Ecological landscape plan for the Waipu Cove Recreational Reserve, Northland

David Bergin[1] and Paul Quinlan[2]

[1]Environmental Restoration Ltd
[2]Paul Quinlan Landscape Architect Ltd

December 2014




This ecological landscape plan for the Waipu Cove Recreation Reserve including the camp ground and public amenity area has been prepared for the Waipu Cove Reserve Board by Paul Quinlan Landscape Architect Ltd and Environmental Restoration Ltd.

ENVIRONMENTAL RESTORATION LTD
53 Te Puea Road
RD 4, Rotorua, New Zealand
Mobile +64 27 600 3017
Office/home +64 7 345 5453
davidbergin.erl@gmail.com

PAUL QUINLAN LANDSCAPE ARCHITECT LTD.
Mangamanihi Road
R.D. 2 Kaeo, 0479
PH. (09) 405-0052, (021) 1478-279
pdq@pqla.co.nz

TABLE OF CONTENTS

Ecological landscape plan for the Waipu Cove Recreational Reserve, Northland

David Bergin[1] and Paul Quinlan[2]

[1]Environmental Restoration Ltd
[2]Paul Quinlan Landscape Architect Ltd

December 2014

INTRODUCTION

Waipu Cove Domain Recreation Reserve is 12.9 ha of coastal sand dune at the southern end of Bream Bay on the east coast of Northland (Figure 1). It is located at Waipu Cove 6 km south of Waipu village and 40 km south of Whangarei. The reserve is in the form of a narrow wedge between the Waipu-Mangawhai Road (Cove Road) and the coast. Most the reserve is occupied by the camp ground, Camp Waipu Cove, with the southern end managed as a narrow public amenity area. To the north of the reserve is the Waipu Government Purpose Wildlife Reserve (Wildlife Refuge) managed by the Department of Conservation and to the south a small stream and headland that separates Waipu Cove from Langs Beach.

The reserve is part of the Department of Conservation estate and is managed by the Waipu Cove Domain Board under the Waipu Cove Recreation Reserve Management Plan 2011-13 (http://www.campwaipucove.com/board). This plan states the reserve serves four main purposes – conservation, camping, day visitor use and boat launching.

The Waipu Cove reserve adjoins the Wildlife Refuge with significant natural values comprising wading bird habitat, salt marsh, mangroves and dune lands.

A landscape plan for the reserve is required by the Domain Board to provide a strategic approach to developing and enhancing the ecological characteristics of both the camp ground and the public reserve including access to the beach, while ensuring continued use for campers and the public. This document, known as an Ecological Landscape Plan, provides practical recommendations for the Board and managers of the reserve to address the environmental policies and objectives stated in the Management Plan. These recommendations are compatible with the wider advocacy role of the Department of Conservation and the significant natural values of the area including the adjoining Wildlife Refuge.

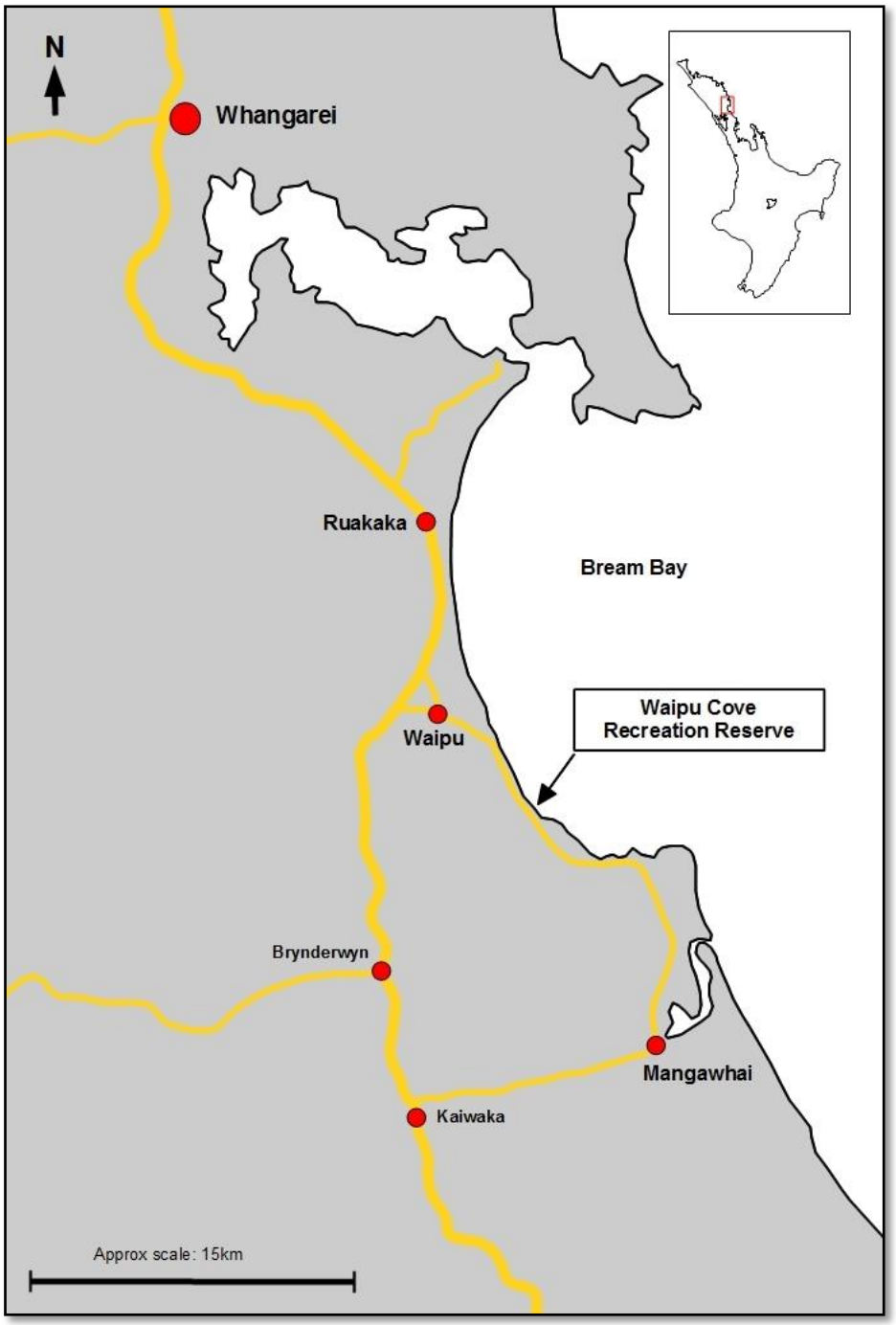


Figure 1: Location of the Waipu Cove Recreation Reserve, Bream Bay, Northland.

ENVIRONMENTAL POLICIES AND OBJECTIVES

The Ecological Landscape Plan is to be compatible with Policies 1 & 2 under Objective 3.2.3 Environmental/Conservation Enhancement as set out in the Waipu Cove Recreation Reserve Management Plan 2011-13 (http://www.campwaipucove.com/board). This objective is:

To maintain and enhance the natural environment and public amenity of the reserve with appropriate management and development.

Policies stated as part of this objective are to prepare a comprehensive landscape development plan with implementation allowing for the following:

a) The provision of native re-vegetation amenity planting and landscape improvements along the Northern boundary between the public access and the camping areas.
b) Species selection shall be approved by the Department of Conservation, and plant material eco-sourced from the local area wherever possible.
c) The provision of suitable specimen tree planting throughout the Reserve to provide shade and shelter, and to enhance the visual amenity within the Reserve.
d) Upgrade and maintain fencing to protect the sensitive dune environment and other natural areas and features and add to the safety and security of users, and
e) Work with the Department of Conservation to develop educational opportunities in order to increase the public's awareness in regards to the sensitive surrounding beach and dune environment.

As part of other objectives and policies in the Management Plan, and pursuant to various sections of the Reserves Act 1977 and the New Zealand Coastal Policy Statement 1994, several general objectives have been adopted by the Board that are relevant to the development of this Ecological Landscape Plan. These include:

1. The ecological values of the reserve will be preserved and protected, and as appropriate, enhanced.
2. Use of the Reserve will be monitored and actions instigated to mitigate or prevent any detrimental impact on the adjoining outstanding estuarine dune lands.
3. The natural environment will be protected, enhanced and maintained to ensure that it is safe, secure, attractive and clean for users.
4. Development, maintenance and usage of the Reserve will be carried out in such a way as to maximize the enjoyment of all users whilst meeting environmental and conservation objectives. Consideration will be given to the needs of surrounding residents in achieving this objective.
5. Further requirement for landscaping and tree planting will be planned and implemented as appropriate in order to minimize the visual impact of the camping areas and facilities, enhance the natural environment, and to provide shade and shelter. Ad-hoc plantings will be avoided.
6. Some uses and/or activities may be incompatible, and may result in conflict situations, either environmental, practical or safety related. Where this is the case the Board shall take appropriate measures to reduce conflict.
7.

