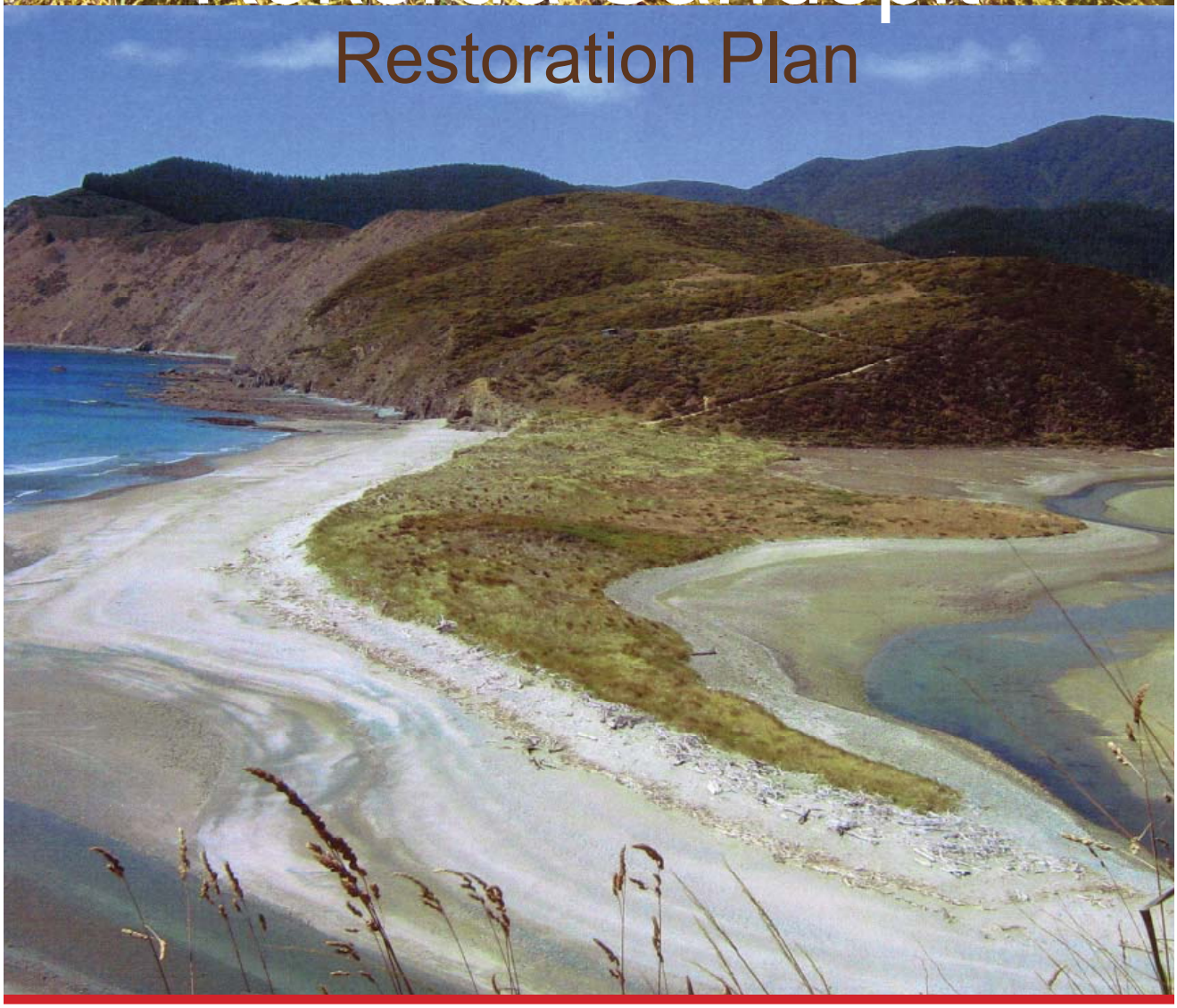
Kokorua Sandspit
Restoration Plan



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Summary

The purpose of this document is to provide direction and guidance for community involvement in ecological restoration at Kokorua Sandspit. It sets out a vision for the rehabilitation of native dune plant species which it is hoped will assist with natural dynamic dune processes, enhance the natural functioning of the native foredune community and provide habitat for regionally threatened dune plants.

It is intended to eradicate marram grass *(Ammophila arenaria)* and other exotic invasive plant species from the foredunes, to replace them with native pingao and spinifex and to introduce several regionally threatened native dune plant species. Coastal forest plants will be encouraged to establish on the back dunes although no planting will be carried out in areas where there are likely to be significant archaeological deposits.

As the site is open, the effects of any animal pest control if undertaken would be limited due to the high potential for re-invasion, making it unlikely that vulnerable native animals will gain any major benefit from the restoration. The primary objective therefore is the protection of native plant species. However it is possible that when the dune ecosystem returns to a more natural state this will provide improved habitat for native species of birds, invertebrates and lizards which may therefore become more abundant.

Plant communities of foredunes have been identified by government agencies as high priorities for protection and restoration. Some restoration work has already been carried out by Department of Conservation (DOC) and Nelson City Council (NCC) staff with assistance from volunteers. In the current economic climate funding from government agencies cannot be guaranteed in the long term. It is therefore intended to encourage community guardianship to assist with long term sustainability of the project.

Kokorua Sandspit

Introduction

Kokorua Sandspit is located at the mouth of the Whangamoa River on the exposed coastline of Eastern Tasman Bay between Delaware Bay and Cape Soucis. The site is approximately 6 hectares and comprises a bar between the open sea of Tasman Bay to the north and the Whangamoa River estuary to the south. (For more information on site description see appendix 2).

The land is administered by DOC and its legal status is an open scientific reserve. This means that the public can visit, but as there is no public road, the only access for the general public is by boat. This isolation presents the opportunity to restore the natural values of this sandspit and to establish self sustaining populations of regionally threatened dune plants without the threat of major human disturbance.

Apart from its natural values the sandspit also has very significant archaeological values. As with many other river mouth sandspit sites Whangamoa has been a strategic place of sustained Maori occupation from early in the settlement period. Its proximity to the metasomatised argillite sources in the Nelson Ultramafics has also been important. Despite having been fossicked and grazed over the last 100 years it remains the most intact of the pre-European Maori river mouth settlements in Tasman Bay and has been identified as a site of major archaeological importance. It is registered as Category 2 under the Historic Places Act 1993 and is scheduled in the Nelson City Resource Management Plan. (For more information see appendix 4)

The sandspit has high ecological value being the only dune system in Eastern Tasman Bay that is legally protected for its conservation values. (For more information on ecological values see appendix 3).

Coprosma propinqua

Melicytus crassifolius

2. Vision and Goals

The vision for the site is a thriving, dynamic, self supporting dune ecosystem where diverse native dune species flourish.

Sand coprosma *Coprosma acerosa*

2.1 Restoration goals

1. Restore natural vegetation communities to enhance the natural functioning of the native foredune community
2. Provide habitat for the protection of regionally threatened dune plants, and create a regionally significant seed source for these.
3. Enhance habitat for native animal species which inhabit dunes.
4. Involve the community in the dune restoration to promote community guardianship and greater understanding of the importance of protecting remaining coastal habitats.

The term restoration has many different definitions and can be interpreted in many ways. Dune restoration projects often concentrate on protecting coastlines from erosion and providing aesthetic and recreational enjoyment rather than addressing biodiversity and ecological considerations. The definition used for this project will be an attempt to re-instate plant communities as close as possible to their pre-modified state.

Restoring a natural ecosystem is a difficult goal to achieve. Coastal dunes are dynamic ecological systems which are built by a combination of wind currents, sediment transfer, wave action and vegetation. These elements are subject to change which affect dune profiles and landscapes. Periodic disturbances caused by natural climatic forces such as storms and flooding in coastal areas can change the effects of these processes.

These disturbances can be regarded as setbacks for a restoration programme if they result in the loss of plants or dramatic changes in the landscape. However these events can alternatively be regarded as opportunities to learn about the dynamics of the system and how

to adapt management to take advantage of these opportunities. Large movements of sand may provide new habitats for different species to establish.
Restoration of dune systems does not therefore aim for a static state. Restoration action must take into account this dynamic element and aim to establish a resilient, diverse and sustainable ecosystem which can cope with disturbance without further intervention.

Whangamoa Valley

Back dune vegetation patterns

Last remaining pingao population (in centre)

Dune view showing cleared land and access road to the north east

3. Objectives and Actions

This chapter outlines a series of objectives and actions that need to be taken to achieve the objectives of the restoration programme.

