Include general recommendations for *Boronia exilis* in Management Plan for Park

The general management recommendations for *Boronia exilis* will be included in the Management Plan for the Scott National Park if the population recorded from the park is relocated. This will include recommendations on dieback and weed control, fire management and monitoring.

Action: Include management recommendations in Management Plan for Park
Responsibility: CALM (South West Capes District) through the CFTFRT
Cost: $500 in the first year.

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 actions required for long-term maintenance.

Action: Write full Recovery Plan
Responsibility: CALM (WATSCU, South West Capes District) through the CFRTFRT
Cost: $19,000 in the third year.

4. TERM OF PLAN

This Interim Recovery Plan will operate from August 1999 to July 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:

Allan Beauglehole	Retired Botanist
Greg Keighery	Principal Research Scientist, CALMScience, Woodvale
Beverley Koch	Consultant Botanist
Diana Papenfus	Botanist, previously CALMScience
Bryan Shearer	Principal Research Scientist, CALMScience, Como
Andrew Webb	Previously CALM Officer, South West Capes District
Paul Wilson	Consultant Botanist
Kim Williams	Program Leader Nature Conservation, Central Forest Region

Thanks also to 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

Brown, A., Thomson-Dans, C. and Marchant, N. (Eds). (1998). *Western Australia's Threatened Flora*. Department of Conservation and Land Management, Western Australia.

CALM (1992a). *Dieback Disease Hygiene Manual.* Department of Conservation and Land Management, Western Australia.

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

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

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

Elliot, W. R. and Jones, D. L. (1982). *Encyclopaedia of Australian Plants Suitable for Cultivation* 2: pp. 334. Lothian Publishing Co., Melbourne.

English, V. and Blyth, J. (1997). *Identifying and conserving threatened ecological communities in the South West Botanical Province*. Final Report to Environment Australia. Project N702. Department of Conservation and Land Management, Perth.

Mattiske Consulting Pty Ltd. (1996a). *Flora and vegetation on Beenup lease area.* Report prepared for BHP Titanium Minerals Pty Ltd. BHP006/241/96.

Mattiske Consulting Pty Ltd. (1996b). *Flora and vegetation of Scott National Park and adjoining camping reserve A12951*. Report prepared for BHP Titanium Minerals Pty Ltd. BHP006/242/96.

Papenfus, D. (1997). *Proposed addition or change to the Schedule of Declared Rare Flora – Boronia exilis.* Conservation and Land Management File 1998F0022478, pg 18.

Tille, P. J. and Lantzke, N. C. (1990). South West Capes – Margaret River – Augusta land capability study; methodology and results Volume 2 Appendices. Technical Report 109. Division of Resource Management. Western Australian Department of Agriculture, Perth.

Western Australian Herbarium (1999). FloraBase - Information on the Western Australian Flora. Department of Conservation and Land Management, Western Australia. http://www.calm.wa.gov.au/science/

Williams, K., Horan, A., Wood, S. and Webb, A. (1999). *Declared Rare and Poorly Known Flora in the Central Forest Region.* Draft Wildlife Management Program. Department of Conservation and Land Management, Western Australia.

Wilson, P. G. (1998). New names and new taxa in the genus *Boronia* (Rutaceae) from Western Australia, with notes on seed characters. *Nuytsia* 12: 119-154.

World Conservation Union (1994). *IUCN red list categories prepared by the IUCN Species Survival Commission, as approved by the 40th meeting of the IUCN Council.* Gland, Switzerland.

7. TAXONOMIC DESCRIPTION

Wilson P.G. (1998).

Boronia exilis

Erect slender-stemmed *perennial c*. 1 m high. Branches glabrous; internodes 2-5 cm long. *Lower leaves* caducous, not seen; medial and upper leaves slender, semiterete, channeled above, 1-1.5 cm long, much shorter than internodes, glabrous or sparsely woolly on midrib, caducous. *Flowers* 3-9 in terminal umbelliform cymes; bracts elliptic, *c*. 5 mm long, woolly ciliate, caducous; pedicels 5-12 mm long, somewhat woolly; bracteoles basal, scarious, caducous. *Sepals* oblong-elliptic, acute, *c*. 4 mm long, dark red, woolly on both surfaces, densely woolly ciliate, deciduous in fruit. *Petals* broadly obovate, with broad claw, *c*. 7 mm long, rounded at apex, sparsely woolly on midrib and within, pink. *Staminal filaments* terete above, flattened towards base, glandular-verrucose at swollen apex, prominently hirsute ciliate; anthers subapically affixed, *c*. 1.2 mm long, shortly white-apiculate. *Disc* cushion-shaped, glabrous. *Ovary* glabrous; style terete, glabrous, *c*. 1.5 mm long; stigma minute.

Distribution. Known only from the Scott River area, extreme south west of Western Australia.

Habitat. Growing in seasonally wet heath.

Etymology. The Latin word *exilis*, meaning slender and weak, refers to the slender stems of the species.

Notes. The species is similar to *Boronia juncea* particularly to the subsp. *laniflora*; it differs most obviously from that species in having strongly ciliate staminal filaments (in *B. juncea* they are glabrous).