INTERIM RECOVERY PLAN NO. 148

TRIGWELL'S RULINGIA

(*RULINGIA* SP. TRIGWELL BRIDGE)

INTERIM RECOVERY PLAN

2003-2008

Gillian Stack & Andrew Brown

Photograph showing fruits of *Rulingia* sp. Trigwell Bridge: Andrew Brown

August 2003

Department of Conservation and Land Management
Western Australian Threatened Species and Communities Unit (WATSCU)
PO Box 51, Wanneroo, WA 6946

Natural Heritage Trust
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Government of Western Australia

DEPARTMENT OF Conservation AND LAND MANAGEMENT
Conserving the nature of WA

FOREWORD

Interim Recovery Plans (IRPs) are developed within the framework laid down in Department of Conservation and Land Management (DCLM) 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.

DCLM 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Plan, which replaces IRP 33 (1999-2002), will operate from July 2003 to June 2008 but will remain in force until withdrawn or replaced.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 reviewed after five years and the need for a full Recovery Plan assessed.

This IRP was approved by the Director of Nature Conservation 21 September, 2003. The provision of funds identified in this Interim Recovery Plan is dependent on budgetary and other constraints affecting DCLM, as well as the need to address other priorities.

Information in this IRP was accurate at July 2003.

SUMMARY

Scientific Name:	*Rulingia* sp. Trigwell Bridge	**Common Name:**	Trigwell's Rulingia
Family:	Sterculiaceae	**Flowering Period:**	August
Dept Region:	South West	**Dept District:**	Wellington
Shire:	West Arthur	**Recovery Team:**	South West Region Threatened Flora Recovery Team (SWRTFRT)

Illustrations and/or further information: A. Brown, C. Thomson-Dans and N. Marchant (Eds) (1998) *Western Australia's Threatened Flora*; N.G. Marchant, J.R. Wheeler, B.L. Rye, E.M. Bennett, N.S. Lander, and T.D. Macfarlane (1987) *Flora of the Perth Region*; The Department (1998) *FloraBase - Information on the Western Australian Flor*a (http://www.calm.wa.gov.au/science/).

Current status: *Rulingia* sp. Trigwell Bridge was declared as Rare Flora in November 1993 and ranked as Critically Endangered (CR) in 1995. It currently meets World Conservation Union (IUCN, 2000) Red List Category 'CR' under criteria A1c; B1ab(iii)+2ab(iii); C2a(i); D as there has been an estimated population size reduction of 90%; the extent of occurrence is estimated to be less than 100 km^2 and the area of occupancy less than 10 km^2; the species is known to exist at a single wild location with a continuing decline in the quality of habitat and the single known population contains fewer than 50 mature individuals in size.

Rulingia sp. Trigwell Bridge is known from a single very small wild population of two adult plants with a continuing decline in the quality of its habitat. There are also four translocated populations. The species appears to have very specific habitat requirements and its restricted distribution is a major threat to its survival. Other threats include the lack of natural recruitment, poor genetic diversity, inappropriate fire regimes, grazing and weeds.

Distribution and habitat: *Rulingia* sp. Trigwell Bridge is endemic to Western Australia where it is known from a single wild population in the West Arthur area over a range of less than 1 km. Plants are found in small fissures on a lateritic ridge supporting open low jarrah (*Eucalyptus marginata*) and marri (*Corymbia calophylla*) woodland. It is not known whether this is the plant's preferred habitat or if these plants have survived because they were less accessible to grazing animals. Associated species include *Banksia grandis*, *Xanthorrhoea preissii*, *Macrozamia riedlei*, *Sollya heterophylla* and *Acacia pulchella* (Brown *et al*. 1998).

Critical habitat: The critical habitat for *Rulingia* sp. Trigwell Bridge comprises the area of occupancy of the known populations; area of occupancy of translocated populations; similar habitat within 200 metres of known and translocated populations; corridors of remnant vegetation that link populations and additional nearby occurrences of similar habitat that do not currently contain the species but may have done so and may be suitable for additional translocations.

Habitat critical to the survival of the subspecies, and important populations: Given that this species is listed as Critically Endangered it is considered that all known habitat containing wild and translocated populations is habitat critical and that all populations are important.

Benefits to other species/ecological communities: Recovery actions implemented to improve the quality or security of the habitat of *Rulingia* sp. Trigwell Bridge will also improve the health of the habitat in which it occurs.

