TRANSLOCATION PROPOSAL
Foote's Grevillea
Grevillea calliantha R.O. Makinson & P.M. Olde (Proteaceae)

1. SUMMARY

G. calliantha was first discovered in 1981 by Nick Foote, but was not named until 1991. The name *calliantha* is derived from the Greek *callos* meaning "beauty" and *anthos* meaning "a flower" (Olde and Marriott 1995) referring to the spectacular and prolific displays of inflorescences that this species produces.

Grevillea calliantha, is a compact shrub, which grows to around one metre tall and two to three metres wide. The leaves are greyish, yellow-green in colour, between 4 and 7.5 cm long, divided almost to the midrib, with lobes 1 - 1.1 cm wide. Lobes at the apex sometimes have a pungent point. Leaf margins are rolled under enclosing the lower surface except for the midrib. Midrib conspicuous on the upper leaf surface. The inflorescences on older plants are often located beneath and at the edge of the layered foliage, they are initially greenish-yellow, ageing to apricot-orange with a dark red style. Between 15 and 30 flowers are contained per inflorescence which is borne terminally or on short lateral branches. Flowering occurs between September and February, peaking from September to November. Large quantities of nectar are produced which encourages visitation by honeyeaters. Two seed per follicle are produced and are released from mid-October to February (Makinson and Olde 1991, Olde and Marriott 1995).

Much of the site of the first collections has since been cleared and due to the small size of these populations, the restricted range of the species and its vulnerability to accidental destruction and weed invasion, *G. calliantha* was declared as Rare Flora in 1989 and ranked as Critically Endangered in September 1995.

G. calliantha is endemic to an area near Dandaragan where it is known to occur over a range of just eight kilometres. There are only six populations of this species that occur within an eight kilometre radius with a combined total of just 137 individuals. *G. calliantha* grows in soils of grey to yellow-brown sand over laterite. It occurs in areas of low heath with scattered, emergent *Eucalyptus todtiana* on lower to mid level slopes to low hills.

An Interim Recovery Plan has been drafted for this species. Under section 3.3.8 this plan recommends the consideration of translocation to a secure site and also recommends that steps should be taken to initiate this (Papenfus, Brown, Bunny, in draft). Due to the small number of individuals of this species and the presence of most of these populations on narrow degraded road verges or on land that is not managed for conservation purposes the need for translocation is considered to be high.

The aim of this translocation proposal is to conserve the wild genetic stock of the species by establishing at least one more viable population of *G. calliantha.* This will be achieved by translocating this species to another part of the Reserve where population 1 already occurs. This translocation proposal outlines the need for translocation of the critically endangered *G. calliantha*, the site selection process, the design of the translocation site and the provisions for monitoring. In addition it outlines the criteria for success or failure of this proposed translocation.

2. PROPONENTS

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3. BACKGROUND

3.1 History, Taxonomy and Status

The name *calliantha* is derived from the Greek *callous* meaning "beauty" and *anthos* meaning "a flower" (Olde and Marriott 1995) referring to the spectacular and prolific displays of inflorescences that this species produces.

Grevillea calliantha, is a compact shrub, which grows to around one metre tall and two to three metres wide. The leaves are greyish, yellow-green in colour, subsessile, or with petioles up to 3 mm long. The leaves are between 4 and 7.5 cm long, divided almost to the midrib (pinnatipartite), with lobes 1 - 1.1 cm wide. Lobes at the apex sometimes have a pungent point. Leaf margin rolled under enclosing the lower surface except for the midrib. Midrib conspicuous on the upper leaf surface. The inflorescences on older plants are often located beneath and at the edge of the layered foliage, they are initially greenish-yellow, ageing to apricot-orange with a dark red style. Between 15 and 30 flowers are contained per inflorescence which is borne terminally or on short lateral branches. Flowering occurs between September and February, peaking from September to November. Large quantities of nectar are produced which encourages visitation by honeyeaters. Two seed per follicle are produced and are released from mid-October to February. Seed is slightly curved, 12.5 mm long and 2 - 2.5 mm wide (Makinson and Olde 1991, Olde and Marriott 1995).

G. calliantha was first discovered in 1981 by Nick Foote, a commercial plant collector. Subsequent searches by Dr Steve Hopper of CALM located five small populations. The type specimen was collected in 1989 from near Cataby, by B.J. Conn, however, the species was not named until 1991.

