

Abel Tasman National Park Beech Planting Plan



Project Janszoon
TOGETHER RESTORING THE ABEL TASMAN



Department of Conservation
Te Papa Atawhai



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1. Objective

The objective of beech planting in Abel Tasman National Park is to re-introduce black beech (*Fuscopora solandri*) and hard beech (*Fuscopora truncata*) to the eroded ridges near Anchorage and on Adele Island where it is hoped to accelerate the colonisation of native plants on eroded ridges where re-colonization by these species is inhibited because of conditions created by erosion and loss of organic material.

2. Background

After several field trips to Totaranui and Anchorage by Department of Conservation botanists and ecologists looking at disturbance, original ecosystem composition and pattern, regeneration pathways, and the prospect of reintroducing native beech back into these systems where they have disappeared, the following conclusions were reached.

There is little doubt that black beech and hard beech would once have been a component of the "badlands" above Anchorage Bay. Their reintroduction would have benefits ranging from re-establishment of a keystone species and the components of the ecosystems that come with this (e.g. fungi and invertebrates that rely on beech systems). However any expectation that beech will form dense closed-canopy forest capable of outgrowing and shading out mature willow-leaved hakea are likely to be false. If, however, we can promote, in the longer term, a more complete indigenous ground cover as part of an open beech-kanuka forest community we will provide less available bare ground for hakea to colonise. At present willow-leaved hakea does not appear to be rampantly invading these open badlands either. It is present through all age classes but is not suffocating the indigenous vegetation that is present, though this would change dramatically if there were to be further fire events.

*The presence of large populations of the coral mistletoe, *Korthalsella salicornioides* (At Risk – Naturally Uncommon), growing on kanuka, indicates the low vegetation on the "badlands" above Anchorage is long standing. The presence of this mistletoe could be explained by post-burning recolonisation from unburned refugia such as wetland margins nearby though recolonisation rates for this species are thought to be relatively slow. The presence of woody roots in the bare deflation zones indicates that these were covered in woody vegetation at some point. Furthermore the mature vegetation in similar parts of the ridgetop above Anchorage which supports both black beech and hard beech with no bare loamfield, also suggests that the bare patches are induced.*

*Other species in mature vegetation noted above Anchorage include *Dracophyllum urvillianum* (At Risk – Naturally Uncommon) which is also present in open beech forest at Totaranui, and *Pimealea gnidia*. Both are characteristic of open forest in low fertility sites. Black beech, hard beech and kanuka co-occur as advanced canopy species and it appears that kanuka is not simply a seral species, but is a component of the structural vegetation of more stable communities.*

*Conclusion: Low fertility, combined with the exposed, summer-dry nature of the ridgetops and north-facing shoulder slopes mean that the natural vegetation pattern is likely to be one of a low-statured open forest community of kanuka, hard beech and black beech. At least some burning events within the last 200 years has curtailed natural regeneration to the point that there are open eroding zones with little or no vascular plant cover. Expansion from 'islands' of heath-like vegetation dominated by kanuka, *Gahnia setifolia*, *Leptecophylla juniperina* ssp. *juniperina* is slow and seemingly dependent on the accumulation of organic matter in moss and lichens from the margins. *Cyathodes fraseri* appears to be one of the few vascular species capable of invading areas where lichen is the only other vegetation. (Simon Moore pers. comm.)*

Similar conditions to those described above occur on Adele Island. Black beech and hard beech are keystone species in this area and there is evidence that they were formerly present in both these locations. As

mentioned, similar ridges higher above Anchorage support both beech species, but the poor soils, hot dry conditions and lack of organic material on both the lower Anchorage ridges and Adele Island are restricting the ability of beech and other native species to colonise the bare patches. Also inhibiting colonisation is the presence of willow-leaved hakea which, because it is more suited to these conditions, is colonising faster than native species. It is hoped that by planting, a seed source can be established that will assist recolonization in the longer term.

Results from the beech planting trial initiated by Simon Moore on Adele Island in May 2014 showed a 96% survival rate of the black beech trees planted there after 2 years. This indicates that planting may be successful and that it will be worth starting to initiate the planting at Anchorage and on Adele Island in the next couple of years. It is proposed that planting commence in Autumn 2018. Seed has been collected and sown but the trees will not be available until this time. This gives time for planning of logistics.



Bare loam field south of Anchorage



Eroded zone with small islands of vegetation

3. Planting programme

3.1 Overview

Low-intensity planting of small (10 tree) nuclei of both black beech and hard beech will be implemented into existing islands of vegetation. Trials will be carried out on introducing mapere (*Gahnia setifolia*), D'urville's grass tree (*Dracophyllum urvilleanum*) and Pimelea (*Pimelea gnidia*) into the bare loamfields. Mapere is difficult to propagate and the conditions are challenging for the establishment of any plants so, if germination is successful, experimental planting of low numbers of these species will be undertaken.

Twenty nuclei will be established initially at each site to train volunteers and refine methods. After logistics and methods have been tested it should be possible to continue establishing more nuclei each year as space and resources allow, and the numbers of plants to be introduced in any one season can be adjusted depending on how well the operation succeeds in the first season. More survey work will need to be undertaken to establish the full extent of the planting. When the optimal number of trees per year is determined the planting programme will become an annual activity until all available sites have been covered.