DESCRIPTION OF THE RESERVE

A layout of the Waipu Cove Recreation Reserve with selected physical features and key aspects of vegetation that occurs in the reserve is shown in Figure 2. The reserve comprises three main components:

- ***Camp ground –*** occupies most of the reserve with cabins and sites for caravans, motorhomes and tents,
- ***Public amenity areas –*** comprises the main public park at the southern end and a small park in the northwest corner with beach access along the boundary to the Wildlife Refuge, and
- ***Coastal sand dunes –*** the seaward sand dune zone running the entire length of the reserve.

The Waipu Cove Surf Club building is located at the southern end of the camp grounds on the crest of the foredune and a public boat ramp is located in the public amenity area. At the north eastern corner of the reserve a small stream or drain separates the camp ground from the grassed carpark and picnic area adjacent to the Waipu Cove Road.

The Waipu Cove Recreation Reserve Management Plan 2011-13 provides a description of the reserve (http://www.campwaipucove.com/board). Key points relevant to development of this Ecological Landscape Plan are summarised and supplemented with observations during the survey of the reserve for the development of this plan.

Figure 2: Layout of the Waipu Cove Recreational Reserve showing the 3 main areas – camp grounds that occupies most of the reserve, a southern public amenity area, and the seaward sand dune zone.

Physical features

The Waipu Cove Recreation Reserve is located on sand dunes although significant modification of the natural dunes has taken place with levelling of the dunes and capping with fill including clay. This clay filling is evident along eroded parts of the seaward faces of the foredune from north of the Surf Club building to near the southern end.

Descriptive cross-sections of the foredune show that the reserve comprises flattened dunes at the southern end at only 3-4 m high likely due to being bulldozed flat decades ago when this area was used for camping (Figures 3, Transects T1 & T2). The crests of the foredunes along the central area of the reserve where the Surf Club is located have been flattened and are now an elevated grassed recreational area with steep foredune and backdune slopes (Transects T3 & T4). In contrast, the less well developed dunes at the northern end of the reserve comprise tall undulating, semi-stable foredunes up to 8 m high (Transects T5 & T6) that are similar to the dunes that continue northward along Bream Bay as part of the Wildlife Refuge.

Figure 3: Descriptive cross-sections across the seaward dunes of the Waipu Cove Recreational Reserve (left) and location of each transect (right). The dunes at the southern end (Transects T1 & T2) are low probably likely due to being bulldozed flat decades ago, dune crests in the centre have been flattened (Transects T3 & T4) whereas the more dynamic dunes at the northern end up to 8 m high (Transects T5 & T6).

Birds

The nearby estuarine area (Wildlife Refuge) is an excellent wading bird habitat with salt marsh and some mangrove areas backed by dune lands. The Department of Conservation has ranked the estuarine/dune land as a wildlife habitat of outstanding value. Some 31 estuarine bird species have

been recorded using the area many of which are threatened coastal bird species – refer to the Management Plan for further details (http://www.campwaipucove.com/board).

Vegetation cover

Vegetation is highly modified from what would have been present originally along dunes typical of eastern Northland. Exotic species dominate most of the reserve as managed grassed areas, various planted exotic trees, shrubs and garden ornamentals, and weeds and introduced grasses on foredunes and backdunes (refer to Appendix 1 for the botanical names for native species mentioned in this plan).

The camp ground and public park areas comprise mostly mowed lawns of exotic pasture species with kikuyu (*Pennisetum clandestinum*) dominant in many areas including the crest of the foredunes along the recreation areas at the Surf Club and the southern public park.

The camp ground is dominated by exotic grass with scattered planted trees mostly pohutukawa that provide shade and shelter. The northern end of the camp ground has fewer trees than the southern end.

A range of exotic and native trees occur throughout the reserve many of which have been planted for shade, shelter and as screens. The major native tree and shrub species include pohutukawa, karo, houpara, taupata and the endemic to the Three Kings Islands puka or pukanui. Harakeke and ti kouka are also present. The major exotic trees and shrubs include banksia (*Banksia integrifolia*), river myrtle (*Agonis flexuosa*), sheoak (*Casuarina equisetifolia*), Norfolk Island hibiscus (*Lagunaria patersonii* subsp. *patersonii*), Norfolk Island pine (*Araucaria heterophylla*), and an assortment of ornamental shrubs.

Some of the native and exotic tree species listed above have also been planted or have naturally regenerated along the semi-stable parts of the dunes including dense areas of woody vegetation that occur on backslopes of the foredune immediately north of the Surf Club. The semi-stable backdune areas that occur between the camp ground and foredunes along most of the dunes to the north of the reserve is dominated by exotic ground cover species including grasses such as Yorkshire

fog (*Holcus lanatus*) and hares tail (*Lagarus ovata*), and scramblers such as South African ice plant (*Carpobrotus edulis*). Native ground covers include pohuehue, and scattered spinifex, wiwi and nihinihi or shore bindweed with scattered taller natives such as karo and harakeke.

Steep backslopes are a dense mixture of natives and exotics with scope for removal of exotics and planting or encouraging natives in cleared gaps.

An example of the exotic ice plant dominating the backdunes and spreading over the recreational area in the camp ground.

A small estuarine stream and drainage channel along the inland northern end of the reserve comprises a mixture of rushes including the native species oio and wiwi along with saltmarsh ribbonwood on banks and mangroves within the tidal zone. A line of large exotic pampas (*Cortaderia* spp.) occurs between the camp ground and grassed carpark near the boundary.

Estuarine area in the northwest corner of the camp ground with many native coastal wetland species including oioi, salt marsh ribbonwood and mangroves.

This estuarine area adjoins a small stand of mostly native shrubs in the northwestern corner of the reserve comprising a mixture of manuka, karamu, harakeke and mingimingi. This forms the inland boundary of the camp ground adjacent to the Wildlife Refuge which forms a 10 m wide buffer dominated by exotic grasses, herbs and ornamentals, and scattered native shrubs to the coast. Garden escapees including agapanthus (*Agapanthus praecox* subsp. *orientalis*) are spreading from this buffer across a fenced public beach accessway that runs along the northern boundary of the camp ground and into the refuge.

Fenced accessway along the northern boundary between the camp ground (left) and Wildlife Refuge (right). Exotics including ice plant and ornamentals dominate the buffer zone within the camp ground but also occur in the refuge.

Foredune reshaping and planting

Substantial areas of the foredune are part of ongoing restoration programmes undertaken by the Waipu Cove Domain Board in collaboration with the local community, Northland Regional Council

(NRC) and Department of Conservation (DOC). This has included reshaping of the foredune seaward face and planting of the native sand binders spinifex and pingao along the southern amenity area and along the front of the Surf Club.

Most recently (mid 2014) concrete poles at the southern end have been removed and the low dune reshaped. A further reshape has also just been completed along a 100 m section of the foredune north of the Surf Club that has included a set-back of the grassed dune crest. The reshaped dune was planted with spinifex along the seaward facing slope with an increasing proportion of pingao included in the upper slopes. Some planting of wiwi and pohuehue has occurred along the upper foredune slope along most of the southern end of the reserve associated with the reshaped dunes.

Garden plantings

Developments within the camp ground include the establishment of gardens some of which are in the form of long narrow beds that are raised and boarded to provide some degree of separation between camping areas and the internal roading network. A mixture of exotic garden ornamentals and natives including *Carex* spp. and rengarenga lily have been planted in these gardens between and under existing native trees and shrubs, mainly karo and pohutukawa.

Access and fencing

Vehicle access to the Reserve is currently provided from Cove Road at the main entrance leading past the manager's dwelling and the camp office for vehicles associated with campers and the Surf Club. A boat ramp and day parking area is provided in the public amenity area.

Pedestrian access along the reserve is provided to the beach along both the public amenity area at the south end and at various points across the dunes between the camp ground and the beach. Marked and fenced accessways comprise timber steps constructed at several locations for heavily used steep dune sections from the southern public area to north of the Surf Club. Accessways at the northern end are less formal but are fenced and sign posted in most locations. The fenced public pedestrian access to the beach along the northern boundary with the Wildlife Refuge from a grassed parking area on Cove Road is managed by the Department of Conservation.

Pedestrian access from the public park to the beach along the northern boundary of the camp ground and the Wildlife Refuge.

Fencing comprising mostly round posts with 2-5 wires is erected along the crest of the dune to keep beach users off the planted and natural sand binding zone and to help direct pedestrians to formal fenced accessways. Fences along the foredune toe have been mostly post and wire but increasingly are being replaced by stakes and tape or light rope along recently reshaped and planted foredunes.