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. However, as *Rulingia* sp. Trigwell Bridge is not listed under any international agreement, the implementation of other international environmental responsibilities is not affected by this plan.

Role and interests of indigenous people: There are no known indigenous communities interested or involved in the management of areas affected by this plan.

Social and economic impacts: The implementation of this recovery plan is unlikely to cause significant adverse social and economic impacts. The single known wild population occurs on private property and has been fenced with the approval of the owners.

Evaluation of the Plan's Performance: The Department of Conservation and Land Management (DCLM), in conjunction with the Recovery Team will evaluate the performance of this IRP. The plan is to be reviewed within five years of its implementation.

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

1. Land owners have been made aware of the location and threatened status of the species.
2. A ringlock fence was erected in 1992 to exclude sheep from Population 1.
3. A netting cage was erected in 1994 to exclude rabbits and 'twenty eight' parrots from Population 1.
4. Botanic Garden and Park Authority (BGPA) staff conducted germination trials in April 1995.
5. In 1995 samples taken to assess the presence of *Phytophthora cinnamomi* (dieback) in the habitat tested negative. Dieback hygiene practices are adhered to.
6. Tests undertaken by the Department's Science Division staff indicate that the species is not susceptible to dieback.
7. Soil sample analyses have indicated high organic matter and average nutrient levels at Population 1.
8. Soil sample analyses have indicated very high organic content at Population 1, probably due to deep fissures in rock collecting leaf debris. The plants grow in these deep fissures.
9. In 1997 BGPA staff conducted experimental micropropagation trials to establish long-term cryostorage of the species.
10. The Department's Threatened Flora Seed Centre (TFSC) has over 7,000 seeds in long-term storage.
11. The Botanic Garden and Parks Authority currently have 75 plants of *Rulingia* sp. Trigwell Bridge from five clones.
12. Translocations have taken place according to an approved Translocation Proposal.
13. All translocation areas have been fenced.
14. Grazing by rabbits within fenced areas at Populations 1 and 2 has been controlled with use of 1080 oats.
15. An information sheet that describes and illustrates the species has been produced.
16. Staff from the Department's South West Region regularly monitor both natural and translocated populations of the species.
17. The South West Region Threatened Flora Recovery Team is overseeing the implementation of this IRP and will include information on progress in an annual report to the Department's Corporate Executive and funding bodies.

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

Recovery criteria

Criteria for success: The number of individuals within populations and/or the number of populations have increased by 10% or more.

Criteria for failure: The number of individuals within populations and/or the number of populations have decreased by 10% or more.

Recovery actions

1. Coordinate recovery actions
2. Develop and implement a fire management strategy
3. Control grazing
4. Undertake weed control
5. Maintain dieback hygiene
6. Monitor populations
7. Liaise with land managers
8. Conduct further surveys
9. Collect seed and cutting material
10. Continue implementing translocations
11. Obtain biological and ecological information
12. Promote community awareness
13. Review this IRP and revise it or prepare a full Recovery Plan if necessary

1. BACKGROUND

History

Rulingia sp. Trigwell Bridge was first collected from private property by R. Smith in 1989 and is still the only known wild population known. Plants grow in cracks on a lateritic ridge in an area that was used for grazing sheep until 1992. As just two wild plants are known a translocation project coordinated by the South West Region Threatened Flora Recovery Team (SWRTFRT) is underway and includes putting plants back into the wild population and up to six other self-sustaining populations in areas of similar habitat. Research into the fire response of *Rulingia* sp. Trigwell Bridge seed has confirmed that fire stimulates germination of the species. This knowledge has been used during germination trials in two new translocated populations (Populations 4T and 5T).

Due to the extremely small population size, restricted distribution and threats associated with growing in a specialized habitat, *Rulingia* sp. Trigwell Bridge was declared as Rare Flora in November 1993, and ranked as Critically Endangered in September 1995.

Description

A full taxonomic description for the species has been prepared by Dr. Gordon Guymer, Senior Botanist, Queensland Herbarium, however, as the species has not yet been formally described, it is not currently available.