3.1 Eliminate marram grass

The most important goal of the restoration is to enhance the natural functioning of the vegetation communities with the long term objective of restoring natural ecological processes. In order to achieve this the removal of marram grass is essential. Marram grass has been widely planted in the past for dune stabilisation, as its sand-binding effect inteferes with the dynamic dune system process and stops the movement of sand. It also creates steeper dunes that are more susceptible to erosion and blowouts. It is a very vigourous species, has a high tolerance to being buried in sand, and competes very strongly with native pingao *(Ficinia spiralis)* and spinifex *(Spinifex sericeus)* due to its ability to extract water more effectively making it more resistant to drought. Removing the marram will assist the re-establishment of pingao and spinifex. The natural growth of these species allow more movement of sand which will eventually help to restore the dynamic nature of the dunes.

Removing large amounts of vegetation from dunes can cause large scale movement of sand and could cause more erosion from storm events. As the growth rate of the replacement native vegetation is likely to be quite slow, removal of marram will be approached in a staged process. The map at Appendix 1 shows the planting zones and planting sequence.

Research carried out by the University of Otago has shown that the seed bank of marram can last at least nine years (and probably longer) after the last seeding plant has been removed, and the deeply rooted rhizomes can regrow after herbicide treatment. Long term commitment to control is therefore essential. However seedling density has not proved to be very high and it should be possible to control seedlings by hand pulling in the follow up years. Any regrowth on deep rooted rhizomes must be followed up with repeat herbicide treatment.

Mesh fences have proved successful in excluding rabbits from the plantings so these will be extended to new plantings. As it is difficult to remove the wooden posts that have been erected in the past, a different method of support will be used.

Actions

- 1. Construct new mesh fence exclosures on the foredune in each zone prior to planting. Use an open mesh designed to exclude browsers without trapping sand, supported by plastic waratahs to make it easy to re-position the fence when plantings are extended. Monitor the effectiveness of this method of support in the first season and adjust if needed.

- 2. Spray marram with Gallant herbicide within the exclosure. The use of Gallant which is selective to grasses will reduce the likelihood of negative impacts on the exisitng pingao population.

- 3. Each year enlarge the exclosure by removing one side and extending it further out and carry out follow up control by hand pulling seedlings and spraying any regrowth. The planting sequence indicated at Appendix 1 shows the hectarage in each zone, the size of the area extended each year will depend on various factors including sand movement, the numbers of plants available for planting, survival rates of natives and abundance of marram seedling and rhizome regrowth.

- 4. Monitor results of survival of plants and to see what changes occur in the sand movement and adjust management accordingly.

3.2 Introduce appropriate native plant species

A high priority is the establishment of native dune plant species to replace marram and to assist re-establishment of natural dune processes. The two species that will be most crucial for these processes are pingao and spinifex. These species are particularly suitable for establishing on foredunes. Pingao traps sand but still allows a degree of sand movement which forms dunes with a lower profile which are less susceptible to scouring from wave action. Spinifex has the ability to spread down the foredune and invade fresh sand deposits at the base. These two plants will provide the basis for the replacement of marram as discussed above. Other dune plant species will provide a diverse association of plants which will help to sustain resilience in the ecosystem and establish populations of regionally threatened plants. No planting will be carried out on the back dune (see no planting zone at Appendix 1). Appropriate tree and shrub species will be established among the shrubland at the base of the sandspit to establish a seed source for natural colonisation of the back dune. Small exclosures will also be set up as trial plots where seed will be sown as experiments to see if natural regeneration can be assisted by seed sowing to prevent ground disturbance of archaeological sites.

Actions

- 1. Plant pingao and spinifex in large numbers on the foredunes to replace marram within exclosures and continue to extend these in association with the control of marram as above. Initial planting of these species will be quite dense (1 metre spacing) in order to build up a seed source. As the project progresses and the plantings extend towards the point of the spit, reduce the density of plants to provide a more open sand environment.

- 2. Plant other dune species in appropriate locations. Some planting of spinifex could be done outside the exclosures as it does not appear to be so palatable to rabbits. Monitor this to ensure no browsing pressure. A list of appropriate plant species and the locations to plant them can be found at Appendix 6.

- 3. Plant hardy trees and shrubs in a series of "vegetation islands" along the northern edge of the no planting zone. It will be difficult to establish these species given the exposed nature of the site so some protection from the wind may initially be required. This can be done by careful placement beside existing vegetation or by constructing temporary wind shelters.

- 4. Plant trees and shrubs at the base of the sandspit and estuary margin to the east of the no planting zone. Monitor browsing pressure and provide protection if required.

- 5. Set up small metal cages for seed sowing experiments on the back dune where exotic grasses have been controlled.

3.3 Control exotic grasses

Exotic grasses have a detrimental effect on the recruitment and vigour of native vegetation by competing for space and nutrients. Exotic grasses are present on the back dune where native trees and shrubs will be encouraged to colonise. Control of exotic grasses will assist the expansion of native ground cover such as muehlenbeckia and native grasses. Natural colonisation by native vegetation will assist the restoration while preserving archaeological sites.

Actions

- 1. Control exotic grasses in selected sites to aid the natural establishment of native vegetation.
- 2. Ensure that those carrying out control have the ability to identify the native meadow rice grass (Microlaena stipoides) which is present on the back dunes and should not be sprayed.
- 3. Experiment with sowing seed of native plant species where exotic grasses have been controlled.

3.4 Control all invasive weeds species

Apart from marram and exotic grasses the presence of invasive weeds is low. Gorse is the main threat at present as there is potentially a large seed bank in the soil where it has previously been controlled and because of the high density of plants in the surrounding area. This species must be controlled annually to prevent spread. It is essential that any new species of invasive weed that appears on the site is also removed as soon as possible before it has time to establish.

Actions

- 1. Control gorse by spraying with Grazon before seeds develop. This should be done in spring and autumn at flowering time.
- 2. Maintain a high level of weed surveillance annually to identify any other invasive weeds and remove them before they have time to establish.

3.6 Eliminate stock browsing

From time to time it has been observed that animal stock from adjacent farms have managed to escape through fences onto the sandspit. The threat from these animals is trampling and browsing of vegetation. Local farmers have generally co-operated in ensuring stock are secure. It will be essential to continue to have this local support.

Actions

- 1. Check for signs of stock invasion when visiting the site
- 2. Continue liaison and advocacy with local landowners. Encourage them to engage with the project by reporting any stock invasion to neighbours and DOC staff and to observe and record any major changes on the sandspit.

3.7 Control mammalian pests

Rats, mice, mustelids, rabbits, hares, feral cats and dogs are all potential pests for the site. The experimental plantings have shown that introduced plants that do not have protection from rabbits have been subject to heavy browsing which inhibits their ability to establish.

The topography of the sandspit is such that there is no possibility of eliminating mammals from the site as they will always have the ability to reinvade from surrounding farmland. It would be possible to keep them at lower levels by establishing a trapping or poisoning programme but as it is uncertain what resources will be available to the project and because of the remoteness of the site this may be too onerous a task to undertake.

Actions

- 1. Fence planted areas to exclude rabbits and hares.
- 2. Lay pindone to reduce rabbit numbers.
- 3. Investigate the feasability of other animal pest control

3.8 Encourage native animal species

As it will not be possible to eliminate mammalian predators from the site the likelihood of major changes to native animal species is low. However when the dune returns to a more natural state it is possible that some species will become more abundant and others will arrive unaided.

Lizards

One species of lizard, the common gecko *(Hoplodactus maculatus)* is already known to be present. It is possible that other species are present in the area. The Nelson green gecko

(Naultinus stellatus) could be present in forest in the Whangamoa Valley. The spotted skink *(Oligosoma lineoocellatum)* has been recorded at nearby Cable Bay and Peppin Island. Another skink with a distribution in the Marlborough Sounds but not recorded locally is the brown skink *(Oligosoma zelandicum).*

Invertebrates

A population of Katipo spider *(Latrodectus katipo)* has been recorded at Kokorua. This is a highly threatened species due to loss of habitat and disturbance. It will be important to ensure that any increase in activity at the sandspit does not negatively impact on this species. Disturbance of driftwood and excessive foot traffic on the beach should be avoided and and spraying of marram around piles of driftwood should be approached carefully.

As no substantial surveys have been undertaken, it is not known what other invertebrates are present. Reducing the impact of marram and establishing native species should however generally benefit native invertebrates. A species of carabid beetle *(Brullea antarctica)* which has a widespread distribution in dune habitats could possibly be present. The scarab beetle *Tericoptus truncata* could live under driftwood on the beach. Copper butterflies are attracted to muehlenbeckia which is estalishing naturally on the back dune.

There may be an opportunity to establish a new population of the very scarce back beach beetle *(Zecillenus tillyardi)* at the site at some time in the future. This species is currently only known in the Nelson District at Tahunanui Beach.

Birds

Dunes provide habitat for waders such as Banded dotterel, Variable Oysterchatcher, gulls, terns and other estuary species. However some of these favour more open habitat than is provided at Kokorua. The presence of marram on the sandspit increases the vegetation cover and reduces the likelihood of these birds establishing. Creating more open habitat on parts of the dune may favour the establishment of some of these species in the future.