AN ECOLOGICAL APPROACH

The aim of this Ecological Landscape Plan is to provide an ecological perspective to directly address and contribute to the environmental and conservation enhancement policies and objectives stated in the Reserve Management Plan. The vision is to provide users of both the camp ground and public reserve with a natural New Zealand landscape experience in terms of dune management with the use of local indigenous vegetation that still allows existing use and enjoyment of the beach and the reserve facilities. The reserve already has a large proportion of native plant species present. This plan will enhance existing indigenous biodiversity with recommendations on planting and managing a wider range of native plant species appropriate for the estuarine and dunes areas of eastern Northland that can be integrated with the various uses of the reserve.

To meet this vision , the plan focusses on gradual removal of exotic species in favour of establishing appropriate locally sourced natives to improve indigenous biodiversity and reduce spread of invasive weeds both within the reserve and the surrounding lands and in particular the adjoining Wildlife Refuge. In addition, there is excellent scope to establish a wider range of local native coastal species including some of the threatened species that potentially can become seed sources for distribution by birds and wind to the dunes in the local area.

There is also scope to provide an educational component in the reserve and especially for the thousands of camp users, and for the local community, in profiling the range of coastal native species on display and in use throughout the camp ground.

DEVELOPING A LANDSCAPE PLAN

There are many examples of native plants in the Waipu Cove Recreational Reserve contributing to meeting the objectives of environmental enhancement and multiple uses as stated in the reserve management plan. Further opportunities for native species in the reserve are presented in this Ecological Landscape Plan based on the three main areas of the reserve (Figure 3), with recommendations for specific sites and features within each area as shown in Figure 4:

- **Area 1 – Camp grounds:**
  - specimen shelter and shade trees;
  - management of shelterbelts and screens;
  - enhancing gardens and ground cover;
  - establishing a northern boundary buffer;
  - restoration of the estuarine area and coastal forest; and
  - an interpretive nature trail.
- **Area 2 – Public amenity area:**
  - management of amenity trees;
  - other planted areas; and
  - safety audit of specimen trees in the reserve.

- **Area 3 – Sand dune zones:**
  - foredune restoration;
  - managing kikuyu adjacent to foredunes;
  - management of backdunes;
  - the northern dunes; and
  - management of beach accessways and fencing on dunes.

An illustrated concept plan of the reserve provides an aerial overview with selected prescriptions and species for the range of sites and uses in the reserve (Appendix 2).

The Management Plan for the Waipu Cove Recreational Reserve also requires consideration of potential visual impacts of buildings to views from public areas and neighbouring properties so recommendations are provided in this landscape plan for the design and appearance of the built environment within the reserve.

Finally, to assist implementation, the plan provides:

- A quick reference guide of species for the various sites and uses in the reserve; and
- Information sources on best practice guidelines for planting and management of natives.

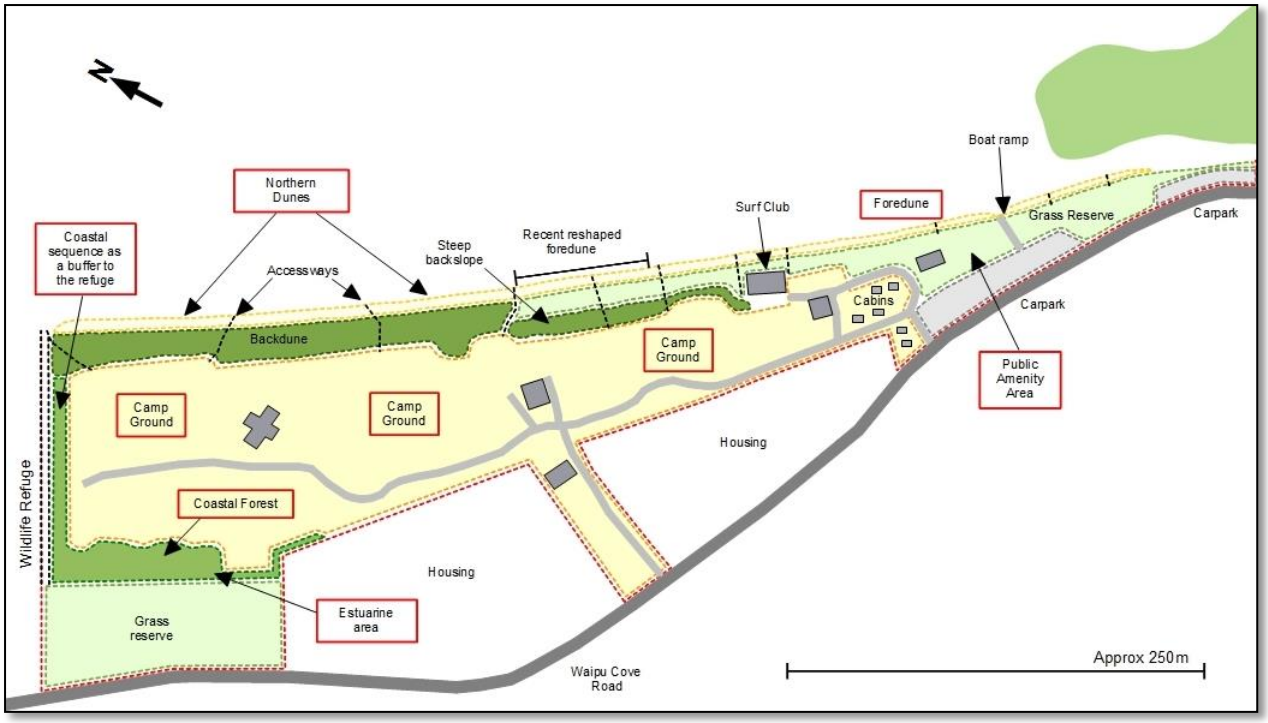


Figure 4: Specific sites and features within the three main areas of the Waipu Cove Recreational Reserve divided into separate areas for the development of this Landscape Plan: Area 1 – Camp ground, Area 2 – Public amenity area, Area 3 – Sand dune zones.

AREA 1 – CAMP GROUND

Specimen shelter and shade trees

- ***Pohutukawa –*** a range of established trees provide shade and shelter throughout the camp ground, particularly in the central and southern parts; in particular, these include excellent examples of small to medium-sized multi-leader, healthy pohutukawa planted within areas designated for camper vans and caravans, as well as established trees around cabins at the southern end; there is also scope to extend shade and shelter trees to other camping areas such as the open areas in the northern part.
- Pohutukawa can be slow to establish from planted nursery-raised seedlings especially when planted as single specimens on an open site; options for planting pohutukawa in the camp ground include:
  - ***Companion planting –*** involves pohutukawa planted amongst hardy coastal species (e.g. karo, taupata) to provide shelter in early years but requires space for additional plantings for these companion plants; avoid use of harakeke and ti kouka near mowed areas;
  - ***Transplanting large specimens –*** pohutukawa can be transplanted as large specimens but watering and staking on an exposed site may be required during the first summer after planting; depending on size of the tree transplanting can be expensive;
  - ***Artificial shelter –*** construction of a post and rail enclosure with shade cloth to allow planting of a single pohutukawa; once the tree is 2-3 m high the enclosure could be removed (refer to drawing detail on plan in Appendix 2).
- ***Other native tree species –*** while pohutukawa is a preferred specimen tree species, there are potentially a limited number of other native tree species that can be trialed as stand-alone shade trees such as puriri, houpara and kanuka. Puriri prefer landward sites with some protection from salt winds and houpara are relatively small trees. Kanuka can become windshorn on exposed sites. Note – do not plant any upright, variegated or early flowering cultivars of related pohutukawa species as these have the potential to hybridise with native pohutukawa – only plant pohutukawa seedlings raised from natural local seed sources.
- ***Successional planting –*** aim to have a succession of young to older pohutukawa as shade and shelter trees throughout the camp ground; in the long term this allows for occasional removal of trees deemed to be a risk for camping under but with younger cohorts nearby to provide continual shade and shelter (refer to recommendations for a safety audit of specimen trees in Area 2 – Public amenity area).
- ***Exotic trees –*** avoid planting exotic species as shelter trees; in the long term, plan to remove existing exotics such as Norfolk Island pines, banksia and wattle (*Acacia* sp.).
- In the long term remove the few scattered exotic trees in the camp ground and public amenity areas and replace with native trees and shrubs; plan replacement of exotics by planting natives several years before exotics are removed to avoid significant loss of shelter and shade.
- ***Maintaining views and access –*** care is required in ensuring any key view shafts for neighbouring residents are not blocked by the growth of new shelter trees; trim and prune vegetation to maintain safe access to buildings and for vehicles.
- ***Long term management –*** prune established specimen trees to provide views near ground level and to allow grass mowing; lower crowns of established pohutukawa in particular can be thinned although severe thinning of crowns can induce dense coppicing (growth of foliage) from exposed trunks and branches.
- ***Alternative to tree removal –*** where necessary branches or limbs of multi-leader pohutukawa can be removed, according to best practice arboriculture, without affecting

health of the tree if required for improving vehicle access, construction of facilities and cabins, and for any public safety concerns.