Rulingia sp. Trigwell Bridge is a small shrub up to 1.5 m tall and 1 m wide with branches and leaves covered in star-shaped hairs that are typical of other species in the genus. The narrow stipules are deciduous and the upper stipules are divided into thin lobes. The terminal flowers are creamy white, and petals are equal or shorter in length than the sepals. The broad-based petals embrace the stamens and the upper portion of the petals forms a ligule (Brown *et al.* 1998).

Distribution and habitat

Rulingia sp. Trigwell Bridge is endemic to Western Australia where it is known from a single wild population in the West Arthur area over a range of less than 1 km. New translocated populations are being established near the known population.

In its natural state the species is found on a lateritic ridge supporting open low jarrah (*Eucalyptus marginata*) and marri (*Corymbia calophylla*) woodland, with two mature plants growing in small fissures in the rock. It is not known whether this is the species' preferred habitat or if these plants have survived because they were less accessible to grazing animals, including sheep and rabbits. Associated species include *Banksia grandis*, *Xanthorrhoea preissii*, *Macrozamia riedlei*, *Sollya heterophylla* and *Acacia pulchella*.

Native plant species at the translocation sites are largely the same as taxa associated with the wild population, but soils differ in being laterite rich rather than an exposed laterite ridge. Translocated plants appear to be surviving well at these new sites.

Biology and ecology

In 1995 staff from the Botanic Garden and Parks Authority (BGPA) conducted research to determine seed viability and seed production capability of the two natural plants. They found that 60% of flowers produce capsules, with an average of 6.5 seeds per capsule. This results in a seed production capacity of approximately 5000 seeds. Laboratory analysis of the collected seeds indicated 100% germination in a nutrient enriched medium.

Fire research has been conducted by Wellington District in 2000, 2001 and 2002. Results suggest that a high intensity burn of greater than 50°C for a duration of more than ten minutes is needed for optimum germination

of *Rulingia* sp. Trigwell Bridge seed in the field. There were indications that soil-stored seed was still present and viable after at least seven years.

Threats

Rulingia sp. Trigwell Bridge was declared as Rare Flora in November 1993 and ranked as Critically Endangered (CR) in 1995. It currently meets World Conservation Union (IUCN, 2000) Red List Category 'CR' under criteria A1c; B1ab(iii)+2ab(iii); C2a(i); D as there has been an estimated population size reduction of 90%; the extent of occurrence is estimated to be less than 100 km^2 and the area of occupancy less than 10 km^2; the species is known to exist at a single wild location with a continuing decline in the quality of habitat and the single known population contains fewer than 50 mature individuals.

The species is currently known from one adult and two juvenile plants in single known natural population, and several hundred plants in five translocated populations. In its natural state the species appears to have very specific habitat requirements with the low number of extant plants and its restricted distribution being a major threat to its survival. Other threats include a lack of recruitment in the natural population, poor genetic diversity, inappropriate fire regimes, grazing and weeds.

- **Restricted distribution** is a serious threat to *Rulingia* sp. Trigwell Bridge as a single event such as clearing, disease or senescence could result in the extinction of the natural population. However, it is hoped that translocated populations will become self-sustaining and contribute to the long-term survival of the species.

- **Lack of natural recruitment** threatens this species. The reasons for this low level of recruitment are not certain, but may include an absence of high-intensity fire needed to germinate soil-stored seed.

- **Poor genetic diversity** is likely to result from the low number of plants in the wild population. There are now just two adult plants in the wild population and this represents an extremely limited gene pool (although there may be additional genetic variation in the soil-stored seed bank). Low genetic diversity reduces the species' ability to adapt to changes in its environment.

- **Inappropriate fire regimes** may affect the viability of populations. It is known that seed of *Rulingia* sp. Trigwell Bridge germinates following fire and the soil seed bank would rapidly be depleted if fires recur before juvenile plants reach maturity and replenish the soil seed bank. Conversely, it appears from fire research that occasional high intensity fires are needed for reproduction of the species. Population 1 is protected from fire by the surrounding exposed rock, and through the low fuel levels associated with the habitat.

- **Grazing** by rabbits (*Oryctolagus cuniculus*), sheep, kangaroos and 'twenty eight' parrots (*Barnardius zonarius semitorquatus*) has previously been a major threat to Population 1. Steps have been taken to reduce this threat, and annual rabbit control is required. Insects also impact *Rulingia* sp. Trigwell Bridge and populations may require protection from this threat.