This species is known to be a both a nonsprouter (Olde and Marriott 1995) and a resprouter (regeneration from rootstock was observed following a fire in Population one in May 1993). Viability of the seed ranges from 80 to 100% (A. Cochrane pers. comm.).

Much of the area where the first collections were made have since been cleared and the species is currently known from just six, mostly small populations. Due to the size of these populations, the restricted range of the species and its vulnerability to accidental destruction and weed invasion, *G. calliantha* was declared as Rare Flora in 1989 and ranked as Critically Endangered in September 1995.

3.2 Distribution and Habitat

G. calliantha is endemic to an area near Dandaragan where it is known to occur over a range of just eight kilometres. Four populations consisting of a mere 27 mature plants occur on extremely narrow, degraded road reserves. The largest population of around 100 plants occurs on private property. A total of 10 plants occur in a Reserve that is managed by the Shire of Dandaragan.

G. calliantha grows in soils of grey to yellow-brown sand over laterite. It occurs in areas of low heath with scattered, emergent *Eucalyptus todtiana* on lower to mid level slopes to low hills. Other associated species are listed below in Table 1.

4. THE TRANSLOCATION

4.1 The Need to Translocate

The rarity of this species is probably due to extensive habitat clearance for agricultural purposes in the Dandaragan area. The small remnant populations of this species are exposed to threats such as weed invasion, grazing by kangaroos and rabbits, road maintenance activities, inappropriate fires, adverse effects from adjacent agricultural practices and potentially Dieback (*Phytophthora cinnamomi*).

There are only six populations of this species, that occur within an eight kilometre radius. There is a combined total of just 137 individuals with over 100 of these occurring in one population on private property. A further population occurs in a Reserve vested in the Shire of Dandaragan. In 1988 the Shire Council opposed a CALM recommendation that the Reserve become a Class A Nature Reserve for the purposes of Conservation of Flora and Fauna, so that "they could keep their options open".

An Interim Recovery Plan has been drafted for this species. Under section 3.3.8 this plan recommends the consideration of translocation to a secure site and also recommends that steps should be taken to initiate translocation (Papenfus, Brown, Bunny, in draft). Due to the small number of individuals and the presence of most of these populations on narrow degraded road verges, or on land that is not managed for conservation purposes, the need for translocation is considered to be high.

4.2 Translocation Site Selection

A search was made of areas around the known populations at Cataby on 24th February 1998 to locate a suitable translocation site. An area on the south western corner of Reserve # was chosen as the translocation site. A buffer of at least 100 meters will be allowed between the proposed site and the edge of the reserve. This site was chosen because is only approximately 800 metres from the existing population 1 as well as having several attributes in common with the existing populations. A map of the proposed translocation site in relation to the known populations is shown in Appendix one.

Endorsement for the use of this site was received from the Midwest Region (Appendix three) and from the Shire of Dandaragan (Appendix four). The neighbouring landowners have been contacted by telephone on 25 June 1998 and informed of the translocation.

The proposed translocation site has a soil type of yellow-brown sand over laterite, with an underlying geology of Colluvium (soils found at the foot of a slope) - quartz sand and soil (Carter and Lipple 1982) which is similar to the know populations. The know populations have a soil type of grey to yellow-brown sand over laterite, which has an underlying geology of Colluvium quartz sand and soil or laterite and associated sand (Carter and Lipple 1982).

Table 1. A comparison of the associated vegetation at the proposed translocation site within the Reserve with the known populations of *Grevillea calliantha*.

Associated species of the proposed translocation site within the Reserve	Associated species of the original populations of *Grevillea calliantha*.
Acacia pulchella	*Acacia pulchella*
Adenanthos cygnorum	*Adenanthos cygnorum*
	Allocasuarina humilis
	Anigozanthos humilis
	Anigozanthos pulcherrimus
	Banksia attenuata
Calothamnus quadrifidus	*Calothamnus quadrifidus*
	Conostylis teretifolia
Eucalyptus calophylla	*Eucalyptus calophylla*
	Eucalyptus todtiana
	Gastrolobium spinosum
	Grevillea uncinulata
	Grevillea synapheae
	Hakea auriculata
	Hakea trifurcata
Hibbertia hypericoides	*Hibbertia hypericoides*
	Hypocalymma angustifolium
	Jacksonia sp.
	Lambertia multiflora
	Lechenaultia linariodes
	Nuytsia floribunda
	Synaphea spinulosa
	Xanthorrhoea sp.