- ***Management of grass –*** while herbicide is a practical option for controlling grass and in particular kikuyu grass around trees and structures, evaluate reduced label rates and avoid surfactants to reduce chemical input into the environment; use line trimmers around trees with care to prevent ring barking (do not trim against stems!), especially for young trees; plant specimen trees within a surround of other plants in small gardens to avoid need to control grass around root collars of woody plants; alternatively and where practical, place wood chip or bark around base of trees in grassed areas.

There is scope to extend single specimen trees to the northern end of the camp ground to provide shade and shelter for caravans; pohutukawa are likely to perform better during the establishment phase if protected such as a temporary post and rail fence with shade cloth (refer to design drawing in Appendix 2).

While exotic trees such as Norfolk Island pines, banksia and Norfolk Island hibiscus are popular for coastal settlements, it is recommended that these are replaced in the long term as part of future camp development and planting.

Management of shelterbelts and screens

- ***Choice of species –*** a wide range of coastal native species can be used in shelterbelts and screens; key species such as pohutukawa, houpara, karo and taupata are already used in the camp ground and are a more attractive and low maintenance alternative to artificial shelters such as shade cloth frames and wooden fencing.
- ***Hedges –*** narrow screens comprising a single row of selected native shrubs can be hedged to maintain foliage from ground level to a desired height up to several meters; taupata, broadleaf and korokia are attractive hardy natives that can be mechanically trimmed where necessary as narrow hedges between service areas and camping sites. Where necessary to prevent trampling during the establishment phase, post and two rail fences can be erected (refer to concept detail example on plan drawing Appendix 2).
- ***Multiple species screens –*** for wider buffers plant a mixture of shrub species to form attractive diverse species screens that are relatively low maintenance including karo, taupata, karamu and kohuhu, and away from mowed areas/edges harakeke, ti kouka, and toetoe; plant shrubs at approximately 1.5 m apart with any groundcover border plantings at about 40-60 cm spacing; if practical, occasional native tree species can be inter-planted at an average of 5 m apart.
- ***Use shelter to extend species diversity –*** plant species that are sensitive to salt laden coastal winds in the shelter of established hardy species such as karo, harakeke, tauhinu and taupata, or behind buildings or other structures offering protection.
- ***Separation of uses in the reserve –*** multiple species plantings can be effective in providing greater delineation of uses between the camp ground and the public areas where this is required; over time, replace exotic shelter by gradually replacing with native species.

Infilling of this shelterbelt with other natives will help to provide a more effective screen. Use of mulch, bark or wood chips will reduce the area requiring herbicide spraying and damage to stems with mechanical weed eaters.

Avoid using artificial screens for shelter which inevitably deteriorate and become unattractive. Rather use the range of hardy native species that can be easily established as shelterbelts and screens.

Over time replace exotic shelter such as these sheoak in the camp ground with native shrubs and trees. Inter-plant natives in sheltered gaps created within exotic screens during the early establishment phase.

Excellent settings of native trees and shrub around the cabins in the camp ground with pohutukawa providing shelter and shade and *Carex testacea* planted in the gardens along decks.

Opportunities for softening hard structures such as this fencing and service vehicle entrance by extending planting of natives either side where practical.

Enhancing gardens and groundcover

- Ground cover natives are already utilised in garden borders around facilities, in raised gardens, and as understorey in narrow screens in the camp ground.
- Replace exotic garden species such as agapanthus with low-growing and ground cover coastal natives including pohuehue, speckled sedge, wiwi, coastal tussock, toetoe, sand coprosma, *Hebe* species such as *Hebe speciosa*; for shady garden borders and understorey within established native shrub and tree areas, plant shade-tolerant natives include kawakawa, rengarenga lily, ferns such as hounds tongue fern, and kokihi.
- Do not use rocks in gardens as these appear out of character with the sand dune landscape context; use plants for features and form, or post and rail fences if a structural barrier is required (refer design drawing on plan in Appendix 2).
- ***Refuge for threatened coastal species –*** excellent scope exists for planting threatened coastal ground cover species in gardens and as understorey throughout the camp ground including sand daphne, sand coprosma and sand spurge; check with botanists at the Department of Conservation and the Northland Regional Council for local seed sources.
- Use a range of gardening methods to improve performance such as planting the more sensitive species in the shelter of established hardy species to reduce wind and salt burn, continued use of bark mulching, and watering during dry summer months particularly for the first year after planting; filling in gaps caused by mortality with better performing species in subsequent years will be required.

A raised boarded garden around a screen of shrubs between an internal road and camping sites. There is scope to plant a range of threatened ground cover coastal native such as sand daphne and sand coprosma.

Avoid using exotic ornamentals such as these yukkas in gardens and around facilities in the camp ground. There are many attractive, low-maintenance native ground cover and shrub species to select for planting in these sites.

Rather than plant agapanthus as ground cover and understorey, use natives such as *Carex* species, sand coprosma, kawakawa, rengarenga lily and pohuehue. Avoid rocks in this sand dune landscape context; rather use plants for features and form, or post and rail fences if structural barriers are required.

Establishing a northern boundary buffer

- There is an excellent opportunity to restore a sequence of native coastal vegetation from foredunes to backdunes along this buffer area and to include the estuarine and forest area near the northwest corner. The restored buffer should be at least 10 m wide and would complement the Wildlife Refuge. This is a priority in the reserve management plan.

- Many natives are already present as scattered small patches or plants but control of aggressive weeds is a priority such as agapanthus that is spreading into the Wildlife Refuge.
- ***Restoration plan –*** it is recommended that gradual restoration of this buffer is undertaken using appropriate natives over a 3-5 year period as follows:
  - ***Weed control –*** removal of exotics in small areas 5-10 m in width to limit areas of bare sand vulnerable to sand movement; herbicide spray exotic grass and herbaceous species including agapanthus, South African ice plant, etc…in autumn;
  - ***Planting –*** at least 2 months after weed spraying, densely plant natives using appropriate species for each zone as follows (refer to best practice guidelines and species including Northland Regional Council factsheets www.nrc.govt.nz):
    - Foredune zone – spinifex, pingao;
    - Transition groundcover zone – wiwi, pohuehue, sand coprosma;
    - Shrub zone – karo, taupata, harakeke, ti kouka, tauhinu;
    - Tree zone – mixture of shrub species along with pohutukawa, houpara, kanuka.
- Long term, with increasing cover provided by the plantings on the sheltered landward sites, various other shrubs and tree species will regenerate or can be inter-planted.

An excellent opportunity exists to restore a full sequence of coastal vegetation from the road to the beach along the buffer between the camp ground and Wildlife Refuge.

Aggressive weeds within the camp ground adjacent to the Wildlife Refuge require urgent control such as this patch of agapanthus which is spreading into the refuge. This is a priority task.

Restoration of the estuarine and coastal forest area

- Potential for enhancing a small area of estuarine habitat and adjoining forest area in the northwestern corner of the camp ground dominated by a range of natives from freshwater to coastal sites including oioi, wiwi, *Carex* species, salt marsh ribbonwood, toetoe, marsh clubrush, tussock swamp twig rush, umbrella sedge, mangroves and raupo.
- Exotic pampas, gorse (*Ulex europaeus*), pines and rank grass require spraying or cutting and the gaps created planted with native shrubs including salt marsh ribbon wood, harakeke, ti kouka etc… on damp sites, and shrub hardwoods such as karamu, koromiko, manuka, etc… on drier shrubland and forest sites.
- Some of the low growing wetland species can be extended along the ephemeral drain and lowland area extending southwards between private dwellings and the camp ground where they will not interrupt views.

Removal of pampas and other exotics is recommended followed by planting of native wetland species (left). There is scope for extending natives along the boundary to neighbours using low growing native wetland species that will not conflict with their views (right).

Developing a nature trail

- There is excellent scope to construct a low-impact interpretative walkway along the northern end of the camp ground integrating the park at the northwest corner of the reserve with the estuarine area and proposed restored coastal forest sequence to the frontal dunes.
- This walkway extending along the transition area to the Wildlife Refuge could have one or more information panels for camp users, visitors and locals walking the nature trail describing the importance of estuarine and coastal dunes habitats including details on restoration underway and the environmental and cultural benefits of restored diverse coastal ecosystems.
- Interpretive boards will complement the the current dune restoration signage at the seaward end of the northern boundary access track to the beach.