- **Weed invasion** is a minor threat to Population 1. Weeds suppress early plant growth by competing for soil moisture, nutrients, and light. However, as Population 1 occurs on rocky exposed habitat there are relatively few weeds. Those that are there are readily managed by hand weeding.

Summary of population information and threats

Pop. No. & Location	Land Status	Year/No. plants	Condition	Threats
1. NE of Boyup Brook	Private Property	1995 4 1998 1 (2) 2001 3 2002 2	Moderate	Lack of natural recruitment, inappropriate fire regimes, weeds, grazing
1T. NE of Boyup Brook	Private Property	1998 49 2001 42 2002 41	Healthy	Inappropriate fire regimes, weeds, grazing poor recruitment
2T. NE of Boyup Brook	Nature Reserve	1998 89 2001 46 (18) 2002 37 (73)	Healthy	Inappropriate fire regimes, grazing, firebreak maintenance, weeds
3T. ESE of Collie	Proposed Conservation Park	1998 40 2001 54 2002 52	Moderate	Inappropriate fire regimes, grazing, poor recruitment
4T. S of Darkan	Nature Reserve	2001 (17) 2002 (5)	Healthy	Inappropriate fire regimes, grazing
5T.	Conservation Park	2002 (223)	Healthy	Inappropriate fire regimes, grazing

Number in brackets = number of juveniles. Pop. T = translocated population.

Critical habitat

Critical habitat is habitat identified as being critical to the survival of a listed threatened species or listed threatened ecological community. Habitat is defined as the biophysical medium or media occupied (continuously, periodically or occasionally) by an organism or group of organisms or once occupied (continuously, periodically or occasionally) by an organism, or group of organisms, and into which organisms of that kind have the potential to be reintroduced. (*Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)).

The critical habitat for *Rulingia* sp. Trigwell Bridge comprises:

- the area of occupancy of the wild population;
- the area of occupancy of translocated populations;
- areas of similar habitat within 200 metres of known populations, i.e. open jarrah and marri woodland associated with laterite (these provide potential habitat for natural population expansion);
- corridors of remnant vegetation that link populations (these are necessary to allow pollinators to move between populations); and
- additional occurrences of similar habitat that do not currently contain the species but may have done so in the past (these represent possible translocation sites).

Habitat critical to the survival of the species, and important populations

Given that this species is listed as Critically Endangered it is considered that all known habitat for wild and translocated populations is habitat critical and that all populations are important.

Benefits to other species/ecological communities

There are no threatened ecological communities in the immediate vicinity of *Rulingia* sp. Trigwell Bridge. However, recovery actions put into place for the species will benefit the remnant bushland habitat in which it occurs.

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. However, as *Rulingia* sp. Trigwell Bridge is not listed under any international agreement, the implementation of other international environmental responsibilities is not affected by this plan.

Role and interests of indigenous people

There are no known indigenous communities interested or involved in the management of areas affected by this plan.

Social and economic impacts

The implementation of this recovery plan is unlikely to cause significant adverse social and economic impacts. Although the single natural population of the species occurs on private property, the landowner is working closely with DCLM in providing protection and a ringlock fence was erected around the population in1992 and nursery grown plants have been translocated back into the area. Four of the five translocated populations are on Conservation reserves.

Evaluation of the Plan's Performance

The Department of Conservation and Land Management (DCLM), in conjunction with the Recovery Team will evaluate the performance of this IRP. In addition to annual reporting on progress with listed actions and comparison against the criteria for success and failure, the plan is to be reviewed within five years of its implementation.

Guide for decision-makers

Section 1 provides details of current and possible future threats. Any on-ground works (clearing, firebreaks, roadworks etc) in the immediate vicinity of *Rulingia* sp. Trigwell Bridge will require assessment. On-ground works should not be approved unless the proponents can demonstrate that they will not have an impact on the species, its habitat or potential habitat.

2. RECOVERY OBJECTIVE AND CRITERIA

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

Criteria for success: The number of individuals within populations and/or the number of populations have increased by 10% or more.
Criteria for failure: The number of individuals within populations and/or the number of populations have decreased by 10% or more.

3. RECOVERY ACTIONS

Existing recovery actions

BGPA have successfully propagated *Rulingia* sp. Trigwell Bridge using tissue culture, cuttings, and grafting techniques.

The owner of land containing Population 1 has been formally notified of the presence of *Rulingia* sp. Trigwell Bridge and associated legal responsibilities.

