TRANSLOCATION PROPOSAL
McCutcheon's Grevillea
Grevillea maccutcheonii G.J. Keighery & R.J. Cranfield (Proteaceae)

1. SUMMARY

Gary Robertson a farmer in the Tutunup area first discovered *G. maccutcheonii* sometime prior to 1992. The name "*maccutcheonii"* refers to Graeme McCutcheon formerly from the Environmental Protection Division of CALM who was instrumental in protecting the new species.

Grevillea maccutcheonii, is an erect, densely branched, spreading and domed shrub to 2m in height and width Mature leaves are sessile, 12-33 mm long, 6–22 mm wide, with a distinct white margin. There are three lobes all terminating in pungent points and the leaf base clasps the stem. The flowers are reddish green and arranged in a terminal 26-42 flowered inflorescence. Flowering occurs between May and December with a peak between July and November (Keighery and Cranfield 1996). It is likely to be a nonsprouting species as it lacks a lignotuber (Keighery and Cranfield 1996). Viability of the seed ranges from 77 to 80% (A. Cochrane pers. comm.).

The rarity of this species is probably due to its restriction to a soil type of which 90% has been cleared for agriculture. *G. maccutcheonii* is endemic to a small area (10m by 220m) near Busselton where it is known from just 15 individuals. *G. maccutcheonii* grows in winter wet flats and slight depressions with shallow red brown sandy clay soils over ironstone (Keighery and Cranfield 1996, English in prep). It occurs in vegetation described as shrublands on southern ironstones (Gibson et. al 1994), a critically endangered community (English, in prep.)

An Interim Recovery Plan has been drafted for this species. Under this plan translocation to a secure site is recommended (Phillimore and Papenfus, in draft). Due to the small number of individuals of this species and the presence of several threatening processes 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 over a 5 year period by establishing additional populations of *G. maccutcheonii* at sites with secure tenure and where threats such as weed invasion and dieback have been ameliorated. This will be achieved by restocking the known population and translocating to nearby nature reserves and other suitable lands with appropriate tenure. This translocation proposal outlines the need for translocation of the critically endangered *G. maccutcheonii,* 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

G. maccutcheonii was first collected by Gary Robertson, a farmer in the Tutunup area sometime prior to 1992. He had not seen this plant anywhere else, and passed the specimen to Graeme McCutcheon of the Environmental Protection Branch of CALM. He recognised it as an undescribed species and lodged a specimen with the Western Australian Herbarium. In 1996 Greg Keighery and Ray Cranfield named the species *Grevillea maccutcheonii* in honour of the work Graeme McCutcheon had done to conserve the species.

Grevillea maccutcheonii, is an erect, densely branched, spreading and domed shrub to 2m in height and 2m in width. Mature leaves are sessile, 12-33 mm long, 6–22 mm wide, with a distinct white margin. There are three lobes all terminating in pungent points and the leaf base clasps the stem. The flowers are reddish green and arranged in a terminal 26-42 flowered inflorescence. Flowering occurs between May and December with a peak between July and November (Keighery and Cranfield 1996). It is likely to be a nonsprouting species as it lacks a lignotuber (Keighery and Cranfield 1996). Viability of the seed ranges from 77 to 80% (A. Cochrane pers. comm.).

In 1993 the species was known from 27 plants, five on the road verge and 22 in the adjoining private property. However, grazing by cattle is believed to have killed all plants on the private property. The landowner removed the cattle and CALM has since purchased the land, however no regeneration of the plants has occurred. Road grading caused the death of a plant on the road verge, reducing the overall population to four. There are presently 15 plants following the recruitment of 16 seedlings in 1996/7 and five seedlings in 1999 and the death of one mature plant and nine seedlings. Between 1992 and 1994 extensive surveys were undertaken of the southern Swan Coastal Plain by CALM and the Conservation Council of Western Australia. Despite the intensive level of search effort during this survey and other surveys specifically targeting this species no new populations of *G. maccutcheonii* were located.

The species is currently known from just one small population of 15 individuals on a shire road reserve. Due to the restricted range of the species and its vulnerability to accidental destruction from clearing, road maintenance activities and grazing, *G. maccutcheonii* was declared as Rare Flora in 1994 and ranked as Critically Endangered in September 1995.

3.2 Distribution and Habitat

G. maccutcheonii is endemic to an area near Busselton where it is known to occur in one small area of approximately 10m by 220m. Only 14 mature and 1 juvenile plants occur on the degraded Shire road reserve.