There is potential to restore a coastal forest in the northwest corner of the reserve by enhancing existing natives and replacing exotics with native plants. This would become part of the proposed coastal forest sequence adjacent to the Wildlife Refuge and provide opportunities for setting up an interpretive nature trail for camp users, locals and the public.

AREA 2 – PUBLIC AMENITY AREA

The southern end of the reserve landward of the foredunes is dominated by scattered shade trees throughout the mowed reserve. The small park at the northwestern corner of the reserve is largely mown grass with scattered large pohutukawa used mainly for parking and access to the beach.

Amenity trees

- Pohutukawa that comprise most of the shade trees in this area are healthy and provide ideal cover for user of this public grassed space for picnicking, games and those taking in the views of Bream Bay; established pohutukawa also provide useful shade for car parking.
- It is recommended that the few exotic trees are removed in the long term to be replaced by pohutukawa as shade trees.
- Depending on view shafts from neighbouring properties, consider establishing a small number of pohutukawa in open areas particularly along the seaward crest of the dune to provide additional shade trees.
- It is recommended that pohutukawa are planted initially within a small planted group of hardy coastal shrubs including karo and taupata to assist in their establishment; alternatively plant individual pohutukawa within a 1.2 m square post and rail tree protectors with shade cloth protection through the establishment phase (refer detail design on plan in Appendix 2).

Good examples of pohutukawa providing shade next to a playground (left) and around the car park in the public amenity area (right).

There is limited scope to plant a few well-spaced pohutukawa on open sites of the public amenity area to provide shade for those using picnic tables and seating.

The park at the northwest corner of the reserve used for parking, open space recreation, and access to the beach along the northern boundary of the camp ground and the Wildlife Refuge.

Other planted areas

- Native shrubs such as karo, taupata, ti kouka, karamu and koromiko could be used for replacing exotics in the fringe of vegetation at the southern end.
- Similarly, tree and shrub planted areas in the park at the northwest corner of the reserve could be improved with spraying of dense rank kikuyu grass and inter-planted with a range of native shrub species.
- It is not considered necessary to provide further planting of screens or gardens of natives in these public parks; the aim is to maintain as much open grassed area as possible, provide views to sea, allow open space recreation, and to keep maintenance to a minimum while providing the option of sufficient shade from scattered pohutukawa.

Park at the northwest of the reserve where dense kikuyu within an existing harakeke and pohutukawa area could be sprayed and inter-planted with a mixture of native shrubs such as karo, koromiko, taupata, ti kouka, manuka and tauhinu.

Safety audit for specimen trees

With the increasing awareness of safety of camping, picnicking and other recreational activities in public reserves that have trees, it is recommended that the Domain Board undertake a safety audit of particularly the specimen trees in both the camp ground and public amenity parks.

This can be undertaken by an experienced and qualified arborist involving inspection of specimen and shade trees in the reserve, both native and exotic, to determine any potential issues with safety and in particular to identify those trees or limbs that could fail in the near future. Most trees in the camp ground are small to medium size but an assessment of these younger trees should be included at the same time to determine poor tree form and potential for failure in the long term so that remedial treatment can be actioned.

Mitigating safety – any trees and limbs identified by the reserve manager and a qualified arborist that are considered dangerous should be isolated immediately from public and camp use until remedial action is undertaken. Options for mitigating safety issues for specimen trees include:

- Removal of the tree if necessary and plan for a replacement;
- Pruning or thinning of problem branches, stems and poorly formed junctions;
- Check younger trees for any potential long term safety issues and undertake remedial action to pre-empt future stem failure; or
- Change landuse in the immediate vicinity of trees identified with potential for failure such as under-planting with natives to prevent camping and picnicking under the tree.

Planting a succession of trees over time in the camp ground and public amenity area will ensure that there is a range of young to older trees and will allow for occasional removal of older, storm damaged or inherently unsafe trees so that the reserve will always have sufficient shade trees. Depending on recommendations from the arborist as a result of the first safety audit, inspections of tree safety throughout the high use areas of the reserve should be considered every five years and following major storms.

A safety audit of trees undertaken by a qualified arborist, particularly for trees in high use public areas and within the camp ground, will identify those that may be potentially unsafe and require pruning of limbs.

AREA 3 – SAND DUNE ZONES

It is essential that the dune system along the entire length of the Waipu Cove reserve is managed to prevent degradation of this buffer and potential loss of as part of the reserve to future storm events. This is particularly relevant with the expected impacts of climate change including sea level rise and increased severity of storms that will see greater pressure on our coastal dunes. Restoration and management of the frontal dunes by restoring natural dune form and function wherever possible using appropriate native plant species will assist in mitigating the effects of climate changes (e.g. Dahm, Jenks and Bergin 2005) as well as the high impacts of ongoing public use and other human induced modification such as weed and pest animals.

Techniques and species to use in restoration of foredunes and backdunes are available in several publications and websites (e.g. Northland Regional Council website www.nrc.govt.nz/ /Coast/Dune-Plants/Planting-guidelines; Dunes Trust Technical Handbook 2011; Bergin 1999; Bergin and Herbert 1998).

Foredune restoration

- It is recommended that restoration and management of reshaped foredunes that has been underway along southern and central sections of the coastline to the reserve continues as this provides the best opportunities to restore and maintain natural dune form and function.
- ***Establishment of sand binders –*** plant spinifex and pingao on the seaward face of the foredune using guidelines available from the Northland Regional Council and the Dune Restoration Trust of New Zealand (Dunes Trust) (refer to references below). This includes:
  - planting any gaps including areas of storm damage on the foredune to assist recovery of sandbinders where practical;
  - planting to stabilise wind-blown sand landward where necessary; and
  - use of fast-release fertilizer (urea) to boost growth of existing spinifex where required.

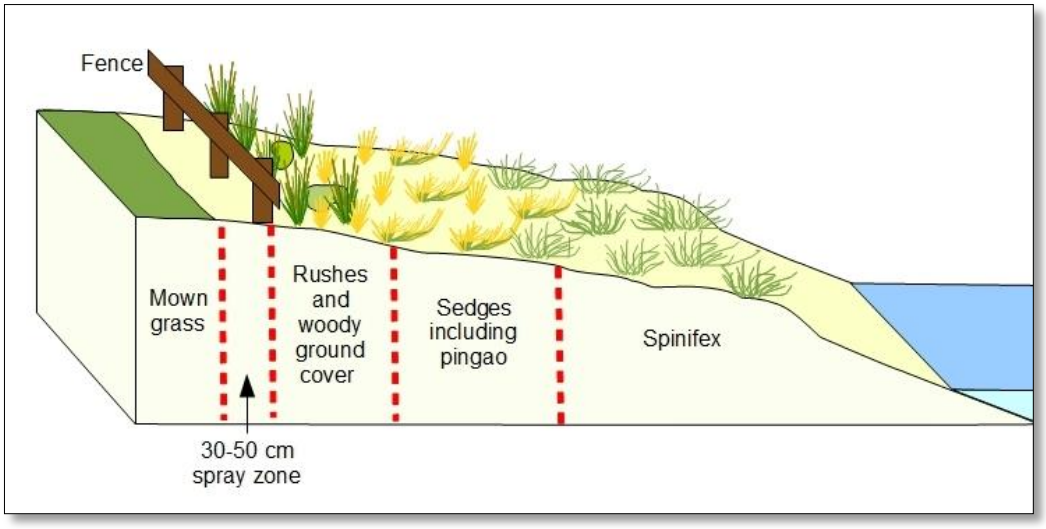
An excellent sward of spinifex on this steep foredune immediately south of the Surf Club planted several years previously where the kikuyu lawn has been prevented from invading the sand binder zone. The site has also been protected by post and wire fencing along the crest and stake and tape fencing along the toe to prevent access over the dune face and to encourage use of formal accessways.

Recently reshaped low angle foredune at the southern end of the public amenity area (left) in contrast to the recently reshaped higher and steeper foredunes north of the Surf Club (right).

- ***Weed control –*** there is good weed control along most of the reshaped dunes to prevent exotics invading the sand binding foredunes zone; regular monitoring of weed invasion and undertaking control is essential.
- Continue regular maintenance of accessways and fencing to assist in dune vegetation recovery and protection.
- ***Rabbit control –*** Where feasible and necessary, control rabbits to low numbers for both existing dune vegetation and for new plantings (refer to pest animal control officers at the Northland Regional Council for appropriate control options).

