



Global Re-introduction Perspectives: 2010

Additional case-studies from around the globe
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IUCN/SSC Re-introduction Specialist Group (RSG)





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Translocation of the resinous *Eremophila*, from test tube, to a degraded bushland site in the wheatbelt of Western Australia

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Introduction

Eremophila resinosa (Myoporaceae) was declared as Rare Flora in 1982 under the Western Australian *Wildlife Conservation Act 1950* and is currently ranked as Endangered (EN) under World Conservation Union (IUCN 1994) Red List criterion. It has an approved interim recovery plan (IRP No 266) and is listed as Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It is ("known from 24 natural populations and 697 plants") most of which are on a rehabilitated mine site indicating this species is a disturbance opportunist. Populations are centered around Westonia in the Eastern Wheatbelt of Western Australia. Plants are found in sandy loam to clay soils in open Eucalyptus (mainly mallee) woodland with a mixed but open scrub understorey. Its restricted distribution is due mainly to clearing for agricultural purposes and mining activity. Present populations are vulnerable on road verges due to frequent road maintenance, weed competition and liable to damage through frequent fire, herbicide and fertiliser drift from farming operations, grazing by rabbits and future mining operations. This translocation is fully consistent with the aims and recommendations of the Convention on Biological Diversity that was ratified by Australia in June 1993. NB: Text in quotations thus ("...") is quoted directly from: Department of Environment and Conservation (2008). Resinous *Eremophila* (*Eremophila resinosa*) Interim Recovery Plan 2008 - 2013. Interim Recovery Plan No. 266. Department of Environment and Conservation, Western Australia.

Goals

- Goal 1: Reducing the threat of extinction by learning how to establish new populations of this threatened plant.



Volunteers planting seedlings on the extended site



***Left:* Translocation site in August 2004 just after planting very small tissue cultured clones & *Right:* Volunteers monitoring seedlings planted in 2005 with good survival rates, plant form and growth indicating high genetic diversity © Bob Dixon**

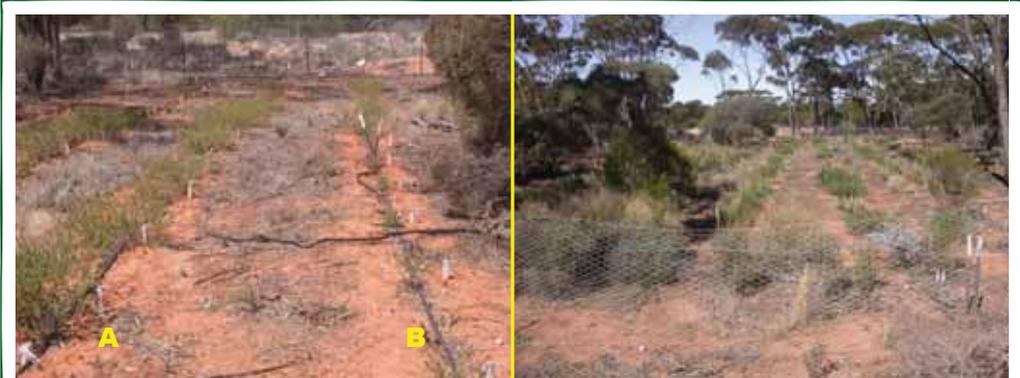
- **Goal 2:** Improve understanding of the biology/phenology of the plant and cultural techniques.
- **Goal 3:** Increase in biodiversity of the site.
- **Goal 4:** Contribute a better understanding of rehabilitation of this species on degraded sites.
- **Goal 5:** Maintain a range of genetic diversity from minesite populations.
- Produce a minimum 50 greenstock of each clone (five clones in total 250 plants) and establish a self sustaining population of *Eremophila resinosa*.

Success Indicators

- **Indicator 1:** Determine whether these species can be successfully propagated by tissue culture and successfully grown on in a degraded site.
- **Indicator 2:** Provide critical information on the biology of these species for management and conservation.
- **Indicator 3:** Short term success indicator-after one year 25% of the plants have survived
- **Indicator 4:** Long term success indicator-sustainability of the translocated populations by natural recruitment

Project Summary

Feasibility stage: "*Eremophila resinosa* is a spreading shrub 40 to 80 cm tall by 60 to 100 cm wide with branches that are densely covered in short white woolly hairs and sprinkled with resinous wart-like projections." The greyish/green leaves are 4 to 8 mm long by 2 to 3 mm wide. ("The flowers are blue or purple with white spots inside. There are four stamens not exceeding the length of the corolla. The ovary is densely covered in short woolly hairs and is four celled with one ovule in each cell"). Flowering time is predominantly in November and December on new growth. The translocation site, with similar soil and vegetation type to natural populations, location was chosen due to its proximity to the town site and easy access. The project was initially a one year pilot study to see if this rare species



Left: In November 2007 poor growth close to tree roots (B) compared to (A) & Right: In November 2009 good plant growth after removal of the irrigation system © Bob Dixon

can be successfully propagated and established on a 0.2 hectare deep ripped, fenced and irrigated but degraded site. It was first planted up with five tissue cultured clones derived from plants cleared from the minesite. Initially the site was planted with 321 plants, a mixture of the clones planted in a grid pattern to maximise genetic diversity, in 2004. The following year more plants were cleared from the minesite, seed were collected from these plants, mixed with seed from the original 5 clones, and sown resulting in 257 seedlings planted on an extension of the original site. *Eremophila* species rarely produce good viable seed and are generally very difficult to germinate because of their hard woody fruit.

