

**Draft Action Plan for Fleurieu Peninsula Guinea-flower
(*Hibbertia tenuis*)**



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Summary

Hibbertia tenuis is a critically endangered shrub, endemic to the Fleurieu Peninsula in South Australia. It is only known from two small populations, with less than 20 plants remaining in the wild. *H. tenuis* only grows in peat swamps with diverse heathy vegetation and gravelly grey clay soils. This habitat is part of the Swamps of the Fleurieu Peninsula which are also listed as critically endangered.

The main threats to the species are habitat clearance, livestock grazing, weed invasion, and changes to swamp hydrology. Limited genetic diversity, seed viability, and seedling recruitment are also likely to impact on the survival of the species.

It is imperative that both existing populations of *H. tenuis* are protected, and measures are taken to maintain and enhance populations. This plan aims to improve the conservation status of *H. tenuis* by increasing the size and number of populations, and improving the protection and condition of habitat.

The priority actions in this plan include:

- inform key stakeholders to ensure awareness of the species
- protect habitat under conservation covenant or agreement
- undertake targeted weed control programs at both sites
- undertake experimental disturbance trials to promote seedling recruitment
- propagate and plant cuttings into existing populations
- establish an *ex-situ* population from cuttings
- introduce the species into other suitable protected areas, and
- establish a recovery team to coordinate implementation

Population augmentation will be an integral part of the recovery program for this species given the high risk of population extinction. Threat abatement and habitat protection, while being important for the long-term recovery of the species, are unlikely to prevent the decline or loss of populations. Habitat manipulation may also benefit the species (e.g. burning or soil disturbance), but its success is likely to be dependent on the amount of viable seed in the soil, which could be very limited. A translocation plan has been prepared and is included in Appendix 1 of this document.

1. Species Information

1.1 Description

Hibbertia tenuis is a delicate procumbent to scrambling perennial shrub with branches to approximately 50 cm long. Its branches, leaves and floral parts are covered with small, fine star-shaped hairs. The species flowers all year around and has bright yellow flowers on long slender stalks (4–18 mm long), which droop after flowering (Toelken, 1995).

1.2 Conservation status

Hibbertia tenuis is listed as critically endangered in Australia under the *Environment Protection and Biodiversity Conservation Act 1999*. The species is listed due to its extremely small population size, and because its geographic distribution is very restricted and precarious for its survival (TSSC, 2009). The species is also listed as endangered in South Australia under the *National Parks and Wildlife Act 1972*.

1.3 Distribution

Hibbertia tenuis is endemic to the Fleurieu Peninsula, and is currently known from only two locations on private property at Yundi and Hindmarsh Tiers (refer to Map 1). Historical herbarium collections indicate that there were at least another two populations near Mount Compass and Tooperang, both of which are presumed to be extinct. It is possible that the species previously occurred in other swamps on the Fleurieu Peninsula, however most areas of suitable habitat have been cleared or are highly degraded.

1.4 Population size

The population size of *Hibbertia tenuis* is estimated to be between 15-20 individuals. The majority of plants occur in single population on private property near Yundi. A small population was recently discovered on a private Heritage Agreement at Gum Tree Gully in the Hindmarsh Tiers. Herbarium records suggest that the Yundi population has declined substantially over the last 30 years, with the species being described as 'common' at the site in the 1980s. It is also likely that numbers have declined due to historical population extinctions.