Managing kikuyu adjacent to foredunes

- A key requirement for managing foredunes is to ensure that exotics and in particular kikuyu does not invade the spinifex and pingao dominated front face of the dune.
- This is achieved most practically by continuing to maintain a spray strip between the mowed grassed areas of the recreational reserve and the planted foredune.
- ***Establishing a buffer for spraying –*** a strategy that is used along reshaped and planted sections of foredunes at Waipu Cove is to continue:
  - plant a narrow band of rush, sedge and woody ground cover natives between the kikuyu dominated lawns and the foredunes dominated by spinifex;
  - key species include the hardy wiwi and *Carex testacea*; once these are established pohuehue can then be inter-planted;
  - spray the grass-selective herbicide haloxyfop (e.g. Gallant) along the planted wiwi-dominated buffer to prevent invasion of exotic grass into the spinifex;
  - extend this buffer of non-grass natives along the entire interface between the mowed recreational areas and the foredune; and
  - carry out timely monitoring and maintenance by spraying and supplementary planting of any gaps as required.



A buffer of rushes, sedges and wood ground cover established between the spinifex foredune and mown grass will allow spraying of a grass-selective herbicide to prevent invasion of exotic grass seaward.

The recently reshaped and planted foredune north of the Surf Club. Weed control to prevent spread of exotic grass from the lawn into the foredune is essential as is removal of exotics amongst the native sand binders. Spreading of fast-release fertiliser applied in wet and warm periods in spring and autumn will boost growth of sand binders. During the next planting season, gaps on the foredeune will require replanting with sand binders; planting of ground covers such as wiwi and pohuehue are recommended along the buffer between the sandbinders on the foredune and the grassed reserve.

Encroachment of kikuyu grass into the sand binder zone (left) will compromise (out-compete) spinifex and pingao and prevent the natural repairing function of the foredune to accumulate sand after storm erosion. A sprayed buffer along the landward edge of the spinifex (right) is essential to prevent invasion of kikuyu into the foredune. Note the buffer of non-grass native species wiwi and pohuehue has been planted between the mowed grass of the reserve and the spinifex foredune.

Management of backdunes

- The steep backslopes to the dune immediately north of the Surf Club between the grassed dune crest and camp ground are dominated by a diverse range of mainly native shrubs and trees; gaps are dominated by weeds and in particular grass and garden ornamentals.
- It is recommended that the scattered exotic trees are gradually removed to allow infilling by existing native shrubs and trees; options include felling or poisoning in-situ to leave debris as shelter and protection for planted natives; for poisoning exotic trees refer to the Northland Regional Council website for details (www.nrc.govt.nz) or contact the NRC weed control officer for advice (e.g. drill holes into lower stem and fill with herbicide); excessive slash may present a fire-risk and there is a risk of limbs eventually falling from poisoned larger trees so this option is not suited near high use areas.
- Spray exotic ground cover with herbicide to establish small groups of native woody species and monocots including harakeke, toetoe and ti kouka; plant open sandy sites in wiwi followed by pohuehue.
- Use haloxyfop to control exotic grasses where natural regeneration of pohuehue occurs; other herbicide formulations will be required to control exotic herbaceous species and garden escapes such as agapanthus (refer to the NRC website for latest details on chemicals to use and application methods).
- Undulating sheltered backdunes along the northern camp ground comprise a mixture of native and exotic species; herbicide spray patches of exotics such as ice plant and grasses to allow planting of native groundcover and shrubs.

Herbicide spraying of patches of ice plant (orange foliage) and kikuyu (bright green) on backdunes along the northern part of the camp ground will allow planting of a range of native ground cover and shrub species.

Death of these established trees (probably the exotic sheoak on the backdune at the north end of the camp is not precisely known. However a range of ground cover natives and shrubs could be planted to replace the rank exotic grass dominated dunes.

Spot spraying of invading agapanthus amongst the native ground cover pohuehue is urgent (refer to the NRC website for latest information on weed control www.nrc.govt.nz). Where grass has invaded natives, use of the grass-selective herbicide haloxyfop will allow pohuehue and wiwi to flourish.

The exotics agapanthus and purple groundsel that occur on the back-slopes of back-dunes amongst pohuehue ground cover within a gap of shrubs dominated by karo and salt-damaged exotic woody species.

The northern dunes

- This less well used area provides an ideal opportunity to restore a natural dune sequence with the buffer of natives to be established along the northern boundary.
- Retain fencing and signage to reduce access to foredunes to prevent beach users from exacerbating the highly eroding steep open faces of these tall foredunes.
- ***Establishing natives –*** according to zone, establish natives as follows:
  - plant sand binders along crest of dunes and wherever there is open mobile sand to create a dense sward that will reduce movement of wind-blown sand landward;
  - plant a range of rush, *Carex* spp. and woody ground cover species on semi stable habitats in gaps within existing vegetation; over a period of several years, expand natives into any dense exotic sites by spraying or clearing small areas less than 5 m in diameter to reduce risk of sand blowing to plant dense areas of native ground covers; and
  - increase the proportion of native shrub and monocot plantings landward to eventually merge into shrub and tree zones further landward.
- Maintain fencing and accessways to protect regenerating and planted natives.

The ground cover and scattered small shrubs typical of the dunes along the northern end of the camp ground (left – view south). The high foredune along the northern end of the camp ground dominated by ground cover of natives and exotics continues beyond the boundary fence to the Wildlife Refuge (right – view north).

Excellent pingao dominating on foredunes with spinifex at the northern end of the reserve 5-6 m high. Management of beach users to reduce disturbance will allow pingao and spinifex to extend over the steep erosion scarp at the toe and assist in natural repair.

Management of accessways

Existing beach accessways

- There are well established formal pedestrian accessways to the beach along the entire length of the reserve which reflect the different intensities of use of the reserve. These include:
    - three accessways in addition to the boat ramp in the high use public area at the southern end of the reserve approximately 30-40 m apart; access comprise short to medium length steps;
    - four accessways from in front of the Surf Club and along the narrow grassed reserve to the north that range in distances of 37-56 m; this is a high use part of the reserve for public, camp users and the Surf Club with each requiring substantial stepped constructions to access the beach over a steep foredune face; at least 2 formal accessways continue down the backslope to the camp ground from this grassed crest of the dunes immediately north of the camp ground; and
    - three additional access points across the tall northern dunes range from 92-117 m apart with the northern access from the camp meeting the Department of Conservation track along the northern boundary at the foredune; the aim is to keep a low number of access points across this highly dynamic dune system to reduce maintenance commitments, plus this end of the reserve is less well used.
- The number and position of accessways along the Waipu Cove reserve appear to be adequate to meet the needs of the public and users of the Surf Club and camp ground.

Example of wind funneling often associated accessways across high mobile foredunes where fencing requires constant maintenance (left) that leads to wind-blown sand drifting landward (right). Re-siting an angled narrow fenced accessway to a nearby site should be considered. This site then should be closed for access and planted in native sand binders.

Design and construction

- While use of fixed structures on dunes is not recommended, the existing wooden steps along the steep slopes of the middle section of the reserve are the only practical option; short steps for the lower dune along the southern amenity area are probably the best option for most of these accessways due to the high use.
- However, all fixed structures on foredunes are highly vulnerable to natural cycles of dune erosion and burial so will require regular monitoring and maintenance especially after each storm.
- Wherever practical establish all accessways at an angle to the prevailing onshore wind to reduce wind funneling and movement of sand from the foredune to landward zones; walkways with an angle will also slow wind-blown sand; this is particularly relevant for the access points across the high mobile dunes along the north of the reserve (Figure 5 – left).
- In general, avoid surfacing pathways with alternative materials such as clay, bark, sand ladders or fixed boards as these require high maintenance and are not necessary; the only exceptions are the steps required down the seaward facing foredunes and if necessary any steep access across highly used backdunes between the grassed area north of the Surf Club and the camp; when upgrading these pathways consider redesign to reduce slope and construction materials, and to reduce wind funneling of sand.
- Refer to Bergin and Bergin (2011a) for design and layout of accessways for different uses and sites on dunes.

Accessway fencing

- Design and materials for fencing along accessways depend on construction of the accessway, dune characteristics and number of users.
- As already in use along the Waipu Cover reserve, wooden posts with handrails and lower rails or wire are likely the best option for steep heavily used accessways including steps, whereas post and wire may be all that is required for gentle sloping dunes and less frequently used accessways.
- Post and wire fencing is adequate along the three extended accessways from backdunes to the beach for the northern dunes where the foredune is tall and subject to significant movement of sand by wind; use a minimum number of wires (e.g. 2 wires) as this is sufficient to guide users to the beach and will allow for easier maintenance as sand movement occurs.

- Keep all accessways as narrow as possible to reduce wind tunneling and sand movement landward, and therefore ongoing maintenance; a maximum width of 1.5 m between fences will allow two-abreast walking for high use accessways, otherwise a single file track (1.2 m wide) may be all that is required for low use areas.
- Extend fences to near the foredune toe without splaying outwards at the high water mark to avoid creating embayments of bare sand (Figure 5 – right).
- Plant natives appropriate for each zone in any bare sand areas either side of accessways and boost growth of existing disturbed vegetation with fast-release fertiliser.