Actions

→ 1. Carry out surveys to determine the presence of native animal species and develop strategies to encourage these depending on results of surveys

Scarab beetle
Tericoptus truncata

Dune profile 2010

Dune profile 2012

4. Monitoring

Monitoring is important to any restoration project in order to assess the results of management strategies and to adapt these if necessary. It is also useful to document achievements in order to ensure that value for input can be measured and that resources are well utilised. However comprehensive monitoring can take a lot of time and effort. As this project will be managed by volunteers it is necessary to ensure that any monitoring undertaken has a clear purpose and does not take a lot of time.

4.1 Record keeping

Records have been kept by DOC staff of all management activities to date. This record keeping must continue to document all actions such as dates of visits, how many people involved, weed control undertaken, number of plants planted, etc. This can be done with a written diary or by a more sophisticated database depending on resources. Records will be kept for all threatened plant introductions of how many plants were introduced, where the seed was sourced, how many plants survived to maturity and whether dispersal is occuring.

4.2 Movement of sand

Restoration activities present the opportunity to learn about the dynamics of the sandspit which is a unique environment where there is inherent uncertainty about what will happen in the future. Monitoring the movement of sand both naturally and where restoration work has been carried out will be important in order to understand the processes at work and to adapt management strategies depending on what occurs. Monitoring will be carried out by establishing a series of photopoints in specific locations where photographs can be taken from the exact same spot twice a year at the same time, ideally in September and again in March. Marker posts will be established at these monitoring points, GPS waypoints taken and parameters of the photographs documented so that they can be replicated. Visits will also be made to the sandspit if possible after dramatic storm events to check and record the effects of these. Recording these events could be an opportunity to involve local residents.

4.3 Plant survival and colonisation

Monitoring of plant survival for the mass plantings will also be carried out by the use of photopoints as it will not be necessary to know exact numbers and photographs should be sufficient to get a clear idea of changes. These points will be established at corners of the mesh fences.

A complete plant species list would be useful as a record of what is present and to assist in identifying what might arrive on the sandspit in the future. If this list is available it can be used by workers to familiarise themselves with what is present so that any new species of plant that arrives can be noted. The list can be updated as new plants are observed.

4.4 Wildlife monitoring

Some basic wildlife monitoring can be carried out but without comprehensive monitoring programmes it will be difficult to determine what the results of management activities are. However information about what is observed to be present through hand searching and while carrying out other work would be useful to record. Five minute bird surveys once or twice a year are a relatively easy way of recording information about the presence of birds. As with a plant species list, a record can be kept of all animal species known to be present and can be updated with new observations.

Kokorua sandspit from Hori Bay Road

5. Resources

5.1 Roles and responsibilities

Government agencies

The Department of Conservation has responsibility for management of the land and ensuring that any action taken is ecologically appropriate and consistent with statutory requirements and district plans. DOC staff organised the initial planting programme and have carried out maintenance. Nelson City Council's Sustainable Land Management Officer and a staff member from Tasman District Council's Coast Care programme have assisted with planting maintenance and advice. However funding cannot be guaranteed from these agencies in the long term and it may not be possible to maintain the same level of staff participation in the future, but advice and support will still be available.

Local organisations

Nelson Marlborough Institute of Technology ranger trainees have visited the sandspit annually since 2002. Trainees learn about habitat restoration, practice fence building and spray weeds.

Four local nurseries, Titoki Native Plant Nursery, Mainly Natives, Nelmac and Abel Tasman Education Trust have participated in harvesting seed and growing pingao plants sourced from Kokorua to use in restoration in Tasman Bay and to return to Kokorua Spit.
Nelmac is a contracting business with a large commercial nursery and is strongly committed to ecosourcing and the restoration of habitats based on sound ecological guidelines. Staff assist in maintenance at Kokorua and propagation of plants for returning to Kokorua. Titoki Nurseries are also strongly committed to ecosourcing and have collected and propagated seed from Kokorua.

Members of the Nelson/Marlborough Branch of Forest and Bird have visited the site to assist with maintenance and have expressed interest in supporting the project. The Nelson Botanical Society have drawn up a plant species list for the Whangamoa area.

The Department of Conservation's Motueka Area has hosted a commercial business with a concession engaging American students in volunteer work on the conservation estate. These groups have built fences weeded and planted at Kokorua.

All the above groups and agencies have expressed a strong interest in a continuing involvement and support of the project.

A key element in the success of the project will be to identify some individuals in the community who will be willing to manage it. As access to the site is limited, constant visitation by large groups of people would not be possible or appropriate. It would be possible to identify several key people to take responsibility for organising the tasks to be carried out using this plan as a guideline. A small group of volunteers could carry out most of the maintenance and monitoring work without a great investment of time. However this would depend on how much funding could be secured for the purchase of plants and other materials. If propagation of plants by volunteers was required then the time investment would be much greater. Larger groups could be organised occasionally for plantings but this would only be about once or twice a year. The opportunity to visit an otherwise inaccessible site will be a drawcard for the involvement of these occasional volunteers. Local landowners could be encouraged to contribute to the project by helping out on work days and by observing and reporting changes particularly after storm events.

5.2 Funding

Funding will be required for the following:

1. Purchase of plants
2. Herbicide for weed control
3. Materials for the construction of mesh fences
4. Travel expenses

A number of funding organisations are available for applications in the Nelson Region. See Appendix 9 for a list of funding agencies that would potentially fund this project.

6. Timelines

Year 1

Spring

1. Construct a new exclosure in planting zone 2 (see appendix 1 for map of planting zones) and control all marram and other exotic grasses within this exclosure. Use Gallant herbicide, which is specific to grasses, to control marram to ensure that the pingao will not be affected. Spinifex will be affected by this herbicide so care should be taken to ensure the least impact on non target plants.
2. Plant pingao and spinifex and other dune species inside the exclosure. Spring is the ideal time for planting these species as rapid growth occurs in warmer conditions and reduces the risk of sand scouring which is more likely in winter dormancy period.
3. Spray any gorse invading the sandspit and survey for any other invasive weeds and control any found.
4. Continue follow up control of marram seedlings in planting zone 1.
5. Carry out 5 minute bird counts.
6. Establish photopoints for monitoring.
7. Record all plant species present.

Summer

1. Carry out lizard and invertebrate surveys by hand searching.
2. Collect seeds of pingao and spinifex.
3. Record any new animal or plant species observed.

Autumn

1. Plant mahoe and canopy species among gorse at the base of the sandspit in planting zone
2. Plant Kanuka on the edges of the gorse to establish a barrier
3. Carry out follow up control on marram in zones 1 and 2
4. Spray any gorse invading the sandspit, survey for any other invasive weeds and control any found
5. Collect any seeds available from existing native species and use these to establish experimental seeding plots (see paragraph 3.2)
6. Record any new animal or plant species observed

Winter

1. Lay pindone to control rabbits
2. Record any new animal or plant species observed.

Year 2

1. Carry out follow up control in the planted zones to remove marram seedlings
2. Increase the size of the most recent exclosure and control all marram and other exotic grasses and weeds in the extended area.
3. Plant pingao and spinifex in extended exclosure.
4. Extend the shrub plantings
5. Lay pindone to reduce the number of rabbits
6. Record any new animal or plant species observed

Subsequent Annual Tasks

Spring

1. Extend the most recent exclosure and spray marram
2. Plant pingao and spinifex in the exclosure
3. Carry out 5 minute bird counts
4. Carry out weed surveillance
5. Follow up control of weeds
6. Follow up marram control in previous planting zones
7. Take photos from photopoints
8. Record any new animal or plant species observed
9. Record damage from storm events

Summer

1. Collect seeds of pingao and spinifex
2. Record any new animal or plant species observed

Autumn

1. Check on the survival rate of the plantings
2. Extend shrub plantings
3. Carry out weed control and maintenance work
4. Record any new animal or plant species observed
5. Collect seeds available