G. maccutcheonii grows in the Abba Wet Ironstone Flats, which are winter wet flats and slight depressions with shallow red brown sandy clay soils over ironstone (Keighery and Cranfield 1996, English in prep). It occurs in vegetation described as shrublands on southern ironstones (Gibson et. al 1994), which is a community type listed as critically endangered (English, in prep.)

4. THE TRANSLOCATION

4.1 The Need to Translocate

G. maccutcheonii is restricted to the southern ironstone shrublands near Busselton. Up to 90% of this community type is believed to have been cleared for agriculture (English, in prep). The small remnant population of this species is presently exposed to threats such as dieback (*Phytophthora cinnamomi*), other fungal diseases, rising salinity, problems associated with small population size (such as inbreeding depression) and weed invasion.

There is only one population of this species with just 15 individuals, this combined with the numerous threats and the scarcity of this vegetation type means there is an urgent need to establish more individuals and more populations of G. *maccutcheonii*. An Interim Recovery Plan recommending translocations for this species was approved in 1999.

4.2 Translocation Site Selection

An initial search was made of areas around the known population at Busselton on 10th January 2000 to locate possible translocation sites. Two areas were chosen as suitable for the initial translocation attempt. The present population (O Road) will be targeted for augmentation, and an area of southern ironstone shrubland, recently purchased by CALM (N Block), will have plants introduced to the site. A map of the proposed translocation sites is shown in Appendix one.

Endorsement for the use of these sites was received from the Central Forest Region (Appendix two).

The present population is proposed as an augmentation site as this clearly has the edaphic and hydrological conditions suitable for this species. An area of 3.9 hectares of private property directly behind the road verge population of *G. maccutcheonii* was recently purchased by CALM. Action has commenced to have this area declared as a A Class Nature Reserve. The security of land tenure combined with the suitable edaphic and hydrological conditions means this is an ideal choice as a translocation site. This can therefore be considered a restocking or augmentation under the definitions provided by Policy Statement 29 and the Guidelines for Translocation of Threatened Plants in Australia.

The second site (N Block,) is listed as Occurrence 2 of the Southern Ironstone Shrubland Association (English, in prep). This site, therefore, also has the same edaphic and hydrological conditions as the known occurrence of *G. maccutcheonii*. In addition there is a similar assemblage of associated plant species at O Road and N Block. It must, however, be noted that the N Block site is exposed to threats simliar to those at O Road. These threats will be managed in the manner described in section 4.3. This site was recently purchased by CALM and is proposed as an A Class Nature Reserve. The combination of security of land tenure, appropriate edaphic and hydrological conditions and a similar plant assemblage means this is a suitable introduction site for *G. maccutcheonii*. In addition it is only 4.5km from the O Road population. As this species has not previously been recorded from this reserve this translocation can be considered an introduction under the definitions provided by Policy Statement 29 and the Guidelines for Translocation of Threatened Plants in Australia.

4.3 Translocation Design

Threats to the survival of this species will be monitored at each translocation site. Weeds will be sprayed prior to the translocation of plants into the area and the application of weed matting of different types will be trialed where necessary. The control of weeds will therefore be incorporated into the regular maintenance of the sites. The presence of Dieback will be monitored regularly by Regional dieback interpreters or soil sampling. If dieback is assessed as being a threat to the translocation aerial or hand application of phosphite will be undertaken.

Five experiments will be established on the O Rd location and one on the Occurrence 2 (Ns Block) location. The limited number of plants and the need to increase the number of sites where *G. maccutcheonii* occurrs has resulted in the need to split the experimental design between the two sites. As we will not be making statistical comparisons between treatments that are on different sites this was seen as a way of better utilising the limited number of plants.

A total of 332 (29 seedlings, 303 cuttings) plants have been raised for this years translocation. It is proposed to plant the 29 seedlings in the area directly behind the road verge at the O Road population making use of disused fence post holes as planting sites (Experiment 1). The remaining plants, raised from cuttings, will be distributed between the restocking site at O Road (240 cutting derived plants) (Experiment 2) and the introduction site (Occurrence 2, N Block, 63 cutting derived plants). Table 2 describes the treatments applied to each plot. See Appendix 3 for plot layout. Plots will not be cleared of vegetation at the N Block site, instead seedlings will be planted in gaps in the vegetation, adhering as close as possible to the grid pattern presented in this proposal. In this way there will be minimal disturbance to the natural vegetation. There appears to be no reason that there would be adverse effects on the conservation values of this area from this translocation.