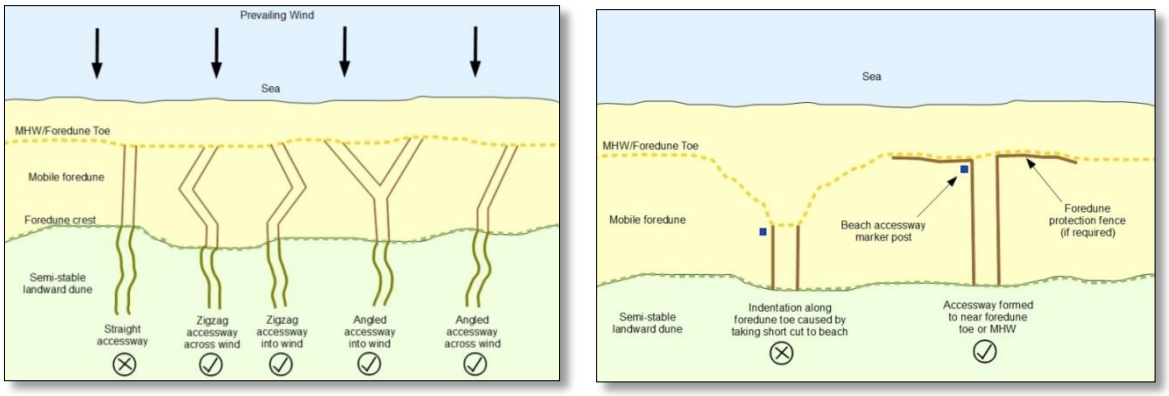


Figure 5: Care taken in the location and design of accessways across mobile foredunes will help reduce movement of sand from the beach and foredune landward. Orientating accessways at an angle to the prevailing wind and changing the direction of walkways will reduce wind funneling (left). Fencing accessways to the toe of the foredune so that beach users do not take short cuts across the dune and trample sand binding vegetation cover will prevent development of a wide embayment of mobile sand (right).

Beach access at the northern end is difficult due to the steep and mobile dune form. A narrow fenced access is required at an angle to the prevailing onshore winds to reduce wind funneling. Fencing either side of the access should extend to near high water mark to prevent users from fanning out across the dunes before reaching the beach.

Appropriate design of accessways to reduce sand movement from foredunes landward is essential and will require regular maintenance. Orientate walkways at angles across dune slopes and avoid splaying out fences at either end of beach accessways over high dunes.

Excellent example of a narrow accessway across the semi-stable backslope of a foredune typical of the northern section of dunes along the camp ground using post and 3-wire fencing (left). However, maintaining accessways across the seaward face of foredunes are always problematic, especially where dunes are dynamic and wave and wind erosion continually undermine fencing (right). While use of minimal low-cost fencing designs and orienting accessways to avoid wind tunneling from prevailing onshore winds are recommended, such accessways will require high levels of maintenance.

Avoid using structures on foredunes especially on dynamic dunes where there is significant sand movement. Such structures often end up redundant and unusable.

When upgrading accessways leading from the grass reserve north of the Surf Club down the backslope to the camp ground consider a design that avoids a straight pathway and allow for angling across the slope to decrease slope and incorporate a curve to reduce wind funneling and sand movement.

Fencing on dunes

Fencing occurs along the entire length of the reserve reflecting the high use of the beach. Fencing is essential along walkways, backdunes and in high use areas along the toe of foredunes to guide beach users to each walkway. Refer to Bergin and Bergin (2011b) for details on fence types and design for different uses and sites on dunes.

Backdune fencing

- Post and wire fencing erected along the landward boundaries of backdunes are effective in preventing beach users accessing the beach between formal accessways.
- Up to 7 wires, battened and tightly strained, on posts not more than 5 m apart (preferably at 3 m centres) at the standard height of 1.1 m will be required where beach users persist in climbing over or through fences along the northern dunes. Alternatively tightly strained sheep-netting fixed at a minimum height of 1.1m makes climbing over difficult. Along the middle and southern sections of the reserve 2 wire fences are proving adequate in guiding beach users to the formal accessways.

Foredune toe fencing

- While backdune fencing reduces beach user access across the dunes to the beach, some fencing at the base of the foredune is desirable in high use areas to deter access to bare foredune faces (often favourite slopes for children) and to reduce trampling of natural or planted sand binding vegetation by beach users.
- Toe of foredunes are highly vulnerable to erosion from high seas especially during storms and burying by sand during periods of dune accretion so keep fence designs low-cost and basic.
- Use low-impact, easy to install stake and tape fencing or similar materials and design along sections of foredunes to reduce access to foredune faces; these simple fences can be replaced quickly after storm damage.
- Avoid using steel posts (e.g. warratahs) and wire especially where fencing will be buried or undermined; such materials can become a safety hazard for beach users for many years if not recovered.

If undisturbed the dense spinifex trailing over the face will be effective in trapping wind-blown sand to assist in dune repair. Regular monitoring and maintenance of these fences are essential.

Steep accessways in a high use area of the recently reshaped foredune constructed of steps and hand rails. Fencing along the top of the dune can be post and wire fence (minimum of 2 wires) and the toe stake and tape.

BUILT ENVIRONMENT – DESIGN AND APPEARANCE

Structures in the landscape

Generally any landscape works should try to minimise the use of structures and as far as practicable, use planting to create spaces, barriers, define areas and provide the character and feature elements of the reserve. However, some structures will be required. Selecting appropriate materials in respect of a landscape character befitting the sand-dune environment is an important consideration. For example, in this dune landscape context, naturally weathered timber is a better fit than stone for elements such as entrance walls, steps or garden edges, etc. Stone tends to look out of character and visually discordant with the dune landscape context.

This is a recreational area and should also have a relaxed, informal atmosphere and character. In this regard, structures should avoid having any urban style and character connotations – as that can appear 'up-tight' and too formal in this setting. To this end, structures in the landscape should endeavour to avoid an 'over-constructed' appearance, and rather try to keep a 'visually light-weight' expression and appearance. For example timber edging to gardens should be kept low and visually discrete, with planting designed to spread out and hang over the edges to visually soften or hide the structural element. Also the ends of rails on timber fences should generously extend well past the posts (a minimum of 350 mm) in order to have a light and casual appearance (refer to the sketch details on the drawing in Appendix 2).

The dynamic nature of the dune is in conflict with human attempts to create rigid and permanent structural elements at the beach exit ends of accessways. More about appropriate design and construction of hard landscaping elements including accessways and fencing in these dune areas is covered in Area 3 – Sand dune zones, and two Dunes Trust Technical Handbook articles (Bergin and Bergin 2011a; 2011b).

Buildings and visual impact and character

The Management Plan also requires consideration of potential visual impacts of buildings to views from public areas and neighbouring properties.

Potential visual impact of buildings can be separated into two categories, one is those buildings that are visible from off-site locations and the other, is those buildings only visible internally within the camp-ground. These have different potential viewing audiences with differing sets of expectations regarding appropriateness in terms of visual impact and character (design and appearance). In respect to the first category, the relevant issues are minimising and mitigating potential visibility of buildings in order to avoid having the intensity of buildings becoming a dominating impression on a recreational reserve where expectations are that a natural environment should be the dominant landscape character. In contrast, for the second category, the campers, buildings with character traits consistent with the traditional beach bach vernacular would probably not be inconsistent with their expectations. These often included colourful structures.

In this light, recommendations regarding the design and appearance of buildings on the reserve pertain to buildings according to their potential visual catchments.

- ***Buildings visible from off-site locations***
  Buildings in these locations should be sensitively sited, of modest scale and have visually recessive natural materials (ie timber) and/or colour-schemes (ie 'Color-steel' in *karaka green* colour) and be visually integrated into the landscape setting with the use of associated native planting. Colours should only be warm greyed hues of natural colours with a light

reflectance value (LRV) of less than 25% for roofs and less than 40% for exterior cladding, or naturally weathered (or oiled) timber. Do not use colours with a blue colour base in these areas. **N.B. –** Resene have a range of colours and wood stains called "Cool-colours" that enable the application of very dark colours and stains without increasing the solar heating effect of the sunlight (which can cause timber distortion). The style of buildings (cabins) already used to good effect in the southern part of the camping ground is appropriate. This could be continued with.

- ***Buildings not visible from off-site locations***
  Within the campground itself, buildings with the architectural character referencing the quintessential kiwi-bach – including bright happy colours- may be appropriate in some locations and instances. In these cases, the colours selected from the British Standard BS52 colour range are recommended.

- ***The surf club building***
  The visual impact of this building could be reduced by following the recommended performance specifications above, except that for safety reasons it may be appropriate for the tower to be a clearly visible landmark. Therefore a combination of the two objectives: mitigating visual impact of the building generally; but making a feature of the tower, should be considered. Implementation of any such a change should occur at the next scheduled major maintenance painting.