With the permission of the landowner, a ringlock fence was erected around Population 1 in 1992. This excluded sheep from the area which contains the single known population and its lateritic ridge habitat. In 1994 netting cages were erected over all plants of in *Rulingia* sp. Trigwell Bridge. These cages completely covered plants and protected them from rabbits and 'twenty eight' parrots. The latter had been a major threat to the plants due to their habit of breaking the ends off branches while foraging on the fruit of the species.

In April 1995 staff from the BGPA conducted smoke and smoke water germination trials under and near adult plants at Population with Site 1 (0.9 m x 4.5 m) treated with smoked water (two litres per square metre) and Site 2 (1 m x 5 m) with smoke. Both sites were inspected in October 1995 but no evidence of germination was observed.

The presence of dieback (*Phytophthora* spp.) was suspected on the northwest slopes of Population 1 in April 1995. However, two samples were sent for analysis and the results were negative and research by staff from the Department's Science Division indicates that *Rulingia* sp. Trigwell Bridge is not susceptible to this plant pathogen. Disease hygiene is maintained to protect the surrounding habitat.

Soil samples were collected from the wild population in 1995 and sent to the WA Chemistry Centre. Subsequent analysis indicated that the soil is very high in organic content with levels of nitrogen and phosphorus higher than those generally expected in the locality. The higher levels are due to the fact that *Rulingia* sp. Trigwell Bridge has its roots in deep fissures in which there is an accumulation of leaf litter. Soil samples were collected from the proposed *ex situ* sites in 1996, for comparison with samples taken from the site of the wild population. The results were consistent with average nutrient levels for most southwestern soils.

During 1997, BGPA undertook research into micropropagation, *in vitro* physiology, slow growth, germplasm maintenance and cryostorage and had had success in propagation of the species through tissue culture, cuttings and grafting. Propagated plants were transferred into areas of natural habitat successfully.

A total of 608 seeds collected in November 1994 from 4 plants in Population 1 are being stored in the Department's TFSC at -18°C. Seed from this collection had an initial germination rate of 95%. Another 20,000 seeds collected in November 1998 from the wild population and several translocation sites had an initial germination rate ranging from 56 to 85% and, after 12 months storage, a rate of over 90% (unpublished data A. Cochrane[1]). The TFSC now has over 7,000 seeds in long-term storage at -18°C, and over 13,000 seeds stored at 4°C available for direct seeding trials at translocation sites.

The nursery at the BGPA currently have 75 plants of *Rulingia* sp. Trigwell Bridge from five clones. The species is easy to propagate from cuttings, with a strike rate of 75% and higher (personal communication A. Shade[2]).

A translocation proposal that was approved by the Director of Nature Conservation in September 1997 has the aim of establishing self-sustaining populations of *Rulingia* sp. Trigwell Bridge at up to six locations. In the first year of implementation plants propagated by BGPA were planted into four plots. Plot 1 is adjacent to the only known wild population (Population 1) and Plots 2 and 3 are on a Nature Reserve. A further two translocations were subsequently undertaken - Population 4T in a Nature Reserve and Population 5T in a Conservation Park. Monitoring of translocated plants is ongoing.

In addition to planting nursery grown plants back into the wild, the establishment of additional *Rulingia* sp. Trigwell Bridge plants has also been attempted by burning areas containing hand sown seed of the species. Experimental burns took place in April 2000. Germination was first recorded in June 2000. Results from this initial trial support the hypothesis that fire stimulates germination of this species and show that a burn with temperatures higher than 50°C and duration of more than ten minutes is required for optimum germination. It is possible that a lack of high intensity fire is a contributing factor to the species' rarity as such fires are quickly put out in agricultural areas. The area of the wild population (Population 1) has not had an intense fire for more than 40 years.

Further burns in areas that were hand sown with *Rulingia* sp. Trigwell Bridge seed collected for this purpose were undertaken in 2001 and 2002. In 2001 fifty two seeds germinated at one site with eight surviving semi-drought conditions through the 2001/02 summer. Eighteen seedlings germinated at a second site with five surviving the same summer. The 2002 trial burn took place in May over an area of 100m^2 in a Conservation Park (Population 5T). Unfortunately weather conditions were not favorable and burning the remainder of the

[1] Anne Cochrane, Manager, the Department's Threatened Flora Seed Centre
[2] Amanda Shade, Horticulturalist, Botanic Garden and Parks Authority

area has been deferred until Autumn 2003. Nevertheless, despite the small size of the area burnt, 223 seeds had germinated by September 2002.