Winter

1. Lay pindon to control rabbits
2. Record any new animal or plant species observed
3. Record damage from storm events

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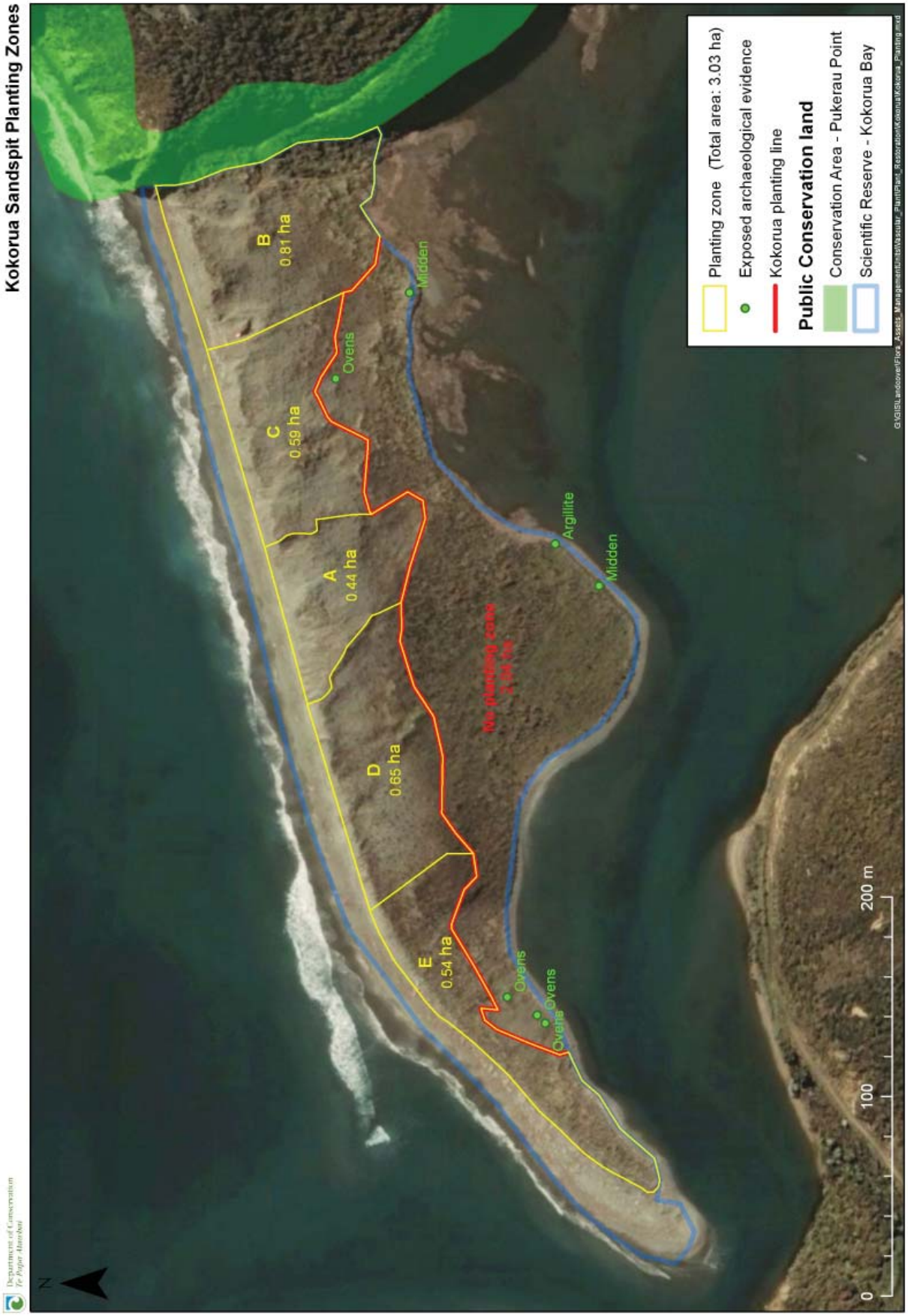
APPENDIX 1


Kokorua Sandspit Planting Zones
Department of Conservation
Te Papa Atawhai
N
B
0.81 ha
C
0.59 ha
A
0.44 ha
D
0.65 ha
E
0.54 ha
No planting zone
2.34 ha
Midden
Ovens
Ovens
Ovens
Ovens
Argillite
Midden
Planting zone (Total area: 3.03 ha)
Exposed archaeological evidence
Kokorua planting line
Public Conservation land
Conservation Area - Pukerau Point
Scientific Reserve - Kokorua Bay
0
100
200 m

APPENDIX 2

Description of site

Kokorua Sandspit is located at the mouth of the Whangamoa River on the exposed coastline of Eastern Tasman Bay between Delaware Bay and Cape Soucis. The site is approximately 6 hectares and comprises a bar between the open sea of Tasman Bay to the north and the Whangamoa River estuary to the south.

The river channel runs behind the sandspit from substantial mudflats and raupo wetlands in the south east to the river mouth at the western tip of the sandspit. The site is approximately 500m long and is 200m at the widest point, tapering to a narrow point at the river mouth. The dunes are approximately three to five metres high at the base of the sandspit, flattening out towards the tip. The site is very exposed to wind shear from both the north and the south-east.

All the surrounding area is private land and the land use is a mix of pine plantations, farmland and broadleaf coastal forest regenerating through gorse. On the coast to the north-east of the sandspit a large area has been cleared of scrub and established in grass. A house has being been built there overlooking the sandspit. There is no public road access to the beach. Vehicle access to the base of the sandspit is via four wheel drive track through private land and permission to use this track is at the discretion of the landowner.

Kokorua Sandspit from the private access road

Vegetation

Vegetation on the sandspit is largely comprised of marram grass *(Ammophila arenaria)* with scattered patches of spinifex *(Spinifex sericeus)* and small remnants of pingao *(Ficinia spiralis)* on the foredune, and exotic grasses, bracken and *Muehlenbeckia complexa* on the back dune. Trees and shrubs

are scarce but occasional small tauhinu and ake ake can be found. Single specimens of *Melicytus crassifolius* and *Coprosma propinqua* have been observed as well as a small population of sand coprosma *(Coprosma acerosa).* Gorse is common at the base of the sandspit and in scattered patches on the back dune.

Katipo spider

Spinifex among marram

Fauna

A population of Katipo spider *(Latrodectus katipo)* is present on the foreshore mainly inhabiting the driftwood along the shoreline. Little information is available on the presence of other native animal species as no surveys have been undertaken. Common skinks have been recorded on the sandspit and there is potential for other lizards to be present.

Estuaries provide a range of habitats for shorebird species but native bird life does not appear to be significantly diverse on the sandspit itself. This may be due to dense dune vegetation and the high profile of the dunes, the narrow exposed beach and the lack of protection from predators. These factors make inhospitable habitat for waders such as dotterels which might otherwise be present.

Browsing of vegetation from rabbits has been observed and it is assumed that rats and mustelids are present in the area.

APPENDIX 3

Ecological Values of Kokorua Sand Spit, Whangamoa River Mouth

Shannel Courtney (Technical Support Officer - Threatened Plants, Nelson) 7 May 2009

General policy and priority statements about dune ecosystems

5. Only 11.6% of NZ's original dune ecosystems remain.

6. The Department of Conservation and Ministry for the Environment's general policy statement on protecting rare and threatened biodiversity on private land ("Protecting our Places" 2008), lists 4 national priorities. One of these specifically singles out dune ecosystems as high priority for legal protection for conservation purposes: ie National Priority Two: "To protect indigenous vegetation associated with sand dunes, wetlands and ecosystem types that have become uncommon due to human activity."

7. Priority 4 of the general policy is "To protect habitats of acutely and chronically threatened indigenous species". It is relevant in this case due to the presence of natural populations of both pīngao and katipo at Kokorua.

8. Dune systems are also identified by the NZ Coastal Policy Statement as a national priority ecosystem, which recognises that sand dunes are an integral part of the natural character of our coasts.

Kokorua Spit Dune System in a Regional Context

8. There only three duneland sites in the Nelson Region (from Kahurangi Point to Cape Soucis) where native dune plants still dominate. These are on the NW Nelson coast 1) south of Kahurangi Point, 2) north of Paturau River mouth and 3) on the inner, stable parts of Farewell Spit. All other dunelands that still remain in the region are dominated by exotic vegetation including all of the mobile dunes of Farewell Spit (1,500 ha), all of the Abel Tasman sandy coast and Rabbit Island (1,200 ha).

9. Kokorua (12 ha) is one of only five dune systems in eastern Tasman Bay (Nelson City Council area) - the other ones being Tahunanui (200 ha), Delaware Spit (20 ha), Oananga Bay (2.5 ha), and Omakau Bay (1 ha). Kokorua is the third largest after Tahunanui and Delaware Bay dune systems.

10. Kokorua dunes are part of a diverse local network of indigenous ecosystems in and around the Whangamoa River mouth including estuarine communities, freshwater wetlands, a coastal alluvial forest remnant and coastal forest on the hillslopes. Though it has been subjected to burning and other human activities, it is relatively undeveloped compared with most coastal settlements elsewhere in Tasman Bay.

11. Kokorua is the only dune system in Tasman and Golden Bays that supports a wild population of the native dune-binder pīngao *(Desmoschoenus spiralis)*. This species has become extinct in all other dunes between Farewell Spit and Marlborough. Kokorua also still supports the best wild population in Tasman Bay of the other main native dune-binder, spinifex *(Spinifex sericeus)*. Despite this, over 90% of this dune system is covered in exotic marram grass.