1.5 Habitat

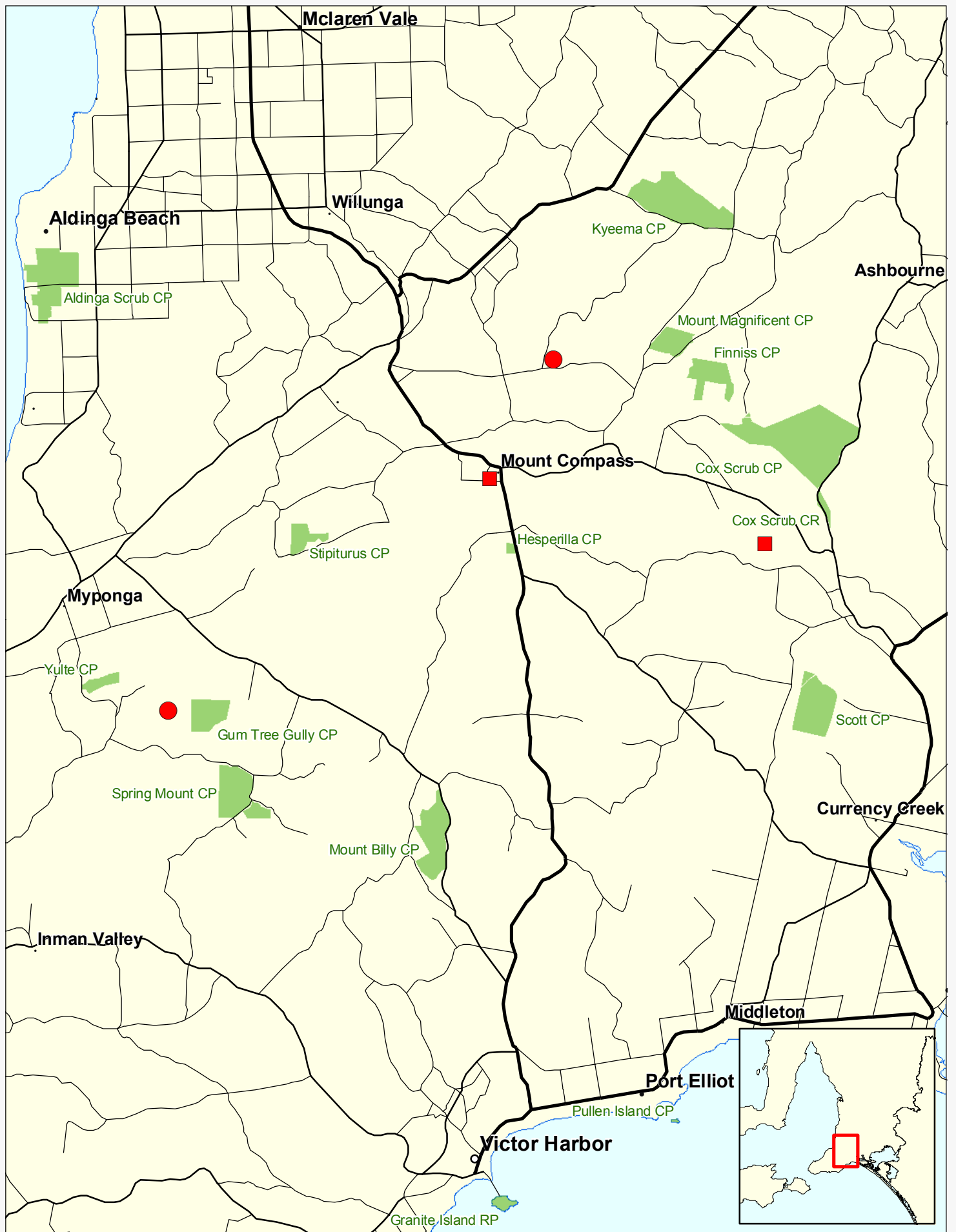
Hibbertia tenuis grows in peat swamps with diverse heathy vegetation dominated by *Leptospermum continentale*, *L. lanigerum*, *Melaleuca squamea*, *Viminaria juncea*, *Gahnia sieberiana*, *Gleichenia microphylla*, *Empodisma minus*, and *Baumea* species. The soils at both sites are peaty grey clays with quartzite gravel, and are almost permanently waterlogged. The species is presumed to be very habitat specific. This habitat is part of the Swamps of the Fleurieu Peninsula which are listed as critically endangered under the EPBC Act.