Implementation stage: No indigenous communities interested or involved in the land affected by the translocation have been identified. The Aboriginal Sites Register maintained by the Department of Indigenous Affairs does not list any significant aboriginal sites in the vicinity of translocated population. Phytosanitary guidelines for the translocation were strictly adhered to and were primarily aimed at reducing the risk of introducing diseases, particularly root pathogens, and weeds to the translocation site. No flowering plants were translocated, avoiding the risk of inter-species pollen transfer within the nursery and resulting hybrid seed of nursery origin.

Post release monitoring: Monitoring of plant survival, growth rates, flowering and seeding patterns began within a few months of planting. Due to the high cost of travel to the site it was monitored twice a year in autumn and spring. Lower than expected plant losses were recorded and deaths were generally attributed to poor water delivery, especially at the far ends of the trickle irrigation lines and stress due to competition from tree roots. Water was delivered from a tank through a trickle irrigation system using 2 litre/hour pressure regulated drippers, initially a pump was used to give good pressure and even delivery, however this was stolen after a short period of time and water pressure was not adequate there after. Survival rates have been remarkably good and 500 plants are still present on this site (as at 25th November 2009). Most plants flowered and produced viable

seed the first year after planting and continued to produce seed every year since. Due to the large soil seedbank seedlings are recruiting but at this stage only four have been recorded and one has produced flowers and seed. Two weed species on site have proved to be difficult to control when using herbicides without risking significant off-target damage to the *Eremophila*, when appropriate hand weeding was carried out. Growth rates of indigenous species on site have been excessive when compared to adjacent areas necessitating cutting them down on two occasions, to reduce competition, this practice has now ceased. Since removing the irrigation system, now the plants are established, growth rates for both the *Eremophila* and indigenous species has declined. However, as expected, we have not recorded any substantial increase in plant losses.

Major difficulties faced

- Producing woody tissue cultured plants within a short time frame (1 year).
- Lack of knowledge of the biology of this species and cultural requirements.
- Managing people in remote areas to carry out essential tasks, especially watering, during summer.
- Distance traveled and associated costs for site visits reduced opportunities to visit the site more frequently.
- Managing weed control on site, especially as the best window of opportunity for control is often missed due to sporadic rainfall events.
- Lack of funding to cover long term monitoring and travel expenses.

Major lessons learned

- This species can be successfully established on degraded bushland sites given the correct site preparation, especially deep ripping, and management after planting.
- The *Eremophila* can be successfully propagated by both tissue culture and by seed, given the correct treatment.
- Rare species can be successfully translocated with a small budget, however there needs to be a high reliance on well trained volunteers.
- A weed free site should be chosen where possible to reduce maintenance costs and avoid off-target damage by herbicides. In arid regions weed seed can be viable in the soil seedbank for several years expressing high germination events under ideal growing conditions.
- Avoid planting close to trees to reduce competition from tree roots.
- Make sure your irrigation system runs under high pressure and use pressure regulated drippers to give the same output at each dripper.
- Essential to have good working relationship with sponsors (mine operators) and local government.

Success of project

Highly Successful	Successful	Partially Successful	Failure
	√		

Reason(s) for success/failure:

- This was a well defined project, following translocation proposal guidelines, in association with mine site staff, local government and Kings Park Volunteer Master Gardeners. It was underpinned by a research program based in Kings Park Science Directorate where new methods were constantly being developed on the propagation and biology of the species.
- Guidelines were in place in the form of the Western Australian *Wildlife Conservation Act 1950* and Interim Recovery Plan.
- This translocation is fully consistent with the aims and recommendations of the Convention on Biological Diversity that was ratified by Australia in June 1993.
- This project also followed the Guidelines for the Translocation of Threatened Plants in Australia 2nd edition published by the Australian Network for Plant Conservation.
- All plants were raised in Kings Park Accredited Nursery (adheres to specific phytosanitary regulations) which specializes in the cultivation of indigenous species.
- Plants monitored twice a year and watered by local government staff.
- High level of plant survival under arid growing conditions.
- All original clones survived in large numbers, as well as seedlings, increasing genetic diversity.
- Successful propagation methods developed.
- Most plants are now producing large amounts of viable seed.
- Plants are recruiting from the soil seedbank indicating viable seed are being produced and conditions are suitable for germination and growing on.
- A good suite of indigenous species are present on site despite using non-selective herbicides for spot spraying.
- Translocation site situated close to the town boundary on land which cannot be cleared for mining or other purposes.
- The site is easy to access, especially for water tankers.
- More time, e.g. at least 25 years, is required to determine if this site is naturally self-sustaining in the long term as this species is expected to germinate en-mass after a disturbance event such as fire.

Note: Two more translocation sites, using seedlings derived from other sources of seed and funded by the same mining company, were established in winter 2009 and the present number of plants on all three sites is over 2,000.