TRANSLOCATION PROPOSAL
Western Prickly Honeysuckle
Lambertia echinata subsp. *occidentalis* Keighery (Proteaceae)

1. SUMMARY

Lambertia echinata subsp. *occidentalis* is a recently described member of the endemic Australian genus. It is a shrub to 3 m, much branched at the base and with a few long erect floral branches. There are two types of leaves - vegetative and floral. The vegetative leaves are entire and linear-lanceolate with a pungent tip. The floral leaves, which are smaller than the vegetative leaves, are either entire or lobed with three to five points. Flowers are yellow, 2.3 - 2.6 cm long, with recurved lobes and occur between October and December. Floral bracts are thin and membranous, narrowly obovate with a sharp point at the apex. Inflorescences are 7-flowered and crowded at ends of long floral branches (Keighery, 1997).

It was first found by Bronwen Keighery and Neil Gibson in Oct 1992 when they were undertaking field work for the Swan Coastal Plain survey. Initially it was thought that it was *L. echinata* subsp. *citrina*, with a few differences. However, population genetic studies showed it that warranted further taxonomic work and subsequently it was named as a new subspecies within the *L. echinata* complex (cited in Obbens and Coates, 1997).

Despite the scope of the Swan Coastal Plain survey, which covered large areas in the Busselton region where this subspecies might be expected, no other populations were located. Due to the low number of plants, restricted distribution, threats associated with growing in a highly specialised habitat and susceptibility to *Phytophthora cinnamomi*, known to be present in the area, *L. echinata* subsp. *occidentalis* was declared to be Rare Flora in October 1996, and then ranked as Critically Endangered (Stack and Brown in draft).

Lambertia echinata subsp. *occidentalis* is endemic to the southern ironstones near Busselton. It is found on shallow sandy soils over sheet ironstone, which support rich scrub heath and sedges with scattered Banksias and Marri. The rarity of *L. echinata* subsp. *occidentalis* is probably due to the amount of clearing that has occurred for agricultural purposes in the Whicher Range area in conjunction with the loss of suitable habitat due to the introduction of *Phytophthora* spp. (Stack and Brown in draft). The death of one plant, of only 17 plants has already been confirmed due to *P. cinnamomi. P. cinnamomi* is considered to be such a serious threat to the survival of the only known population, that translocation to a disease free site is now an urgent priority (D. Coates pers. comm, Stack and Brown, in draft).

This translocation proposal outlines the need for translocation of the critically endangered *L. echinatat* subsp. *occidentalis*, the site selection process, the design of the translocation site and the provisions for monitoring. In addition it outlines the criteria for sucess or failure of this proposed translocation.

2. PROPONENTS

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3. BACKGROUND

3.1 History, Taxonomy and Status

Lambertia echinata subsp. *occidentalis* is a recently described member of the endemic Australian genus Lambertia (named after the English horticulturist Aylmer Lambert). It is a small genus of ten species, nine of which are from the south west of Western Australia. The name *echinata* is derived from the Latin word meaning hedgehog-like, referring to the prickly nature of the species. The name *occidentalis* is derived from the Latin word meaning western, which refers to the disjunct western occurrence of this subspecies (Keighery, 1997).

Lambertia echinata subsp. *occidentalis* is a shrub to 3 m, much branched at the base and with a few long erect floral branches. There are two types of leaves - vegetative and floral. The vegetative leaves are entire and linear-lanceolate with a pungent tip. The floral leaves, which are smaller than the vegetative leaves, are either entire or lobed with three to five points. Flowers are yellow, 2.3 - 2.6 cm long, with recurved lobes and occur between October and December. Floral bracts are thin and membranous, narrowly obovate with a sharp point at the apex. Inflorescences are 7-flowered and crowded at ends of long floral branches (Keighery, 1997).

It was first found by Bronwen Keighery and Neil Gibson in Oct 1992 when they were undertaking field work for the Swan Coastal Plain survey. Initially it was thought that it was *L. echinata* subsp. *citrina*, with a few differences. However, population genetic studies showed that there was a level of genetic divergence between this new species and *L. echinata* subsp. *citrina*, that warranted further taxonomic work and subsequently it was named as a new subspecies within the *L. echinata* complex (cited in Obbens and Coates, 1997).