A double-sided information sheet has been produced which includes a description of *Rulingia* sp. Trigwell Bridge, its habitat, threats, recovery actions and photos. The sheet will be distributed to community members, local libraries and wildflower shows, and also placed on the internet. It is hoped that it may result in the discovery of new populations.

Staff from the Department's South West Region regularly monitor the wild and translocated populations.

The South West Region Threatened Flora Recovery Team (SWRTFRT) is overseeing the implementation of this IRP and will include information on progress in its annual report to the Department's Corporate Executive and funding bodies.

Future recovery actions

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

1. Coordination

The South West Region Threatened Flora Recovery Team (SWRTFRT) will coordinate recovery actions for *Rulingia* sp. Trigwell Bridge and other Declared Rare flora in the region. The team will include information on progress in their annual report to the Department's Corporate Executive and funding bodies.

Action: Coordinate recovery actions
Responsibility: The Department (Wellington District) through the SWRTFRT
Cost: $400 per year

2. Fire management strategy

Although it appears likely that the species requires an occasional high intensity fire to germinate soil-stored seed, frequent fires may be detrimental to its long-term survival if young plants have not reached maturity between events. Fire also promotes the introduction and proliferation of weed species. A fire management strategy will be developed by the Department's Wellington District in consultation with relevant land managers and the SWRTFRT.

Action: Develop and implement a fire management strategy
Responsibility: The Department (Wellington District), relevant landholders, Bush Fires Board through the SWRTFRT
Cost: $1,900 in the first year and $600 in subsequent years

3. Grazing control

The two individuals in the natural population (Pop 1) are enclosed in large cages to prevent predation of seed capsules by 'twenty eight' parrots. Translocated plants in Populations 2T and 3T have also been enclosed in cages to prevent grazing. However, rabbits are having a continuing impact on some populations through grazing or digging. It is planned that following consultation with relevant landholders rabbits will be controlled using 1080 oats. Where not already present, fences will be erected to protect *Rulingia* sp. Trigwell Bridge and its habitat, allowing a suitable buffer area to contain any regenerating plants.

Action: Control grazing
Responsibility: The Department (Wellington District) through the SWRTFRT
Cost: $6,500 in the first year and $500 in subsequent years

4. Weed control

Some weeds are present at Population 1 but they are not likely to become a major problem due to the exposed rocky nature of the habitat. However, as a precautionary measure, weeds will be hand pulled at that site and weed control maintained at all translocation sites.

Action: Undertake weed control
Responsibility: The Department (Wellington District) through the SWRTFRT
Cost: $400 per year

5. Dieback hygiene

Although research indicates *Rulingia* sp. Trigwell Bridge is not susceptible to *Phytophthora* spp. (dieback), hygiene measures will be maintained to protect the habitat of Population 1 and all translocation sites.

Action: Maintain dieback hygiene
Responsibility: The Department (Wellington District) through the SWRTFRT
Cost: $300 per year

6. Monitoring

Annual monitoring of threats such as weed invasion, pathogens and predation, and population stability (expansion or decline), pollination activity, seed production, recruitment and longevity is essential.

Action: Monitor populations
Responsibility: The Department (Wellington District) through the SWRTFRT
Cost: $1,200 per year

7. Liaison

Staff from the Department's Wellington District will continue liaising with relevant land managers and landowners to ensure that populations on private and other non departmental land are not accidentally damaged or destroyed.

Action: Liaise with land managers
Responsibility: The Department (Wellington District) through the SWRTFRT
Cost: $300 per year

8. Surveys

Surveys supervised by DCLM staff, and with the assistance of community volunteers will be conducted for *Rulingia* sp. Trigwell Bridge during its flowering period (August).

Action: Conduct further surveys
Responsibility: The Department (Wellington District) through the SWRTFRT
Cost: $2000 per year

9. Seed and cutting collection

Preservation of germplasm is essential to guard against the possible future extinction of the single known wild population. Such collections can also be used to propagate plants for translocations. Some seed of *Rulingia* sp. Trigwell Bridge is currently held in the Department's TFSC. However, further collections from as many plants as possible are needed and will be lodged with the TFSC and the BGPA seed store. Cuttings may also be taken and propagated to enhance the living collection at BGPA.