Table 2. Description of experimental treatments.

Treatment	Description of Treatment
Fertiliser	Slow release fertiliser added around the plant at planting time
Watered	Plants will be watered with a set amount of water once a week over the first summer. If it is deemed necessary watering will continue over subsequent summers.
Mounding	Create a raised planting site using local soil to minimise inundation of roots.
Ripping	Shattering the surface layers of ironstone to allow root penetration.

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

Each plant will be permanently tagged so that each individual will always be identifiable. The entire O Road site is enclosed in a combination electric and rabbit proof fence. Small cages of rabbit netting may be placed around each plant if this proves to be inadequate. Occurrence 2 (Ns Block) plants will be individually caged.

Monitoring of the translocated population will be undertaken monthly for the first three months post planting then reduced to every third month commencing for a two year period. Monitoring will include counting the number of surviving plants, height of the surviving plants, width of the crown of the surviving plants 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 third 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

Seedlings are being raised at Kings Park and Botanic Gardens nursery after being germinated at the Threatened Flora Seed Centre. Cutting material was collected from three adult plants in 1993, from three adult plants in 1994, from three adult plants in 1997 and from five adult plants in 1998. It is likely that some of these collections represent the same genetic material and that less than 14 clones were collected. Cuttings are being raised at Kings Park and Botanic Gardens nursery.

4.5 Criteria for Success or Failure

Criteria for Success

- Short Term: establishment of translocated seedlings and cuttings
  production of flowers and seed
  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, and a soil stored seed bank has been established.
- The production of guidelines for the establishment of future translocations of related species.

Criteria for Failure

- Short Term: failure of translocated seedlings and cuttings to establish
  failure of plants to produce flowers and seed
- Long Term: there is a significant decline in the size of the translocated population due to lack of natural recruitment

5. TIMETABLE

Time	Action
February 1998 – April 2000	Plants raised from cutting material
January 2000	Translocation site selected.
April 2000	Translocation proposal submitted for review.
August 2000	Translocation of seedlings into O Road and N Block.
August 2000 – August 2001	Three monthly monitoring of translocated plants.
October 2000	Further cuttings taken from stock plants.
November 2000	Setting up of irrigation system.
May - June 2001	Further translocation of seedlings into the translocation sites.
May 2001 - May 2005	Once or twice yearly monitoring of translocated plants and soil seed bank and maintenance of translocation sites.
May 2005	Final Report

6. FUNDING

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7. ACKNOWLEDGMENTS

Val English, Robyn Phillimore and Russell Smith are thanked for their input in selecting suitable translocation sites.

8. REFERENCES

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Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994). *A floristic survey of the southern Swan Coastal Plain*. Unpublished Report for the Australian Heritage Commission. Prepared by Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.).

Keighery G.J. and Cranfield R.J. (1996). *Grevillea maccutcheonii* (Proteaceae), a new rare *Grevillea* from Western Australia. *Nuytsia 11 (1)*, pp 33-36.

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Appendices One and Two may be available on contacting the authors.

Appendix Three.
Diagram of the proposed layout of the treatments and plots.

O Road
Experiment 1
(where the control plants are those controls used for Experiment 2, 3 and 4)

Planting into old drill holes	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Planting into old drill holes	*	*	*	*	*	*	*	*	*	*	*	*	*	*	

Experiment 2 - Mounding

Mounded	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Not Mounded (Control)	*	*	*	*	*	*	*	*	*	*					

Mounded	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Not Mounded (Control)	*	*	*	*	*	*	*	*	*	*					

Mounded	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Not Mounded (Control)	*	*	*	*	*	*	*	*	*	*					