Despite the scope of the Swan Coastal Plain survey, which covered large areas in the Busselton region where this subspecies might be expected, no other populations were located. Due to the low number of plants, restricted distribution, threats associated with growing in a highly specialised habitat and susceptibility to the effects of *Phytophthora*, known to be present in the area, *L. echinata* subsp. *occidentalis* was declared to be Rare Flora in October 1996, and then ranked as Critically Endangered (Stack and Brown in draft).

L. echinata subsp. *occidentalis* lacks a lignotuber. It is considered to be a nonsprouter, as it is known to be killed by fire, and regenerates solely from seed (Obbens and Coates 1997). Initial germination of the seed is high, between 93 and 100% (A. Cochrane pers. comm), which is another characteristic common to nonsprouters.

Like most other members of the genus, it is very susceptible to dieback disease caused by the fungus *Phytophthora cinnamomi.* The only known population of this subspecies is known to be infected with *P. cinnamomii* and a recent plant death has been confirmed to be due to that pathogen.

3.2 Distribution and Habitat

Lambertia echinata subsp. *occidentalis* is apparently confined to the Whicher Range area near Busselton. It is found on shallow sandy soils over sheet ironstone, which support rich scrub heath and sedges with scattered Banksias and Marri.

4. THE TRANSLOCATION

4.1 The Need to Translocate

The rarity of *L. echinata* subsp. *occidentalis* is probably due to the amount of clearing that has occurred for agricultural purposes in the Whicher Range area in conjunction with the loss of suitable habitat due to the introduction of *Phytophthora* spp. (Stack and Brown in draft). At present there are only seven adult and ten juvenile plants.

Obbens and Coates (1997) suggest that, whilst there is sufficient material of high genetic diversity to support a successful translocation, that translocation should only be considered if there has been no recruitment after two years. However, *P. cinnamomi* is such a serious threat to the survival of the only known population, that translocation to a disease free site is now considered a high priority (D. Coates pers. comm). The draft Interim Recovery Plan for *L. echinata* subsp. *occidentalis* (Stack and Brown, in draft) also recommends that translocation is essential for the survival of this subspecies. Gibson *et al.* (1994) lists the community in which

this species occurs as threatened, and the Interim Recovery Plan lists the community as critically endangered (English, in draft). Therefore the need for translocation of this species is considered to be extreme.

4.2 Translocation Site Selection

An area along S Road (approximately 27 km from the original site) was inspected on the 11th March 1998 to locate a suitable disease free site for translocation. This is an area of state forest that is adjacent to a critically endangered community (Occurrence 9 of the Southern Ironstones (English in draft)) which is protected from logging and planned burns (English and Blyth 1997). Therefore, protection can be readily extended to the translocation site. The critically endangered community will not be disturbed by this proposed translocation, as the translocation is intended for an area adjacent (across the road) to the community. As this species has not previously been recorded from this area this translocation can be considered an introduction under the definitions provided in the Guidelines for Translocation of Threatened Plants in Australia. A map of the proposed translocation site in relation to the known population is shown in Appendix 1.

The proposed translocation site has a soil type of sand over ironstone, which is very similar to the soil type of the area where *L. echinata* subsp. *occidentalis* presently grows. There are very few areas of natural vegetation left which grow on this soil type (Gibson et al. 1994).

Table 1. A comparison of the associated vegetation at the proposed translocation site with the known populations of *Lambertia echinata* subsp. *occidentalis*.

