Threatened plant translocation case study:

Wet and Dry subtropical Coastal Heath translocation

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The species (community)

Approximately 15 hectares of coastal heath (10 ha 'dry', 5 ha 'wet' heath) including habitat for Ground parrot (*Pezoporus wallicus*), Lewin's rail (*Rallus pectoralis*), vulnerable Acid frogs (*Crinia tinula, Litoria freycineti, Litoria olongburensis*) and five plant species that were listed as vulnerable or rare within Queensland at the time the project commenced; *Acacia attenuata* (vulnerable), *Acacia baueri*, *Boronia rivularis, Blandfordia grandiflora, Schoenus scabripes*.

Threatening processes

The site was threatened by a housing development proposal.

Deciding to translocate

Translocation was suggested as an option to compensate for the potential impact on the wet and dry heath as well as habitat for several specified animals and threatened plants.

Aim of the translocation

The aim of the translocation was to compensate for the loss or damage due to the proposed development of 15 ha of coastal heath and establish populations (of the five listed plant species) equivalent to the ones being impacted by the proposed development. An additional aim was for the translocation to replace equivalent appropriate habitat for the listed bird and frog species. The specific translocation aims were defined by a comprehensive set of performance criteria.

Translocation working group and key stakeholders

A steering committee oversaw the translocation; composed of members from University Sunshine Coast (Dr Alison Shapcott chair; Dr Neil Tindale, USC Facilities management), Sunshine Coast Regional Council (initially Maroochy Shire Council) and Stocklands Bundilla (the developer). There was an ecologist who made assessments of the translocation at key stages (Dr Mike Olsen, Landscape and Mine Rehabilitation);

Figure 1. Systematic placing of whole turves using modified machinery. Photos: Stocklands Bundilla

Figure 2. Left: First control Burn. Photo: Tom Lewis. Right: A control burn in 2016 in a dry heath section of the translocation. Photo: Peter Dufourq

an ecologist who was employed by Stocklands (Christopher Dean, Australian Farm Forestry) to direct the on-site translocations, who developed the translocation plan and prepared the reporting document. In addition, the contractors undertaking the translocation (Halls contracting) were required to employ an ecologist (Arborcare) to oversee the actual in-site translocation in accordance with the translocation plan. Plus Stocklands employed ecological consultants to prepare initial site assessment surveys (James Warren and Assoc).

Biology and ecology

The five listed plant species all regenerate after fire from seed, and only two were known to resprout after fire. This understanding of the fire ecology of the species shaped some of the methods later selected, as well as ongoing management. Relatively few of the species recorded as present in the heath, and intended to be translocated, were known to have been propagated either by seed or by cuttings previously. Hence, translocation of the existing heath species was determined to be the best way to maintain the species composition in the compensatory habitat. Preliminary trials and studies had demonstrated that translocation of whole turves rather than just topsoil would result in higher success rates and significantly lower ongoing management of weeds.

Site selection

The source site was the area proposed for development adjacent to the Mooloolah River National Park. The University of the Sunshine Coast (USC) was selected as an appropriate recipient site after initial site assessments for compatible drainage, proximity, habitat suitability, and soil types.

Translocation proposal

The source site was subject to a development application for a housing development. The preparation of a set of measurable performance criteria and evaluation of alternative options and feasibility was undertaken first under directive of Sunshine Coast Council (initially Maroochy Shire Council prior to council amalgamation) prior to development approval being granted. This involved the establishment of the USC campus as a potential recipient site for a proposed translocation to compensate for the loss of the habitat to be impacted.

Pre-translocation preparation, design, implementation and ongoing maintenance

After development of the set of agreed performance criteria and formal legal agreements between the three parties, a detailed translocation plan was then developed by the developer's ecological consultant (Christopher Dean, Australian Farm Forestry) in consultation with all parties. This determined how the translocation was to be undertaken in order to achieve the performance criteria and included staging plans as well as monitoring plans. Specific detailed studies were undertaken to determine the population size, extent, density and genetic composition of the five plants species and these were used to fine tune expectation and design.

We opted to translocate entire turves of heath in a systematic manner and their locations on the recipient site as best matching habitat specificities and original proximity as was possible. The parts of the development site that were translocated captured the largest sections of the populations of the listed plant species, and other sections were relocated within the site to conservation zones. Individual plants of the listed plant species were propagated from material on the development site and used to supplement plants that did not survive the translocation.