1.6 Biology

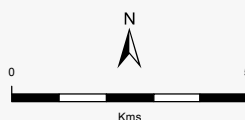
There is no information about the life-span of *Hibbertia tenuis*, however it is thought to be a relatively short-lived species. It can produce flowers all year round, but flowering is often most prolific in summer. It is likely to be pollinated by bees and possibly beetles and hoverflies, as is the case with other *Hibbertia* species.

The germination requirements of *Hibbertia tenuis* are currently unknown. The seed of some *Hibbertia* species are known to have seedcoat-imposed dormancy and, or an embryo-imposed dormancy. Seed scarification and smoke are necessary to break seed dormancy in some *Hibbertia* species, which may also be the case with *H. tenuis*.

Map 1 - Distribution of *Hibbertia tenuis*



- *Hibbertia tenuis* populations
- Historical occurrences (Pre 1985)
- DENR Reserves
- Major Road
- Secondary Road
- Minor Road



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1.7 Threats

1.7.1 Vegetation clearance

Vegetation clearance is a serious threat to *Hibbertia tenuis*. It has resulted in a significant loss of swamp habitat on the Fleurieu Peninsula, and is presumed to have contributed to the extinction of *H. tenuis* populations. Swamp habitat on the property adjacent to the Yundi population was illegally cleared in 2003, which is speculated to have resulted in the loss of *H. tenuis* from this area. Indiscriminate herbicide spraying has also occurred at the Yundi site is a serious threat to the species.

1.7.2 Livestock grazing

Grazing by livestock is a threat to *Hibbertia tenuis*. Stock have only recently been excluded from both populations, however there is currently no formal conservation agreement with the landholder at Yundi to prevent future grazing. Livestock can cause considerable damage to peat swamps through grazing, trampling, pugging and erosion, excrement and spreading weeds, and are a recognised threat to the Swamps of the Fleurieu Peninsula.

1.7.3 Changes in water use

Hydrological changes related to ground and surface water extraction and construction of drains and dams are a potential threat to *Hibbertia tenuis*. Dams have been constructed in both swamps, and water is being extracted from the Yundi site, which is likely to be altering the hydrology.

1.7.4 Weed invasion

Weed invasion is a threat to *Hibbertia tenuis*, particularly at Gum Tree Gully. Weeds of most concern are Blackberry, Phalaris, Yorkshire Fog, Sweet vernal grass, Pine, and Montpellier broom. These weeds are currently at relatively low abundance, however they have the capacity to spread and displace *Hibbertia tenuis*.

1.7.5 Altered disturbance regimes

It is possible that fire and soil disturbance are important for promoting seedling recruitment in *H. tenuis*, and that long intervals between disturbance events have contributed to population decline. However, the outcome of disturbance would be largely dependent the amount of viable seed in the soil, which could be very limited given the small population size. Competition from regenerating native species (e.g. *Gleichenia microphylla*) may also impact on the growth and survival of *H. tenuis*.

1.7.6 Phytophthora

Phytophthora infection is a potential threat to *Hibbertia tenuis*. It is currently unknown whether the species is susceptible to *Phytophthora*, however the pathogen is known to cause dieback in other *Hibbertia* species in South Australia. Furthermore, *Phytophthora* is suspected to occur in Gum Tree Gully CP, which is adjacent to the Gum Tree Gully population.

2. Recovery objectives and criteria

2.1 Overall objective

The overall objective of this action plan is to improve the conservation status of *Hibbertia tenuis* by increasing the size and number of populations, and improving the protection and condition of habitat.