Associated species of the proposed translocation site.	Associated species of the original population of *Lambertia echinata* subsp. *occidentalis.*
	Adenanthos obovatus
Agonis ?parviceps	
Allocasurina sp.	
	Banksia grandis
	Banksia meisneri
	Casuarina obesa
Dasypogon sp.	
Dryandra squarrosa subsp. *argillacea*	
Dryandra sp.	
	Eucalyptus calophylla
Eucalyptus marginata	
Hakea ruscifolia.	*Hakea ruscifolia*
	Hemigenia pungens
	Hypolaena exsulca
	Kunzea aff. *micrantha*
	Lepidosperma augustatum
	Lyginia barbata
	Nuytsia floribunda
Pericalymma ellipticum	*Pericalymma ellipticum*
Petrophile serruriae	*Petrophile lateriticola*
Stirlingia latifolia	*Stirlingia latifolia*
	Xanthorrhoea preissii

Both the translocation site and the *L. echinata* subsp. *occidentalis* population are listed by Gibson et al. (1994) as having a vegetation type of shrublands on southern ironstones. The proposed translocation site has several associated species in common with the known populations. These are shown in Table 1.

The proposed translocation site is therefore considered the most suitable because the environmental attributes of climate, soil type, vegetation structure and associated vegetation are very similar to the known population of this species. Whilst the translocation site is approximately 27km away from the known population, it is the closest disease free site with almost identical attributes.

4.3 Translocation Design

Three plots of 11m by 4m will be selected and then measured at the translocation site (see Appendix 2 for site diagram). Within each plot a grid of two rows by eleven columns will be measured, so that there is 2m between rows and 2m between columns.

Seedlings will be randomly assigned to either the control or the mulched treatment, so that there are 33 seedlings in either treatment. They will then be randomly assigned to one of the three plots, so that each plot contains 22 plants each: 11 controls and 11 mulched.

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.

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.

A metal tag with information pertaining to the individual will be attached to a metal peg next to each individual seedling. Each plant will then be enclosed with rabbit netting to prevent predation of the seedlings by large herbivores such as kangaroos and rabbits.

Monitoring of the translocated population will be undertaken every second month. Monitoring will include counting the number of surviving germinants, height of the surviving germinant width of the crown of the surviving germinants in two directions (so that crown volume can be calculated), reproductive state, number of flowers and seed pods, 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 population (population 1) will also be undertaken every second month. Monitoring will include counting the number of individuals, height and crown width of the individuals, reproductive state, number of flowers and seed pods and general health of the plants.

4.4 Source of Plants

Seed was collected under guidelines outlined in Appendix 4. Seed has been sourced from the original population from a bulk of 7 plants (from a total of seven adult plants) for planting at the translocation site in 1998, and all subsequent plantings.

Seeds were germinated at the Threatened Flora Seed Centre. Seeds were surface sterlised with a 10% solution of 4g/L sodium hypochlorite for five minutes prior to being placed on agar plates. Agar plates were placed in germination cabinents at 15°C with a photoperiod of 12 hours of light and 12 hours of darkness. Seedlings have been raised at Kings Park and Botanic Gardens nursery.

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
October 1997	Seeds put down for germination.
February 1998	Translocation site selected.
April 1998	Translocation proposal submitted for review and approval.
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	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

Rob Brazell (CALM Mornington District, Bob Fitzgerald (CALM Central Forest Region), Les Robson (CALM Swan Region), Greg Durell (CALM Narrogin District), Andrew Batty (Kings Park and Botanic Gardens), and Kingsley Dixon (Kings Park and Botanic Gardens) are thanked for allowing me to view their translocation projects or proposals, and for advice given.

8. REFERENCES

English V. (in draft) Shrubland association on southern swan coastal plain ironstone (Busselton area), Interim Recovery Plan (Southern Ironstone Association) (Swan Coastal Plain Community Type 10b - Gibson *et al.*, 1994).

English, V. and Blyth, J. (1997). Identifying and Conserving Threatened Ecological Communities in the South West Botanical Province. Project N702, Final Report to Environment Australia. Department of Conservation and Land Management. Perth, Western Australia.

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.).

Guidelines for the Translocation of Threatened Australian Plants. (1997) Produced by The Australian Network for Plant Conservation Translocation Working Group. Canberra, Australia.