The recipient site was scraped clean of weeds and topsoil prior to placement of the turves to remove weeds and to lower the soil level to minimise changes in drainage. There were distinctive management sections created within the translocated site according to different parts of the source site. These divisions were maintained

to enable fire breaks between different management units within the site. The turves were moved from the source site and placed on the same day on the recipient site. Shade cloth was used to line the truck tray wall to reduce wind damage. The recipient site was fenced to keep out kangaroos and the fence also lined with shade cloth to reduce grass seed entering the site from adjacent sports fields. After completion, monthly monitoring of the site was undertaken for three years. This included assessment of the performance criteria for species composition, structure, and abundance and reproduction of the listed species. Spot spraying of weeds was undertaken as needed. After the final assessment against the performance criteria was made by the independent ecologist the project was deemed to have been successful and the site was handed over to USC for ongoing management.

Subsequent actions

USC management committee was established and met for several years to establish ongoing maintenance by the USC facilities management. A detailed fire management plan for the site was developed. Each management block has its own fire schedule and the USC has been able to engage with the local rural fire brigade to use the site as a training site. USC students have contributed to the weed monitoring of the site. Weeds have mostly been observed along the edges of the management blocks. These have been successfully managed by close mowing/slashing up to the edge of the translocated turves. An Honours student undertook a comprehensive re-evaluation of the site against the original performance criteria. Students are now actively using the site for many different studies and projects.

Outcomes

The translocation was very successful. It found that the fire management is a key element to the ongoing success of the site. The use of large whole turves leads to much lower ongoing management, particularly of weeds.

What we learned

Carefully planned and executed translocations of whole large turves are the best choice. Translocations of species that require fire for regeneration need to factor fire in as part of ongoing management.

Figure 3. *Blandfordia grandiflora* regeneration and flowering 1.5 years post burn on Compensatory Habitat site. Photo: Alison Shapcott

Figure 4. Resprouting three weeks after a controlled burn. Photo: Peter Dufourq

Figure 5. Monitoring *Acacia baueri* regrowth after fire. Photo: Alison Shapcott

References and further reading

Brownlie, H., Playford, J., Wallace, H. and Shapcott, A. (2009). Population ecology and genetics of the vulnerable *Acacia attenuata* (Mimosaceae) and their significance for its conservation, recovery and translocation. *Australian Journal of Botany* 57: 675-687.

Shapcott ,A., Olsen, M. and Lamont, R.W. (2009). The importance of genetic considerations for planning translocations in the rare heathland species *Boronia rivularis*. *Ecological Restoration* 27: 47-57

Dufourq, P. (2017). *The post-evaluation of a 15 hectare subtropical heathland translocation*. Honours thesis, University of the Sunshine Coast.

Figure 6. Regeneration 11 months after a controlled burn. Photo: Peter Dufourq

Threatened plant translocation case study:

Androcalva perlaria (Pearl-like Androcalva) Malvaceae

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The species

- Low growing, shorter-lived perennial shrub.
- Endemic to Western Australia.
- Seven extant natural populations.
- Narrow geographic range (~800 km^2).

Threatening processes

- Habitat loss and fragmentation.
- Grazing.
- Mining.
- Altered hydrology and water quality.
- Weed competition.
- Altered fire regimes.
- Climate change.

Deciding to translocate

Androcalva perlaria was first collected on the south coast of Western Australia in 1993. Intensive surveys in 2006 and 2007 of 124 wetlands identified three additional populations with several more recently discovered (Grange Resources Limited 2009). Currently, seven natural populations are known which collectively contain no more than 400 individuals. Five of these populations are found on farms in bushland fragments. The largest population is found along a roadside reserve. The second largest (~70 plants) occurs within a proposed mine and may be removed in future (Grange Resources Limited 2009). Due to the future mine impacts as well as a lack of long-term protection within a reserve, two experimental translocations were implemented at two different locations.

Aim of the translocation

Two research-only translocation trials were conducted to establish some principles for undertaking large-scale conservation focussed translocations. The first translocation (2012) gathered baseline information about the general *in situ* plant performance and no specific treatments were assessed. The aim was to identify critical factors that may reduce overall translocation success using a site that reflected the attributes of natural *A. perlaria* populations (*i.e.,* wetland habitats), had long-term security (C Class Nature Reserve) and was in close proximity (< 5 km) to natural populations.

A second translocation was established (2014) that was based on the outcomes of the first translocation.