2.2 Recovery objectives and performance criteria

Recovery objective 1. Increase the size of existing <i>H. tenuis</i> populations
<u>Performance criteria</u> 1a. Both existing populations have increased in size by 2016 1b. The population size of the species totals at least 250 plants in 2016
Recovery objective 2. Increase the current number of <i>H. tenuis</i> populations
<u>Performance criteria</u> 2a. At least one additional population is established in secure habitat by 2014
Recovery objective 3. Preserve the genetic diversity of the species
<u>Performance criteria</u> 3a. A representative collection of seed from both populations is in long-term storage by 2016 3b. An ex-situ population derived from cuttings from both existing populations is established by 2014
Recovery objective 4. Improve and maintain the quality of <i>H. tenuis</i> habitat
<u>Performance criteria</u> 4a. The condition of habitat is improved and maintained by 2016
Recovery objective 5. Increase the area and protection of <i>H. tenuis</i> habitat
<u>Performance criteria</u> 5a. Both existing populations are formally protected by 2013
Recovery objective 6. Involve the community and government agencies in the recovery program
<u>Performance criteria</u> 6a. Community and local and state government agencies are actively involved in the recovery program by 2013

3. Recovery Actions

3.1 Previous Actions

Seed was collected from plants at Yundi in 2007 as part of the Millennium Seedbank Project, and is stored at the Adelaide Botanic Gardens. Cuttings were also taken from plants at Yundi in 2010, and approximately 130 cuttings have been propagated by the Mount Lofty Botanic Gardens.

The population at Gum Tree Gully was discovered in 2010 in a site being managed as part of the Fleurieu Peninsula Swamp Recovery Program (FPSRP). The site was recently protected under Heritage Agreement and fenced-off from stock. A weed control program has also been implemented.

Both landholders have been informed about the species and its management requirements. Advice regarding the management of the species has also been provided to the FPSRP.

3.2 Specific Recovery Actions

Action 1. Protect and manage populations

1.1 Provide advice to stakeholders regarding the management of *H. tenuis*

Landholders and relevant management authorities should be provided with information and advice regarding the management of *H. tenuis*, and encouraged to participate in the recovery program.

Delivery groups: DENR

1.2 Undertake targeted weed control programs at both sites

Weed control programs should be implemented at both known sites. Work should focus on controlling weeds (primarily Blackberry) in the immediate vicinity of *H. tenuis* populations. Only highly-skilled bush care operators should undertake this work. It is imperative that considerable care be taken to avoid off-target herbicide damage to *H. tenuis* and other native species when undertaking weed control.

Delivery groups: DENR, AMLR NRM, MDB NRM, CCSA

1.4 Protect habitat under heritage agreement or formal management agreements

Landholders at Yundi should be encouraged to protect swamp habitat under Heritage Agreement or other formal management agreement. While priority should be given to protecting the area known to contain *H. tenuis*, it would also be beneficial to conserve surrounding habitat in the system.

Delivery groups: DENR

1.5 Undertake experimental disturbance trials

It is recommended that small-scale experimental disturbance trials are conducted at both locations. It is speculated that seedling recruitment of *H. tenuis* could be reliant on disturbance events (e.g. fire and soil disturbance). However, given the very limited population size of *H. tenuis*, it would not be advisable to directly treat areas containing remnant plants but rather conduct the trials in adjacent habitat. The Gum Tree Gully location is also habitat for *Euphrasia collina* ssp. *osbornii* and a number of other endangered plant species that are likely to benefit from disturbance (eg fire, slashing, crash grazing). These trials would require approval under the EPBC Act and *Native Vegetation Act 1992*.

Delivery groups: DENR, CCSA

1.6 Implement management strategies to prevent the spread of *Phytophthora*

All activities with the potential to spread *Phytophthora* into *H. tenuis* populations need to adhere to strict management and hygiene procedures. In particular all vehicles, footwear, materials, and equipment must be clean and sterilised prior to entering the sites.