Both the translocation site and the existing populations have a similar vegetation structure of Low Heath C with Open Low Woodland A (using Muir's classification). The translocation site has many associated species in common with the know populations. These are listed in Table 1.

The proposed translocation site was chosen because the environmental attributes of climate, soil type, vegetation structure and associated vegetation are almost identical to the known populations of this species. The proposed translocation site is only 800 metres from the nearest known occurrence of this species (population 1). Therefore, it is considered highly likely that the pollinators of this species, most likely Honeyeaters (Olde and Marriott 1995), will also visit the proposed translocation site as well the know populations, which is essential for self perpetuation of the translocated population and therefore the creation of a viable self sustaining population.

4.3 Translocation Design

A total of 95 seedlings of *G. calliantha* have been raised for this years translocation.

At the proposed translocation site three replicates of 12m x 4m each will be measured. Each replicate will be divided into a grid of 30 holes, arranged in three rows of ten, with 1m between each hole and a border of 1m on each side of the plot.

A total of three treatments will be tested: control, mulched or watered (see Table 2). Treatments will be randomly assigned to one row in the grid (see Appendix two for site diagram).

Seedlings have been raised at the accredited nursery at Kings Park and Botanic Gardens and therefore are considered disease free. All equipment used during seedling planting will be maintained under strict disease hygiene.

An irrigation system will be set up in November 1998 to water weekly those plants assigned to the watering treatment (see Table 2). A soil wetting agent will be added to the soil around these plants.

Table 2. Description of experimental treatments.

Treatment	Description of Treatment
Control	Plants not given any treatment.
Mulched	A layer of mulch is placed around the plant to see whether it enhances survival by increasing water retention.
Watered	Plants will be watered with a set amount of water once a week for 24 weeks from the start of November to the end of April to see whether watering over the first summer enhances survival.

Each plant will be permanently tagged so that each individual will always be identifiable. A small cage of rabbit netting will be placed around each plant to prevent large herbivores from eating the plants.

Monitoring of the translocated population will be undertaken every second month commencing one month after the planting out of the seedlings. Monitoring will include counting the number of surviving germinants, height of the surviving germinants, width of the crown of the surviving germinants in two directions (so that crown volume can be calculated), reproductive state, number of inflorescences and follicles, whether second generation plants are present and general health of the plants. A set photo point will be allocated for each plot and a photo will be taken each time monitoring takes place.

Monitoring of the original populations will also occur every second month in conjunction with monitoring of the translocated populations. This will provide essential baseline data for assessing the performance of the translocated population. Monitoring will include counting the number of individuals, height and crown width of the individuals, reproductive state, number of inflorescences and follicles and general health of the plants.

4.4 Source of Plants

Seed was collected under guidelines outlined in Appendix five. Seed has been sourced from population two and six for planting at the translocation site in 1998. These populations are only 7.75 km and 2.8 km away from the proposed translocation site respectively, and are not considered likely to be genetically different (D. Coates pers. comm). No seed was sourced from population one, which is only 800 m from the translocation site as plants were juveniles, having produced no fruit since a fire several years ago. No seed was sourced from

populations three, four or five as insufficient seed was available. Seedlings are being raised at Kings Park and Botanic Gardens nursery after being germinated at the Threatened Flora Seed Centre.

4.5 Criteria for Success or Failure

Criteria for Success

- Short Term: after one generation the number of individuals is sustained by natural recruitment
- Long Term: after two or more generations the number of individuals is sustained by natural recruitment

Criteria for Failure

- There is a significant decline in population size due to lack of natural recruitment

5. TIMETABLE

Time	Action
November 1997	Seeds put down for germination.
February 1998	Translocation site selected.
April 1998	Translocation proposal submitted for review.
May - June 1998	Translocation of seedlings into the translocation site.
June - July 1998	Follow up monitoring and maintenance of translocation site.
August 1998 - May 1999	Monitoring and maintenance of translocation site.
November 1998	Setting up of irrigation system.
October 1998	Translocation proposal for 1999 translocation submitted for review.
November 1998	Second batch of seeds put down for germination. Resulting seedlings raised at Kings Park and Botanic Gardens.
April 1999	Progress report.
May - June 1999	Further translocation of seedlings into the translocation site.
June - July 1999	Follow up monitoring and maintenance of translocation site.
August 1999 - May 2001	Monitoring and maintenance of translocation site.
May 2001	Final Report

6. FUNDING

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7. ACKNOWLEDGMENTS

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8. REFERENCES

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Makinson R.O. and Olde P.M. (1991) *A new species of Grevillea (Proteaceae: Grevilleoideae) from the south-west Western Australia*. Telopea Vol 4(2), pp 351-355.