12. Pīngao is listed on the 2008 nationally threatened plant list as "Declining". Other nationally threatened species that have been recorded from the Kokorua Spit include NZ spinach *(Tetragonia tetragonioides)* ("Naturally Uncommon") and katipo spider ("Serious Decline"). Sand coprosma *(Coprosma acerosa)* ("Declining") has been reinstated at Kokorua recently, from the closest wild source - D'Urville Island.

13. Kokorua is an important site for collecting eco-sourced propagation material of these dune species for restoration of other dune systems in the Nelson Region. For example, all of Tasman and Golden Bay's genetic biodiversity for pīngao is now confined to a few 100 individuals at Kokorua.

14. Additional nationally and regionally threatened species are planned for introduction to Kokorua dunes - sand daphne *(Pimelea arenaria,)* sand spurge *(Euphorbia glauca)*, sand tussock *(Austrofestuca littoralis*), prostrate matagouri *(Discaria toumatou var.)*, leafless pohuehue *(Muehlenbeckia ephedroides)*, and coastal porcupine shrub *(Melicytus crassifolius)*.

15. None of these five dune systems are legally protected for their conservation values. Three are privately owned, while the Tahunanui is owned by Nelson City Council and Kokorua is Un-alienated Crown Land.

16. The Tahunanui dunes are zoned Open Space Recreation, on two titles which currently have no reserve status. It has a management plan which provides for the restoration of the foredunes using eco-sourced species. Unfortunately the plan hasn't been followed and North Island plants have been used to revegetate the dunes.

17. Kokorua dunes are the only dunes in eastern Nelson, and one of the few in the Nelson Region, that are the subject of ecosystem restoration (being defined as an attempt to re-instate biotic communities to their pre-modified state). DOC Motueka Area has been undertaking this work for the last 5 years. Main activities include spraying of gorse and marram, erecting hare-proof fences, collecting, propagating and planting out pīngao, spinifex and sand coprosma, and erecting wind baffles to curb erosion of remnant pīngao population.

18. The current lack of legal title of Kokorua Spit puts DOC in a vulnerable position as there is uncertainty about the ability to continue dune restoration without an appropriate land status. The process to designate the land under the Conservation Act has been initiated by Conservancy Office, which requires consultation with iwi.

19. The adjacent landowner to the east (Taylor's Construction) controls land access to Kokorua Spit and has allowed DOC continued access for management purposes. The owner is also engaged in some fencing and management of other coastal biodiversity remnants. There are two protective covenants in place on this property.

20. The continued restoration of Kokorua dunes to a state which supports a large, self-perpetuating population of pīngao will create a situation where there is potential for pīngao to be sustainably harvested for cultural purposes.

Summary

Kokorua supports one of the larger dune systems in Eastern Tasman Bay and is the only one that is owned by the Crown. Although Kokorua dunes are dominated by a cover of exotic species (mainly marram), it is regionally significant because it provides a refugium for native dune fauna and flora that are either rare or extinct on other dune systems in the Nelson Region. Most of these species have a national threat status. Kokorua dune ecosystem is a vital repository from which to collect eco-sourced material of these species for dune restoration in the Nelson Region. One of the most important ecological values of Kokorua Spit is the site's potential for dune ecosystem restoration: being in public ownership, not threatened by coastal development or other competing land uses, having controlled public access and being relatively accessible for management.

APPENDIX 4

Archaeological Assessment: Proposed DOC Ecological Restoration Project, Whangamoa Spit.

Archaeological Site: O26/2, Middens and Ovens, Whangamoa Spit.

Location: E 1644799 N 5449690

The Whangamoa Spit (also known as the Kokorua Sand Spit) is small (approximately six hectares) Holocene, boulder and sand, barrier spit formed at the mouth of the Whangamoa River through longshore drift. It comprises a small consolidated flat on its inside which is currently under grasses and marram and some small shrubs (native and exotic) and seaward line of active dunes which are primarily in marram but have vestigial remnants of native sand-binding plants including pingao and spinifex. The spit is recognised as a significant dune system within Tasman Bay which has remained relatively undeveloped compared to other river mouths and estuaries. Protection of dune ecosystems has been identified as a national priority[1] . The spit has recently been gazetted Scientific Reserve[2].

Apart from its ecological values the spit also has very significant archaeological values. As with many other river mouth sand spit sites Whangamoa has been a strategic place of sustained Maori occupation from early in the settlement period. Its proximity to the metasomatised argillite sources in the Nelson Ultramafics has also been important. Despite having been fossicked and grazed over the last 100 years it remains the most intact of the pre-European Maori river mouth settlements in Tasman Bay and has been identified as a site of major archaeological importance[3]. It is registered as Category 2 under the Historic Places Act 1993 and is scheduled in the Nelson City Resource Management Plan.

Background to Proposed Project.

The Department has determined that Whangamoa Spit is a priority site for restoration of coastal dune plant communities because it supports one of the larger dune systems in Eastern Tasman Bay, is in Crown ownership and retains a number of species of flora and fauna that are rare or extinct in other dune systems in the Nelson region. Most of these species are nationally threatened.

The restoration project has involved the collection of eco-sourced seed and propagation of plants. The initial planting focus will be on the active dunes on the seaward side of the Spit but will progress inland over time to replace the marram with native sand-binding species, pingao and spinifex. Within the primary archaeological zone it is intended to rely on natural colonisation from adjacent seed sources. A

1 DOC/MFE 'Protecting Our Places 2008' A general policy statement on protecting rare and threatened biodiversity on private land.

2 NZ Gazette 2011 p5669

3 S Bagley 1985 p 11

restoration plan has been prepared to guide this project[4].

The presence of the archaeological site and its significance is recognised and planting is being designed to avoid impact as far as this is possible given our present understanding of the distribution of archaeological evidence on the Spit.

Description of the Archaeological Site.

Surface archaeological evidence is visible over much of the Spit with the exception of the extreme western and eastern ends and the outer (seaward) dunes. On the back of the active dunes there are several widely dispersed clusters of ovenstones left on the surface after deflation through wind and stock erosion. From the base of the seaward dunes to the tip of the inside promontory there is a more concentrated range of evidence including extensive areas of shell midden, ovens and argillite working floors. This concentrated archaeological zone is up to 2 hectares in area. Evidence for this is from historical information, the variety of cultural material exposed in the section around the estuary edge and at the mouths of rabbit burrows. The exposed midden contains primarily shell (cockle, pipi, tuatua, scallop, mudsnail, catseye, whelk and mussel) but also fish and bird bone and is up to 500mmm deep in places. Around this promontory there are large scatters of ovenstone on the beach and out into the estuary indicating that erosion has removed at least five to ten metres of this site in the past. Scatters of argillite flakes are also found on the estuary beach. There is a concentration of argillite working around the eastern side of the promontory (exposed in section and eroded onto the mudflat) which was also noted by FV Knapp in the early 1900s[5]. Other lithic material found at this site includes obsidian, quartz and nephrite. Stratigraphy is difficult to define but Anderson who test investigated this site in the mid 1960s considered it contained at least two possibly three distinct periods of occupation[6]. He also suggested that the occupation soils may extend underneath the present main dune ridge, although he did not test this.

Anderson also found significant quantities of moa bone in the earliest cultural layer and obtained a C14 date from this layer of 743 +- 72 BP[7]. This evidence suggests the Spit was earliest settled in the 14th or 15th centuries.

Archaeological history:

The site has been known for well over a century. Frederick V Knapp a keen Nelson collector and amateur ethnologist noted that ‘ Mr Mackay the first owner of the adjoining land picked up two boot trunks of adzes etc some 18 in(ches) in length[8].’ Knapp also made extensive collections from this site in the early 20th century. He described it as ‘a much favoured fishing resort of the Maoris.’ He also records that ‘on the bank’ he ‘found a number of implements including adzes, gouges, boring points, greenstone chisel, stone shank of hook, cache of rough adzes, seven in all, bone toggle etc’. From the workshop near the

4 H Lindsay 2012.

5 FV Knapp Notebook. Nelson Provincial Museum

6 A.J Anderson, 1966. p 34

7 This date should be taken with caution as it was from large charcoal and has not been calibrated. Calibration would make it younger by c. 150 years

8 FV Knapp op cit.

north east end he collected 'drill points, push planes etc' and suggests that this had been a waka building site[9]. It is likely that other Nelson collectors were well aware of this site and fossicked it for artefacts. The first (and only) archaeological investigation of this site was made by Atholl Anderson as part of his MA thesis in geography[10]. Whangamoa Spit was among twenty nine coastal sites around Tasman Bay sampled by him in an effort to better define the cultural characteristics of Maori settlement in this region. The Whangamoa site was one of three he dated and it provided the earliest date. Anderson sampled at least four different parts of the site and as stated above defined at least two clear periods of occupation. He also investigated an argillite working floor from which he recovered 20 quadrangular adze roughouts, 14 triangular sectioned roughouts and numerous smaller flake tools. He also recovered much broken moa bone from this area. The upper layer he characterised as having more midden, no moabone and was less concerned with argillite tool manufacture. His interpretation of the evidence was that the occupants were very much focussed on the quarry and working of the argillite from nearby quarries and with the butchering of moa during the early period. He tentatively draws a parallel in terms of geographic location (estuary and river mouth barrier spit) and content with the Wairau Bar site. Later occupation was more dependant upon the estuarine and marine resources and the working of argillite was much less.