Monitoring of plant survival will be undertaken using the methods of the previous trials on Adele Island. To keep track of the locations of the nuclei, GPS waypoints will be taken at planting time to facilitate re-visiting for monitoring purposes.

3.2 Actions

1. Recruit volunteers to take part in seed collecting, planting and monitoring at both locations
2. Identify the planting sites
3. Collect seed for future year's propagation
4. Propagate plants, including inoculation with mycorrhiza from duff under existing beech
5. Check the plant bags for weeds before transfer to the park and remove them.
6. Plant 200 beech (20 nuclei of ten trees) at each location
7. Monitor results

Volunteers from Abel Tasman Birdsong Trust will be involved in the Adele Island planting programme and Motueka High School will participate at Anchorage as part of their adopt a site programme. These groups will take responsibility for their respective locations with co-ordination and training being provided by Helen Lindsay, Project Janszoon planting supervisor. Logistics and recruitment of volunteers for Adele Island will be provided by Abby Butler, co-ordinator for Abel Tasman Birdsong Trust, and teachers from Motueka High School will be involved in organising the student participation. The tasks undertaken by these groups will be:

- a) identifying the planting sites
- b) collecting seed
- c) planting
- d) monitoring.

3.3 Identifying the planting sites

It has been observed from the planting trials that plants will struggle in completely open, hot, exposed bare sites particularly on north facing slopes so sites need to have some shelter but be close to bare sites where natural colonisation could take place when growing trees provide more shade and seed source. The presence of kanuka at planting sites would be helpful because of the potential to enhance the mycorrhizal association provided by kanuka which is likely to assist the growth of beech and later germination of beech seedlings.

Aerial photos will be used to identify bare sites for investigation to delimit the total area in which planting is to be carried out. These areas will then be ground truthed and within these areas nuclei planting sites will be identified using the following selection criteria:

- a) usually more than 20 metres from the Coastal Track. (one site will be placed close to the track for interpretation purposes).
- b) at the edge of bare loamfield with some light cover (“islands” of moss and lichen and low shrubs and preferably kanuka present)
- c) not among dense hakea
- d) at least 15m but not more than 30m from other nuclei

3.4 Seed collecting

Some seed of both hard beech and black beech was collected in 2016 and given to Titoki Nursery to be grown on. It is expected that trees from this seed will be available for planting in autumn 2018. More seed will need to be collected each year to supply plants for each planting season or order to have trees of the appropriate grade for planting. This requires establishing nets under mature trees within the Abel Tasman provenance where seed has been identified, and collecting from these after seed fall. Duff from under each tree is collected at the same time in order to capture some of the mycorrhizal fungi that helps beech trees to establish and grow.

3.5 Planting

Planting will take place in autumn and could take place as early as April depending whether there has been enough rain to provide suitable soil moisture levels. However if there are drought conditions it could be the end of May before moisture levels would be high enough. Plants will need to be air lifted to the sites, which will require the use of a helicopter. There is a cage available at DOC St Arnaud to facilitate aerial transfer of the trees. 10 trees will be planted at each nuclei site at a distance of 2m apart.

3.6 Biosecurity

Introduction of plants in soil carries the risk of also introducing plant pests, insects and diseases. Most small herbaceous weed species are unlikely to survive the conditions but it is important to ensure no new invasive weed species or animal is brought into the park. The following biosecurity measures will be adhered to.

1. Transfer only healthy plants
2. Carry out biosecurity checks in all nurseries supplying plants in particular to ensure there are no Argentine or Darwin’s ants present. (This is done on an annual basis by DOC staff at all nurseries supplying plants).
3. Ensure no weed species are present in pots when plants are transported to the site.
4. Monitor the planting sites for germination of any weeds following planting and remove these before they have time to set seed.
5. All staff and volunteers will ensure that clothing and footwear are free of mud and seeds before participating in activities.
6. Seeds and duff should not be collected in areas which are heavily infested with weeds.

4. Monitoring

Monitoring of plant survival will be undertaken each year in autumn using the same methods used in the planting trials. This involves visiting each nuclei, noting any dead trees and measuring the growth rate of each live tree. This will be particularly important for the hard beech sites as this species was not tested on Adele Island. However to reduce the time needed to carry out monitoring as the numbers of nuclei increase,

it may not be necessary to monitor the growth rate of black beech at each site, but rather at a selection of sites, and just record survival rate at all sites. Analysis and reporting from this monitoring would make a good student project.

5. Timeline

The earliest that planting could commence is autumn 2018 as plants from seed already collected will not be available until this time. The most urgent task if the programme is to commence in this timeframe is to collect seed so that trees will be available for following years. Therefore volunteers should be recruited as soon as possible to be able to collect seed in 2017.

The annual sequence will be:

Task	Timing
Collect seed and deliver to nursery	March/April
Select sites	May - March
Order plants for two years out planting	August
Collect trees from nursery	April/May
Check plant bags for weeds and remove	April/May
Organise transport of trees to the sites	April/May
Plant trees	April/May
Monitor previous plantings	April/May
Analyse monitoring data and apply anything learned to subsequent management strategies	AYR

6. Indicative Annual Budget

Item	Cost \$
400 trees	3,000
Helicopter transfer	2,500
Co-ordination and training	2,400
Total	7,900



Pimelia gnidia



Black beech planted among hakea on Adele Island