Delivery groups: DENR, AMLR NRM, MDB NRM, CCSA, contractors, landholders

Action 2. Preserve seed and augment populations

2.1 Collect seed and investigate germination requirements

Additional seed should be collected from both *H. tenuis* populations for long-term storage at the Adelaide Botanic Gardens. Ideally seed should be sourced from all reproductive plants, with the aim of capturing the majority of genetic variability in each population. Studies should be undertaken to determine the germination requirements of the species (i.e. seed scarification, smoke etc).

Delivery groups: DENR, ABG

2.2 Propagate and plant cuttings into existing sub-populations

Both existing *H. tenuis* populations should be augmented by planting cuttings to supplement natural recruitment. Cuttings have already been propagated from plants at Yundi, which will be planted back into this population. Refer to the Translocation Proposal in Appendix 1 for further details.

Delivery groups: DENR, MLBG, AMLR NRM, MDB NRM

2.3 Establish an *ex-situ* population

An *ex-situ* collection of cuttings should be propagated and maintained at the Mount Lofty Botanic Gardens. Ideally cuttings should be sourced from all remnant plants, with the aim of capturing the majority of genetic variability in each population. The *ex-situ* population could then be used as a source of material for future propagation.

Delivery groups: DENR, MLBG

Action 3. Establish new populations

3.1 Establish new populations in conservation reserves

Attempts should be made to establish new populations in conservation reserves (e.g. Stipiturus CP and Hesperilla CP). Cuttings should be propagated and planted into these reserves, with the aim of establishing large viable populations. Refer to the Translocation Proposal in Appendix 1 for further details.

Delivery groups: DENR, MLBG, AMLR NRM, MDB NRM

3.2 Identify additional locations to establish new populations

Opportunities to establish additional planted populations in suitable areas should be identified. Ideally these areas would be substantial enough to establish viable populations, and would need to be appropriately managed, and preferably protected for conservation. The translocation plan should be amended to include any additional sites.

Delivery groups: DENR

Action 4. Search for additional sub-populations

4.1 Undertake targeted surveys in areas of suitable habitat

Targeted surveys should be conducted in areas of potential habitat within known range of the species. It is possible that additional population may exist, especially on private land, in the Yundi, Finnis and Tooperang areas.

Delivery groups: DENR

Action 5. Involve the community

5.1 Establish a recovery team

A recovery team should be established, comprising of representatives from relevant local and state government agencies, landholders, non-government organisations, and community groups. The team should oversee the management of the species and the implementation of this plan.

Delivery groups: DENR, CCSA, AMLR NRM, MDB NRM, TPAG

5.2 Raise awareness of the species

The recovery program should be promoted through media articles, fact sheets etc to inform the community and raise awareness of the species.

Delivery groups: DENR, CCSA, AMLR NRM, MDB NRM

References

Toelken, H.R. (1995). Notes on *Hibbertia*. New taxa from south-eastern Australia. *Journal of the Adelaide Botanic Gardens* 16: 70

TSSC (Threatened Species Scientific Committee) (2009). Listing advice for *Hibbertia tenuis*.

Translocation Proposal for *Hibbertia tenuis*

Summary

This translocation proposal aims to augment existing populations of *Hibbertia tenuis* by propagating and planting cuttings. It is also proposed to establish new populations in conservation reserves with cuttings from remnant populations.

Translocation is intended to occur in conjunction with other recovery actions for the species (as outlined in the main body of this plan). This translocation proposal has been prepared following the Guidelines for the Translocation of Threatened Plants in Australia (Vallee et al 2004). Detailed information about the species' distribution, biology and ecology, threats, and recovery actions are outlined in the main body of this plan.

Translocation objective

- To reduce the immediate risk of extinction by increasing the size of remaining populations
- To increase the number of populations and locations of the species

Justification for translocation

Population augmentation is considered necessary to achieve the stated objectives of this proposal. Both existing populations are extremely small, and are at very high risk of extinction. Threat abatement and habitat protection, while being important for the long-term recovery of the species, are unlikely to prevent the likely decline or loss of populations. Habitat manipulation may also benefit the species (e.g. burning or soil disturbance), but its success is likely to be dependent on the amount of viable seed in the soil, which could be very limited.