Action: Collect seed and cutting material
Responsibility: The Department (TFSC, Wellington District), BGPA through the SWRTFRT

Cost: $2,400 in first, third and fifth years

10. Translocations

Translocation is essential for the long-term conservation of this species as the single small wild population is threatened by poor genetic diversity (two plants), grazing, a lack of natural recruitement and degraded habitat. Information on the translocation of threatened plants and animals in the wild is provided in the Department's Policy Statement No. 29 *Translocation of Threatened Flora and Fauna*. This recovery action has started and will continue to be coordinated by the SWRTFRT.

A Translocation Proposal, endorsed by the Department's Director of Nature Conservation, consists of three phases.

- Phase 1 trialed appropriate establishment techniques to supplement Population 1 and established a population on a conservation reserve with the intention of further supplementation in Phase 2.
- Phase 2 aimed to establish 5 self-sustaining populations on secure conservation reserves over the 1998-2000 period.
- Phase 3 includes continued monitoring of all translocated populations, the erection of fences to prevent grazing of seedlings by kangaroos and rabbits, and the establishment of additional translocations to reduce the level of threat to the species.

Phases 1 and 2 have been completed, and Phase 3 has commenced. Monitoring is ongoing for all translocated populations.

Action: Continue implementing translocations
Responsibility: The Department (Wellington District, TFSC), BGPA through SWRTFRT
Cost: $10,000 per year

11. Biology and ecology

Better knowledge of the biology and ecology of *Rulingia* sp. Trigwell Bridge will provide a scientific basis for management of wild populations. An understanding of the following is necessary for effective management:

1. The response of *Rulingia* sp. Trigwell Bridge and its habitat to fire.
2. The pollination biology of the species and the requirements of pollinators.
3. The affect and level of invertebrate grazing.
4. Factors determining level of flower and fruit abortion.
5. The soil seed bank dynamics of the species and the role of various disturbances (including fire), competition, rainfall and grazing in germination and recruitment.
6. The longevity of plants and the time taken to reach maturity.

Action: Obtain biological and ecological information
Responsibility: The Department (Science Division, Wellington District) through the SWRTFRT
Cost: $17,200 per year in second, third and fourth years

12. Community awareness

The importance of biodiversity conservation and the need for the long-term protection of wild populations of this species will be promoted to the community through poster displays and the local print and electronic media. Formal links with local naturalist groups and interested individuals will also be encouraged.

Action: Promote community awareness
Responsibility: The Department (Wellington District) through the SWRTFRT
Cost: $2,200 for the first year and $1000 in subsequent years

13. Review this IRP and revise it or prepare a full Recovery Plan if necessary

If the taxon is still ranked as Critically Endangered at the end of the fourth year of the five-year term of this Interim Recovery Plan the need to rewrite this IRP or to replace it with a full Recovery Plan (RP) will be determined.

Action:	Review this IRP and revise it or prepare a full Recovery Plan if necessary
Responsibility:	The Department (WATSCU, Wellington District) through the SWRTFRT
Cost:	$20,300 in the fifth year (if a full Recovery Plan is required)

4. TERM OF PLAN

This Interim Recovery Plan will operate from August 2003 to July 2008 but will remain in force until withdrawn or replaced. If the taxon is still ranked Critically Endangered after five years, the need to rewrite this IRP or to replace it with a full RP will be determined.

5. ACKNOWLEDGMENTS

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

Anne Cochrane	Manager, DCLM's Threatened Flora Seed Centre
Tom Kenneally	Forester, DCLM's Wellington District
Amanda Shade	Horticulturalist, Botanic Garden and Parks Authority

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

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7. TAXONOMIC DESCRIPTION

Brown *et al*. (1998).

***Rulingia* sp. Trigwell Bridge**
This small shrub or undershrub can grow up to 1.5 m high and 1 m wide. Star-shaped hairs are visible. Stipules are deciduous, narrow, with the upper stipules often divided into slender lobes. Leaves are entire. There is a terminal inflorescence of creamy-white flowers. The petals are shorter than or as long as the sepals, with a short broad base embracing the stamens and a linear or broad upper portion known as the ligule.