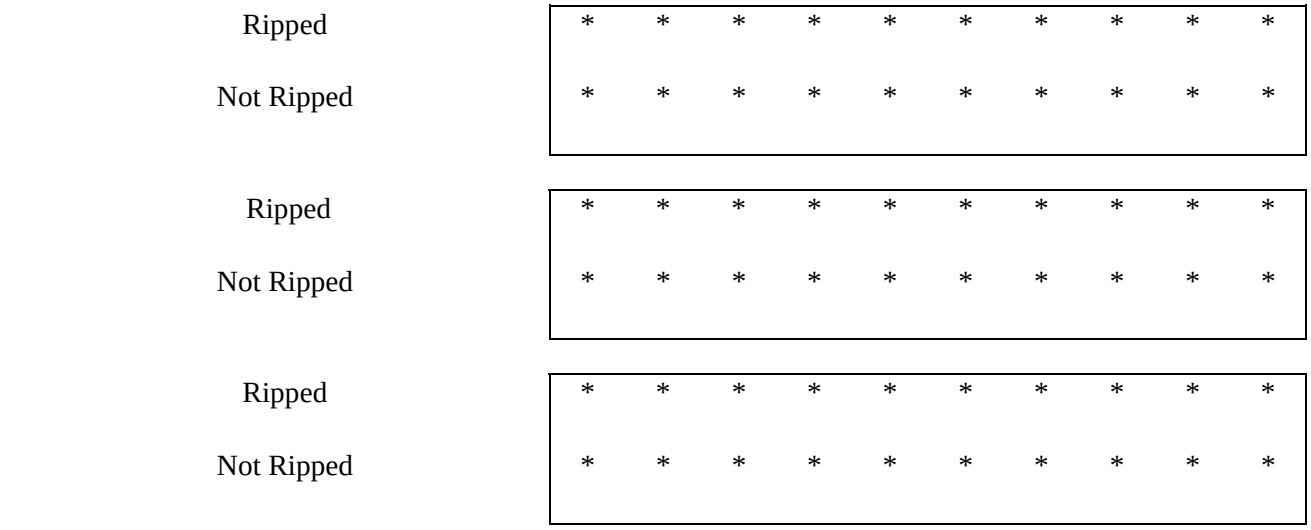
Experiment 3 - Watering

Watered	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Not Watered (Control)	*	*	*	*	*	*	*	*	*	*					

Watered	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Not Watered (Control)	*	*	*	*	*	*	*	*	*	*					

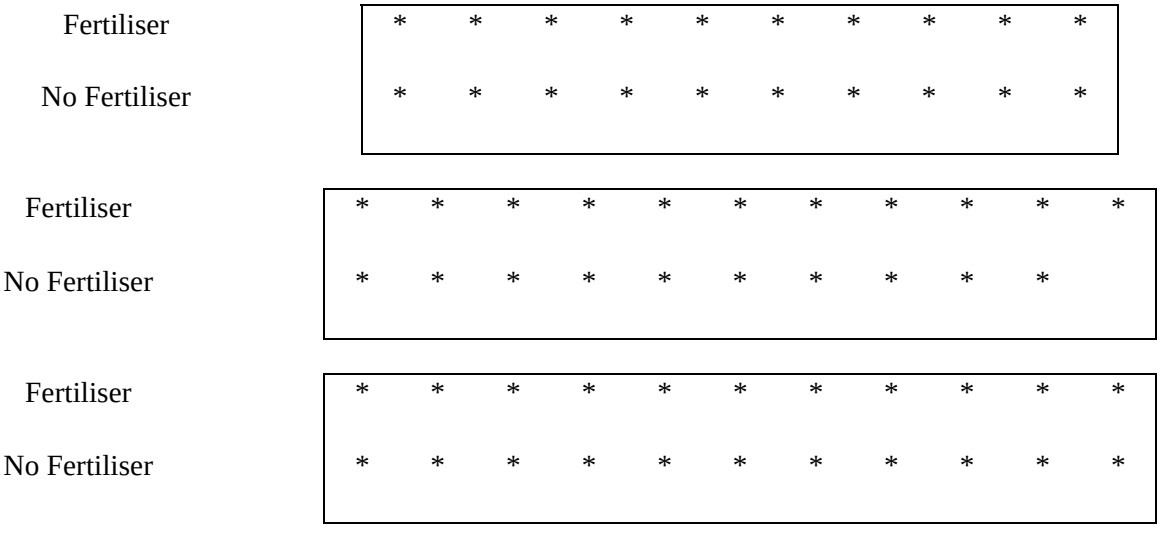
Watered	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Not Watered (Control)	*	*	*	*	*	*	*	*	*	*					

Experiment 4 - Ripping



Experiment 5 – Watered/Ripped/Mounded
(where the control plants are those controls used for Experiment 2, 3 and 4)

N Block
Experiment 6 - Fertiliser



Scale: 1.5 m