The establishment of new populations in reserves could increase the species long-term chance of survival. However, it is possible that cuttings may not survive in these areas due to differences in habitat. The action is still considered worthwhile given the low risk and cost, and potential benefit.

Translocation Methodology

Collecting cuttings

It is proposed to collect cuttings from the two remnant plants at Gum Tree Gully in 2011. Cuttings have already been taken from fifteen plants in the Yundi population, but more may be taken if additional plants are found. Cutting material will be taken from firm new growth in late summer to autumn. Care will be taken to minimise the impact on remnant plants, whilst still ensuring adequate material for propagation. The cutting material will be immediately transferred to Mount Lofty Botanic Gardens (MLBG) for propagation.

Propagation

Propagation of cuttings from the Gum Tree Gully population will be undertaken by MLBG. About 130 cuttings from the Yundi population have already been propagated by the MLBG. If additional remnant plants are found then cuttings should be taken and propagated to maximise the genetic diversity of transplants.

Translocation

Augmenting existing populations

It is proposed to plant cuttings in and around both existing populations. Cuttings will be sourced from recipient populations. It is aimed to plant at least 100 cuttings into the Yundi population and 50 cuttings

into the Gum Tree Gully population, but this number could be increased based on the success of initial plantings. It is intended to stage the planting over several years to reduce the chance that the translocation should fail due to an unfavourable season or unforeseen event.

Establishing additional populations

It is also proposed to plant cuttings sourced from both existing populations into Stipiturus Conservation Park and Hesperilla Conservation Park. While the species is not known to have occurred at these sites, and there are differences in the swamp habitat (especially substrate), it is still considered worthwhile attempting to establish additional populations within these reserves. Relatively small numbers of cuttings will be planted initially (10-20 plants) to minimise potential losses. If these survive then more cuttings can be propagated and planted.

Establishing an ex-situ population

It is also proposed to maintain an ex-situ collection of cuttings at the MLBG. This could be used as a source of material for propagating additional cuttings for translocation.

Site preparation

Both existing sites require minimal preparation prior to planting. The cuttings will be planting into gaps in native vegetation where possible. Some selective pruning of ground covers may be required to reduce competition prior to planting and during establishment. Blackberry and other invasive weeds will be treated prior to planting and follow-up will be undertaken as required.

Translocation logistics

Timing of planting

It is aimed to plant approximately 30-40 cuttings into the Yundi population in July 2011, and similar numbers in the following years (2012-13). The planting of cuttings into the Gum Tree Gully population may not occur until 2013-14 depending on the success of propagation and the availability of material. Planting at this site will also be staggered over several years.

Planting

Seedlings will be laid out randomly in the recipient sites prior to planting, taking advantage of natural gaps in the vegetation, or according to where pre-treatment of ground covers has occurred. Holes will be dug in a way that inflicts minimal damage on the surrounding vegetation and soil structure. Watering in will not be required. Strict disease hygiene measures will be followed throughout the translocation.

Maintenance

The established cuttings should require minimal maintenance. Cages may be considered if the cuttings are being heavily browsed by kangaroos, but this is unlikely. Ongoing control of Blackberry and other invasive weeds around the populations will be a high priority.

Monitoring and evaluation

It is planned to monitor the survival, health and reproductive output of planted individuals. In general this will involve assessing the number of transplants that have survived, their condition, and whether flowers or fruits have been produced. Evaluation will be based on the survivorship and reproductive success of transplants.

Permits

An application for a Scientific Research Permit will be submitted, including all activities related to this translocation.

Resources and funding

Funding for this project will be sought from a range of sources including the AMLR NRM Board, MDB NRM Board, Native Vegetation Council, and Urban Forest Biodiversity Project.