Hnatiuk R.J., (1995) *Lambertia, Flora of Australia* 16: 425-435

Keighery G. (1997)A new subspecies of *Lambertia echinata* (Proteaceae) Nuytsia 11 (2): pp 283-284.

Obbens F. J. and Coates D. J. (1997) Conservation biology and management of endangered Lambertia species. Final Report Submitted to the Commonwealth Threatened Species and Communities Section, Biodiversity Group, Environment Australia. Department of Conservation and Land Management, Perth W.A.

Stack G. and Brown A. (in draft) Western Prickly Honeysuckle (*Lambertia echinata* subsp. *occidentalis*) Interim Recovery Plan. Department of Conservation and Land Management, Perth W.A.

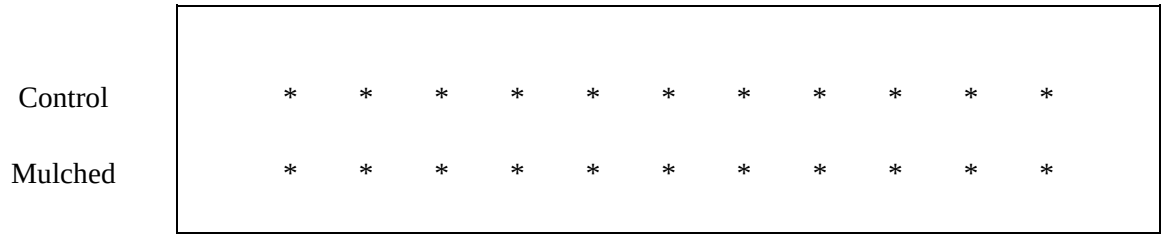
Appendices One, Three and Four may be available on contacting the authors.

Appendix Two.

Site Diagram for Proposed Translocation of *Lambertia echinata* subsp. *occidentalis.*

There is a total of 66 seedlings of *Lambertia echinata* subsp. *occidentalis* available grown from seed collected from a bulk of 6 plants.
These will be planted as shown in the diagram below, with one seedling at each point marked with an asterix (*).
The two treatments of control and mulched will be assigned as per the diagram below.

Replicate 1



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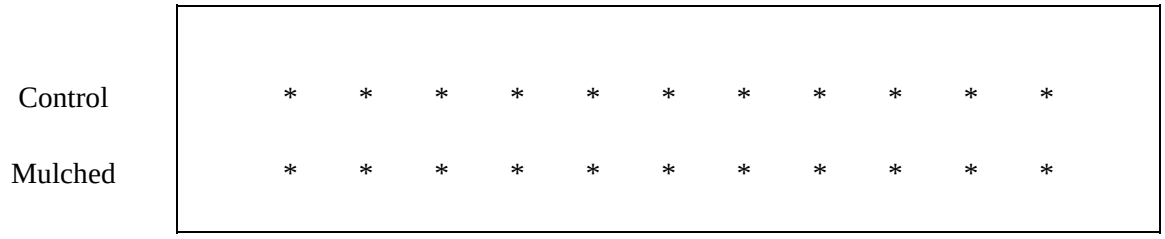

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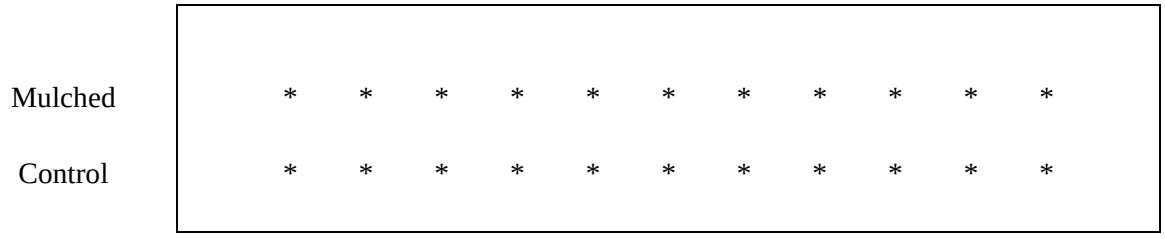

Scale: 2 m