Subsequent work in Tasman Bay has demonstrated that most sites are 16th century or later[11] and that Oananga (north of Whangamoa), Whangamoa, Rotokura (Cable Bay) and Tahunanui stand out as those with clearly early components and associations with moa hunting. Of these sites Whangamoa is now the most substantial and is the most intact.

In 1985 Steve Bagley undertook a re- survey of coastal archaeological sites in Tasman Bay, between Cape Soucis in the east to Marahau in the west assessing their archaeological values and condition. His report provided information to guide future management and made recommendations of site for registration under the Historic Places Act. O26/2 was determined to be among those of highest significance because of it high archaeological value and its comparative intactness. Significant management issues at that time were threats from marine and wind erosion, potential for stock and rabbit damage[12]. The stock have gone but the other issues remain.

Significance:

Whangamoa Spit is one of a handful of sites in Tasman Bay known to contain evidence of early (Archaic) Maori occupation including moa hunting and extensive primary utilisation of the argillite sources. Of these sites it remains the largest and with Oananga to the north the least impacted by human development. Tahunanui has been very heavily impacted by roading and development of commercial buildings, Rotokura, a much smaller site has probably been largely destroyed through the archaeological excavations of the 1960s.

In archaeological terms Whangamoa Spit is now a key site to future understanding of the early period of Maori settlement in Tasman Bay and in particular the utilisation and economy of the argillite sources found adjacent to the Nelson ultramafics. It is possible that it chronologically overlaps with Wairau Bar and it remains to be seen whether there was any relationship between the two sites or it was a stand

9 ibid

10 Anderson AJ 1966.

11 Ian Barber has dated various sites since Anderson and all have been 16th century or later.

12 S Bagley 1985.

alone fishing and argillite working camp. It is, at least, of high regional significance and this is reflected in its HPA registration and listing in the Nelson City Plan.

Condition:

The site has been fossicked significantly in the past and has suffered over the years from natural and human impacts. Despite the continual wind and sea erosion of the seaward dunes which has affected outlying ovens, the inner section of the spit appears to have remained stable apart from ongoing wave induced erosion around the estuary edge of the site. For over 100 years the spit has been farmed and grazed by cattle and sheep and it is only recently that these have been excluded. However it is likely that their impact on the core of the site has been largely superficial. Rabbits have also been an invasive problem.

Despite these impacts the site is sufficiently large to give every expectation that substantial, unmodified archaeological deposits remain. It is now in a stable condition and it is expected that the proposed restoration work will enhance this and help manage future impacts.

Rarity:

As mentioned above this site is a rare survivor of those known to relate to early Maori settlement of Tasman Bay. It is also arguably the most intact of the estuary and river mouth sites around Tasman Bay.

Context:

This site sits with a small group of early sites in the Top of the South with clear evidence of moa hunting and which played an important role in the economy of the exploitation of the Nelson argillite sources. The presence of a later occupation period also might allow evaluation of both cultural and environmental change in Tasman Bay.

There is also a geographic context with a probable connection to other sites within the Whangamoa estuary and watershed. The argillite quarry sites around Red Hill (O27/30, O27/155) and those further up the Whangamoa (O27/19, O27/19, O27/20) are the closest sources to Whangamoa Spit although those above Croisilles Harbour are also readily accessible by waka.

Information Potential:

This site appears to have high cultural and archaeological potential to develop a better understanding of Maori occupation and cultural and social change within Tasman Bay and Te tau Ihu o the Waka a Maui.

Cultural Values:

To be written following iwi consultation

Impact of Project on Site:

It is hoped that during the planting there will be little impact. Every effort will be made to avoid

disturbing the archaeological evidence during planting. The planting zone has been defined to avoid the main part of the site. There is a reasonable chance that subsurface evidence in the dunes (ovens primarily) will turn up while digging planting holes. There is flexibility to adjust the spacing of plantings to avoid any localised archaeological evidence that might be uncovered. There is less flexibility in the construction of the perimeter fence. The warratahs will be driven and the hem of the fence needs to be buried to prevent rabbits burrowing underneath it. However any impact will be minimised by testing the line prior to construction and adjusting it to avoid the site if necessary.

There will also be a longer term impact as shrubs become re-established over the site. Their root systems will become more invasive over time. However previous cycles of vegetation cover will have already had some effect. Maintenance of the site in grass is not a practical management option and the re-establishment of a stable and sustainable native vegetation cover is an acceptable long term option.

Bibliography:

Anderson A J, 1966. Maori Occupation Sites in Back Beach Deposits Around Tasman Bay. MA Thesis (Geography) University of Canterbury.

Bagley Steve, 1985. Coastal Tasman Bay Archaeological Site Registration Project – Summer 1985. Unpublished report to NZ Historic Places Trust.

Knapp F V n.d. Notebook of records of Archaeological Sites, Nelson District. MS, Nelson Provincial Museum.

Lindsay Helen, 2012. Kokorua Sandspit Restoration Plan. Department of Conservation, Nelson Marlborough Conservancy

Appendices:

Site record: O26/2

Kokorua Sandspit Restoration Plan.

Steve Bagley
Technical Advisor, Historic

17 August 2012

NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION

Map Snapshot

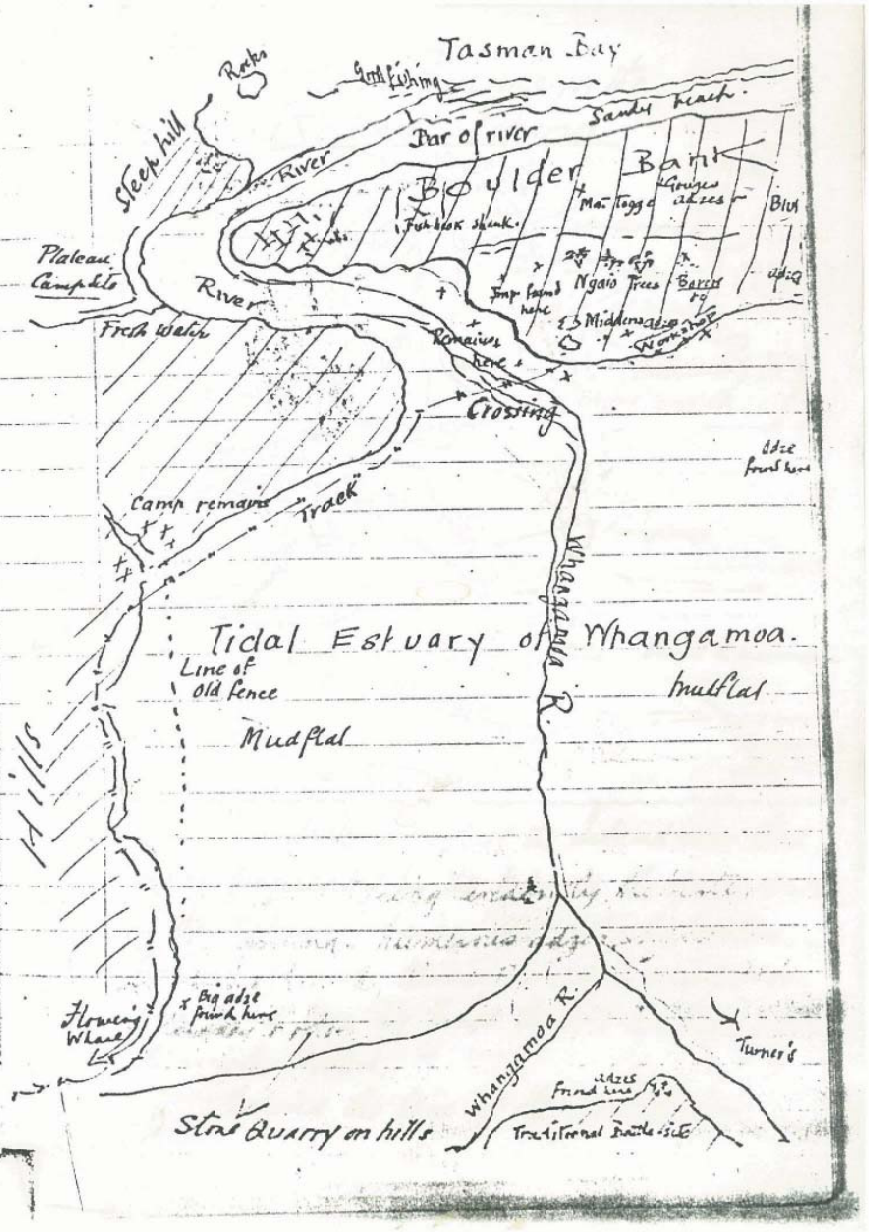
Printed by: File Nelson

06/08/2012

Whanganui.