Olde P. and Marriott N. (1995) *The Grevillea Book* Vol 2. Kangaroo Press, Kenthurst NSW

Papenfus D., Brown A. and Bunny F. (in draft) Foote's Grevillea (*Grevillea calliantha*) Interim Recovery Plan Department of Conservation and Land Management. Perth WA

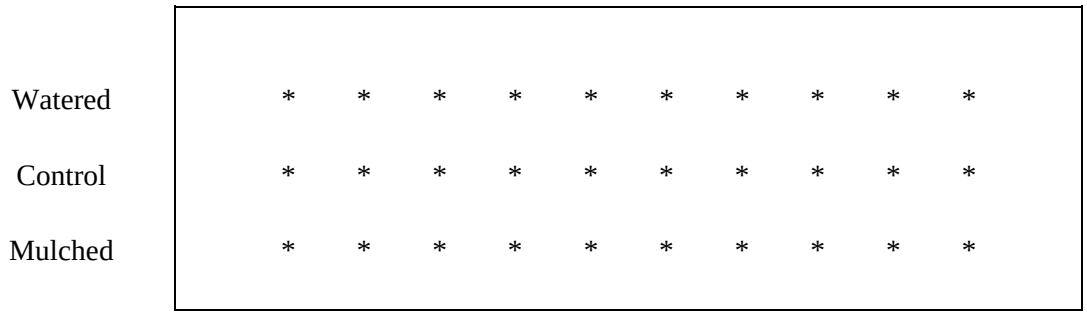
Appendices One, Three, Four and Five may be avaialbe on contacting the authors.

Appendix Two.

Site Diagram for Proposed Translocation of *Grevillea calliantha*

There is a total of 95 seedlings of *Grevillea calliantha* available.
These will be planted as shown in the diagram below, with one seedling at each point marked with an asterix (*).
The three treatments of control, mulched, watered will be assigned as per the diagram below.

Replicate 1



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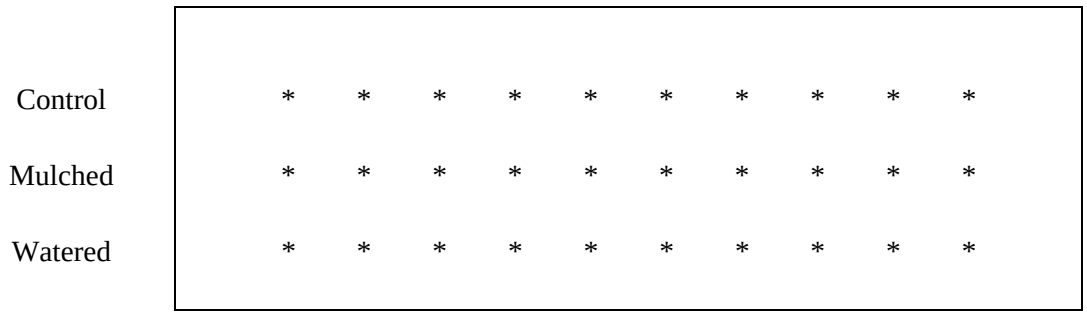

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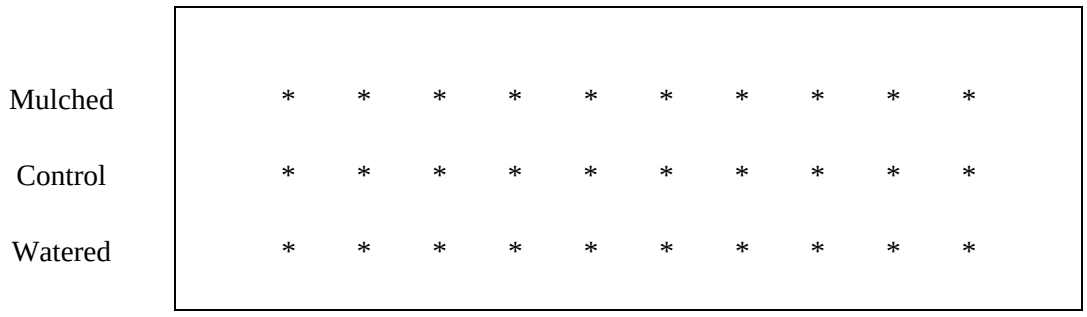

Scale: 1 m