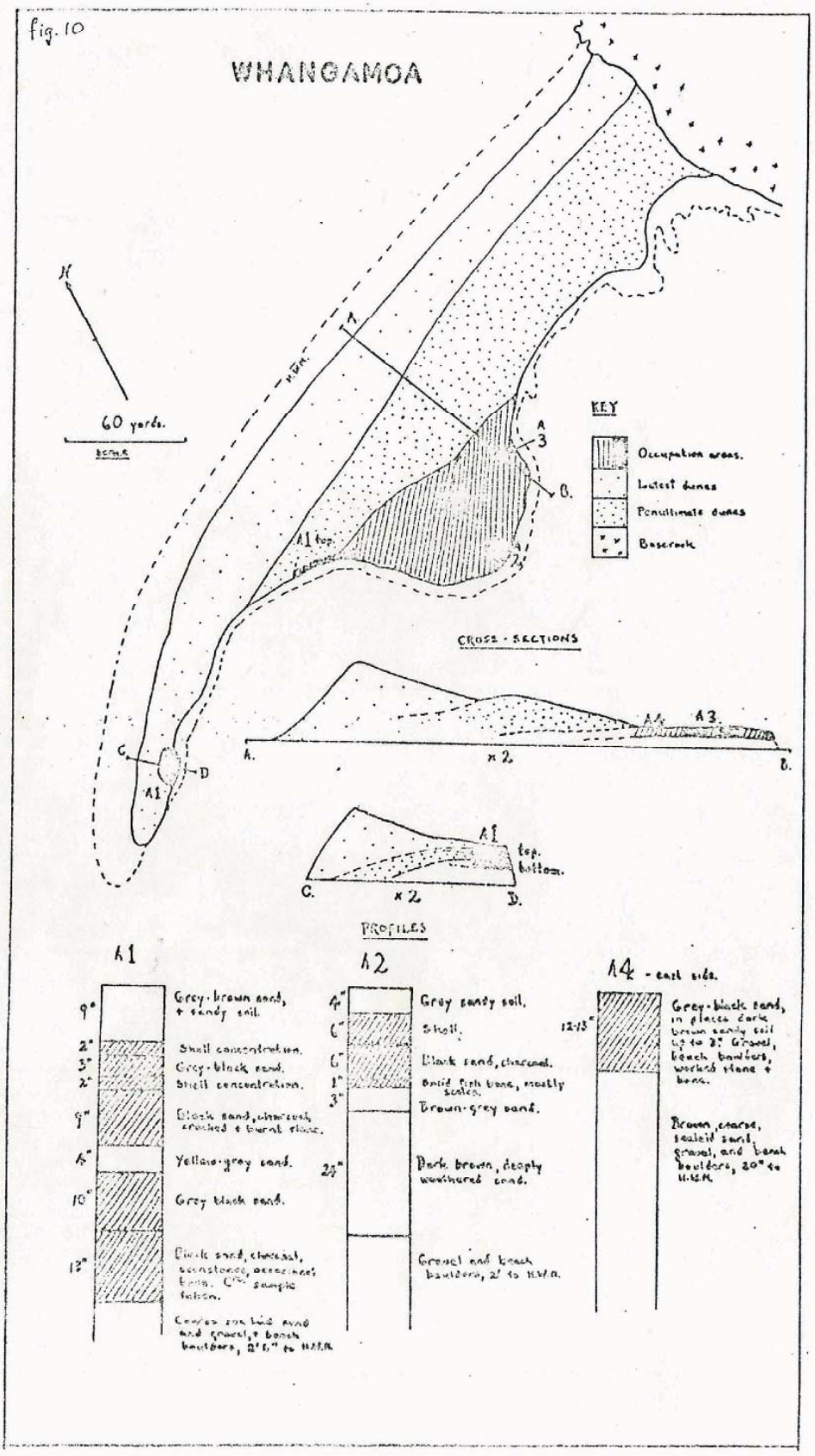
The river Whanganui flows from hills bearing the same name in a north easterly direction. In its upper course is a fine waterfall. In the lower part it flows gently through rich alluvial flats on which formerly grew a pine forest. It enters the sea flowing across a wide mudflat & curving round a long bank which has been formed on the sea-front. Off this bank in the Bay is a good fishing ground & this accounts to a great extent for the fact that a numerous Maori camp must at one time have been located on the inner side of the bank.

Away up in the mountains South of the Elizabeth Valley & north of Copper Peak is the site of a large quarry where immense outcrops of a dark grey argillite occur. This was carried down to the Coast & Wanganui bank where adzes & other



Map from FV Knapp Notebook. MS Nelson Provincial Museum.

S15/9



Anderson AJ 1966.

APPENDIX 5

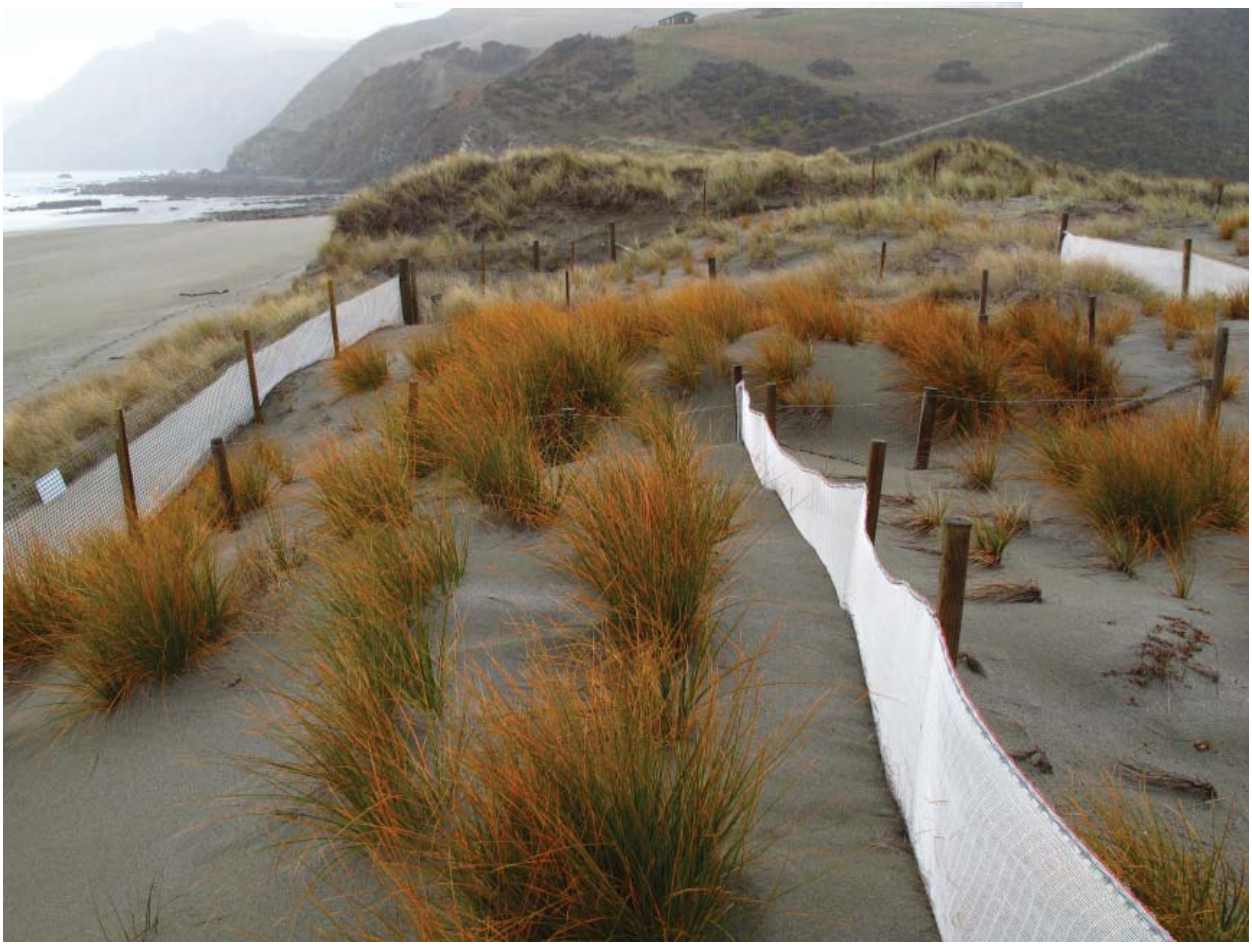
Restoration action to date

To date work has focused on preserving a small remnant of pingao and on planting spinifex, pingao, sand coprosma and matagouri. Material grown from collected seed has been planted and some of these have been fenced with netting to protect them from rabbits. Marram has also been controlled within the fenced area. Plantings outside the fenced area are surviving but have suffered from heavy browsing although spinifex does not appear to be as badly affected as pingao. Those inside the fences are less effected by browsing and are slowly establishing. All plants are affected by the scouring effects of strong winds and drought which is a major factor in the establishment of new plants. Some weed control has been carried out to prevent the spread of gorse and to eliminate isolated invasive weeds.

Planted pingao protected by mesh fences

Browsing on pingao planted outside the mesh fence

Planting pingao



Planted pingao

APPENDIX 6

Appropriate plants for restoration and seed sources

The sourcing collection of seed for propagation of plants of appropriate provenance is often a difficult and time consuming task, particluarly in the case of threatened and rare plants where seed sources are precious and limited.

There are several ways in which plants could be grown for restoration purposes. Commercial nurseries such as those mentioned above can grow the plants which would require funding to be secured. DOC's Motueka Area Office has a nursery where limited numbers of plants can be grown but this requires volunteers to do the nursery work. Volunteers could also grow small numbers of plants at home. However some plants, especially the more sensitive ones, require expertise to grow and manage so the optimal solution would be to secure funding for expert nurseries to produce most of the plants.

The following table outlines appropriate plant species for introduction to Kokorua, in which zone they will be planted and location of the seed source.

Botanical name	Maori or Common name	Fore dune	Back dune	Estuary margin	Seed source
Atriplex cinerea	Grey saltbush			x	
Austroderia richardii	toetoe		x		Taylor Qe11 wetland
Austrofestuca littoralis*	sand tussock	x	x		Farewell Spit Rarangi, Cape Campbell
Carex litorosa*	sea sedge			x	Might be in kokorua estuary?
Carmichealia australis var. "flagelliformis"	whip broom		x		Delaware spit
Coprosma acerosa *	sand coprosma	x	x		Kokorua sand spit
Coprosma propinqua	mingimingi		x		Kokorua sand spitand Qe11 wetland
Cyperus ustulatus	umbrella sedge		x	x	Local
Discaria toumatou var.prostrate	prostrate matagouri		x		Delaware Sand Spit
Dodonea viscosa	akeake		x		Delaware Bay, Kokorua Bay
Euphorbia glauca*	Shore spurge		x		Moukirikiri Island (Croisilles)
Desmoschoenus spiralis	pingao	x			Kokorua Sand Spit
Isolepus nodossa	knobby clubrush	x	x		Kokorua Sand Spit
Kunzea ericoides	kanuka		x		Whangamoa Estuary
Leptospermum scoparium	manuka		x		Whangamoa estuary
Libertia peregrinans*	sand iris		x		Te Tai Tapu coast between Kahurangi Point and Farewell Spit
Melicytus crassifolius*	coastal porcupine shrub		x		Kokorua Sand Spit
Melicytus ramiflorus	mahoe		x		Whangamoa
Melicytus "waipapa"	lowland porcupine shrub		x		Delaware Sand Spit
Muehlenbeckia ephedroides*	leafless pohuehue		x		Omakau cliffs
Myoporum laetum	ngaio		x		Delaware - Omakau
Olearia paniculata	akiraho		x		Delaware - Omakau
Ozothamnus leptophyllus	tauhinu		x		Whangamoa Estuary
Pimelia aff arenaria	Southern sand daphne	x	x		Farewell Spit
Phormium cookianum	whararikI	x	x		Kokorua rocky coast
Phormium tenax	harakeke		x		Taylor Qe11 Wetland
Plagianthus divaricatus	coastal ribbonwood			x	Whangamoa Estuary
Poa aff. cita	Cook straight silver tussock		x		Kokorua Cliffs
Spinifex sericeus	spinifex	x			Kokorua Sand Spit
Tetragonia tetragonioides	NZ spinach				Bells Island Waimea Inlet

APPENDIX 7

Threats

Animal browsing

Browsing pressure from rabbits is quite severe and numbers of these pests must be reduced if plants are to thrive. However it will be impossible to completely eliminate these pests because of access to the sandspit from adjacent land.

Cattle from adjacent farms have occasionally been observed on the sandspit. These not only browse the vegetation but cause damage by trampling plants. It is important to maintain good relationships with the adjacent landowners so that fences are maintained and cattle kept secure.

Weed invasion

Gorse is prevalent in the regenerating bush on adjacent land and has started to invade on the sandspit. This has been controlled in the past few years and this must continue regularly to prevent its spread. Apart from the marram, gorse and exotic grasses invasive weeds are in low numbers. There is a risk of weed invasion from established infestations of the wind blown woody species such as old man's beard, pines and Mexican daisy which are present in the surrounding area. As bird life on the sandspit is low the distribution of bird dispersed species is likely to be lower risk. This may change as more trees and shrubs are established on the site. The harsh environment on the sandspit will reduce the risk of invasive weeds establishing quickly so it will be relatively easy to remove any of these species which appear from time to time. ccasional plants of these species have been found on the sandspit and have been removed.

Gorse on the promontory

Human impact

Past human activity has had a major effect on the natural ecosystem through planting of marram to stabilise sand movement, stock browsing and introducing mammalian predators. At present the main human threat is from the impact of vehicle movements and foot traffic on the beach which are currently low because of the lack of public access. However local landowners can use a track on the sandspit to access the beach with four wheel drive vehicles. It is important to ensure that vehicle access is restricted to this track and that vehicles are not permitted to drive among the dunes. Another potential threat to wildlife is dogs which may be brought to the sandspit by local farmers and fishermen.

Storms and climatic changes

Storms are natural events that cause erosion and landform changes on sand dunes from time to time. These events may cause periodic setbacks to the establishment of replacement vegetation and there is little that can be done to prevent this. There is also no way to predict the effects of sea level changes and the possible future frequency and intensity of storm events. It is inevitable therefore that there will be changes to the profile of the dunes and potentially the course of the river in the future. However establishing more natural vegetation patterns and aiding the recovery of the natural dynamics of the dune system has the potential to create more resilience so the negative impact of these events can be reduced. It is also possible that storms will create an increase in the sediment influx from flooding of the river which contributes to dune building.

Mammalian predators

Predators such as rats, stoats and feral cats are a threat to native wild life on the dunes including birds, lizards and invertebrates. Rats and mice also eat seeds and therefore can slow the dispersal rate of native plants. Rabbits have a major browsing impact on native plants.

Wind scour 2007

APPENDIX 8

Weed species present and control methods

The following table outlines the weed species that have been recorded on Kokorua sandspit with priorities and methods for control. Any other invasive weed that arrives should also be treated with the highest priority and removed immediately to prevent establishment.

Priority	**Common name**	**Scientific name**	**Control method**	**Herbicide**	**Rate**
1	Old man's beard	*Clematis vitalba*	Dig out Knapsack	Glyphosate (Roundup)	200ml/10
1	Mexican daisy	*Erigeron karvinskianus*	Bag any seedheads and dig out		
1	Gorse	Ulex europeaus	Knapsack	Triclopyr (Grazon)	60ml/10l
2	Marram grass	Ammophila arenaria	Knapsack	Haloxyfop (Gallant)	150ml/10l
2	Barberry	*Berberis glaucocarpa*	Dig out seedlings		
2	Pine	*Pinus sp.*	Dig out seedlings		
2	Exotic grasses		Knapsack	Glyphosate	100m/10l

APPENDIX 9

Funding sources

The Kokorua restoration project would meet the criteria for grants from the following organisations.

Canterbury Community Trust
www.commtrust.org.nz

Lottery Grants Board
http://www.communitymatters.govt.nz/Funding-and-grants---Checklists---Lottery-Environment- and-Heritage---Natural-Heritage-Projects

WWF Habitat Protection Fund
http://www.wwf.org.nz/what_we_do/community_funding/habitat_protection_fund/

Pacific Development and Conservation Trust
http://www.communitymatters.govt.nz/Funding-and-grants---Trust-and-fellowship-grants---Pacific-development-and-conservation-trust

Ron Greenwood Environmental Trust
Warwick Greenwood
Managing Trustee
PO Box 10359
Wellington

James Sharon Watson Conservation Trust
http://www.forestandbird.org.nz/what-we-do/partnerships/js-watson-trust

Robert C Bruce Trust (06) 358 4012

Some small amounts of funding and assistance may also be available from Department of Conservation, Nelson City Council, or Forest and Bird Nelson/Tasman Branch from time to time.