Use of natural materials and siting of these cabins at the south end of the camp ground are good examples of fitting structures sensitively into the landscape. Reducing visual impact of high profile buildings such as the Surf Club within this coastal landscape should be considered at the next scheduled maintenance painting.

QUICK REFERENCE GUIDE TO SPECIES

A summary of the range of species for planting in the different areas of the reserve to meet specific uses and sites is tabulated as a quick reference guide (Table 1).

While the selection of species focusses on natives local to eastern Northland, there are some native species such as pukanui that are only found naturally on offshore islands that have been included in the recommended list of options. As indicated by Lisa Forester (pers comm., Biodiversity Advisor, Northland Regional Council) in reference to shade and garden species in the camp ground

…"I don't see why you can't use pukanui and other offshore island [species] in that situation [gardens] *as it is not a restoration planting. Pukanui grows brilliantly…. and won't cross pollinate with any local things as well as being good shade."*

Table 1: Native species recommended for planting for various uses and sites within the Waipu Cove Recreational Reserve. Other local native species may be appropriate. Includes a small number of coastal species from offshore islands often used in coastal plantings on the mainland in Northland. Use of karaka and ngaio should be restricted to mixed species plantings and planted away from high use areas.

Reserve area	Specific use and/or site	Recommended species
CAMP GROUND		
Open grassed sites Shelterbelts/screens/ hedges	Specimen shade trees	pohutukawa (preferred), puriri (with shelter), totara (inland sites), houpara (small)
	Tall screens	karo, taupata, broadleaf,
	Low screens	Hebe spp., e.g. titirangi
	Trimmed hedges	taupata, korokia, broadleaf
Mixed species plantings for large planted areas	Range of coastal shrub species	karamu, koromiko, manuka, ti kouka, harakeke, karo, taupata, harakeke, toetoe, kawakawa (with shelter), mapou, houhere
	Range of coastal tree species	houpara, coastal kanuka, karaka (not high use areas), kapuka, pukanui, coastal kowhai, mahoe, tawapou, totara
Gardens	Shrubs	large-seeded coprosma, mapau, toetoe, titirangi
	Ground cover species	pohuehue, speckled sedge, wiwi, coastal tussock, ferns
	Threatened coastal species	sand daphne, sand coprosma, sand spurge (check with NRC and DOC botanists for local seed sources)
	Understorey	kawakawa, rengarenga lily, kokihi, ferns such as hounds tongue fern
NORTHERN BOUNDARY BUFFER TO THE WILDLIFE REFUGE		
Coastal vegetation sequence and interpretive trail	Coastal forest backdune zone	coastal kanuka, ngaio and karaka (not high use areas), broadleaf, coastal kowhai, mahoe, houpara
	Shrub backdune zone	karamu, koromiko, manuka, ti kouka, harakeke, karo, taupata, harakeke, toetoe, tauhinu, mingimingi
	Ground cover semi-stable dune zone	pohuehue, sand coprosma, speckled sedge, sand wind grass,
	Sand binder foredune zone	spinifex, pingao, sand tussock
RESTORATION OF THE ESTUARINE AREA		
Tidal zone, saltmarsh to freshwater zone	Wet sites – coastal to freshwater	mangrove, raupo, marsh clubrush, tussock swamp twig rush, umbrella sedge
	Damp coastal bank sites	oioi, wiwi, Carex species, salt marsh ribbonwood
	Elevated sites	karamu, koromiko, manuka, ti kouka, harakeke
PUBLIC AMENITY AREA		
Open grassed sites	Specimen shade trees	pohutukawa, puriri (landward site)
	Shrubs/trees in mixed species plantings	karo, taupata, ti kouka, harakeke, toetoe, karamu, koromiko, taupata, manuka
RESTORATION OF COASTAL SAND DUNES		
Foredunes	Front face	spinifex, pingao, nihinihi (regenerates naturally)
	Buffer to lawns	wiwi, pohuehue, speckled sedge
Semi-stable zone	Ground cover	pohuehue, sand coprosma, wiwi, speckled sedge
Backdunes	Shrubs	karo, ngaio (not high use areas), taupata, harakeke, ti kouka, tauhinu
	Trees	pohutukawa, puriri (with shelter from salt winds), kanuka

BEST PRACTICE INFORMATION SOURCES

There is a wealth of information available covering best practice guidelines an all aspects of planting and management of natives including restoration of coastal dunes. These are published and available from a range of sources including the Northland Regional Council (www.nrc.govt.nz), the Department of Conservation (www.doc.govt.nz), the Dune Restoration Trust of New Zealand (www.dunestrust.org.nz), and the Project Crimson Trust (www.projectcrimson.org.nz).

Selected information sources relevant to management of native vegetation in the Waipu Cove Recreational Reserve (including references in this document) include:

Bergin, D. O. 1999: Spinifex on coastal sand dunes. Guidelines for seed collection, propagation, establishment and management. *Coastal Dune Vegetation Network Technical Bulletin No. 2.* New Zealand Forest Research Institute Limited. 32p.

Bergin, D.; Bergin, M. 2011a: Accessways on coastal sand dunes. *Dune Restoration Trust of New Zealand Technical Article No. 9.2*. Dune Restoration Trust of New Zealand. 12p.

Bergin, D.; Bergin, M. 2011b: The role of fences on coastal sand dunes. *Dune Restoration Trust of New Zealand Technical Article No. 9.1*. Dune Restoration Trust of New Zealand. 12p.

Bergin, D. O.; Herbert, J.W. 1998: Pingao on coastal sand dunes. Guidelines for seed collection, propagation and establishment. *Coastal Dune Vegetation Network Technical Bulletin No. 1.* New Zealand Forest Research Institute Limited. 20p.

Bergin, D.; Hosking, G. 2006: Pohutukawa – ecology, establishment, growth and management. *New Zealand Indigenous Tree Bulletin No. 4*. New Zealand Forest Research Institute. 104p.

Dahm, J.; Jenks, G.; Bergin, D. 2005: *Community-based dune management for the mitigation of coastal hazards and climate change effects: a guide for local authorities*. Contract report for Climate Change Office, Ministry for the Environment. 32p.

Dunes Trust Technical Handbook 2011: *Restoration of coastal sand dunes using native plants.* Technical Handbook. Practical guide for coastal communities adapting to Climate Change. Dune Restoration Trust of New Zealand.

Northland Regional Council coastal factsheets including techniques and species to use in restoration and management of foredunes and backdunes – www.nrc.govt.nz/Coast/Dune-Plants/Planting-guidelines.

ACKNOWLEDGEMENTS

Anton and Lucy Trist, Managers Camp Waipu Cove and community members of the Domain Board and Surf Club have provided information and their aspirations considered in the development of this landscape plan. Lisa Forester, Biodiversity Advisor, Northland Regional Council, provided helpful advice on species selection for the reserve. Laura Shaft, Coast Care Coordinator, Northland Regional Council, provided advice on dune management and has long been involved with the Domain Board and local community in restoration planting along the dunes. Gerald Collet, arborist, Geotree Ltd, Auckland, provided advice on safety of specimen trees, and in particular pohutukawa, in public coastal reserves including the need for a safety audit. Michael Bergin, Environmental Restoration Ltd, provided the photographs, maps and diagrams. Appendix 2 was drawn by the co-author Paul Quinlan of Paul Quinlan Landscape Architect Ltd.

APPENDIX 1 – Native plant species mentioned in the text

Maori and common name	Botanical name
Coastal tussock	*Chionochloa bromoides*
Coastal kanuka	*Kunzea linearis*
Coastal kowhai	*Sophora chathamica*
Harakeke, flax	*Phormium tenax*
Hounds tongue fern	*Microsorum pustulatum* subsp. *pustulatum*
Houhere	*Hoheria populnea*
Houpara, coastal five finger	*Pseudopanax lessonii*
Kapuka, broadleaf	*Griselinia littoralis*
Karaka	*Corynocarpus laevigatus*
Karamu	*Coprosma robusta*
Karo	*Pittosporum crassifolium*
Kawakawa, pepper tree	*Piper excelsum* subsp. *excelsum*
kokihi, New Zealand spinach	*Tetragonia tetragonoides*
Kohuhu	*Pittosporum tenuifolium*
Korokia	*Corokia* spp.
Koromiko	*Hebe stricta var. stricta*
Large-seeded coprosma	*Coprosma macrocarpa* subsp. *macrocarpa*
Mahoe	*Melicytus ramiflorus*
Makomako, wineberry	*Aristotelia serrata*
Mangrove	*Avicennia marina* subsp. *australasica*
Manuka	*Leptospermum scoparium*
Mapau/matipo	*Myrsine australis*
Marsh clubrush	*Bolboschoenus fluviatilis*
mingimingi	*Leucopogon fasciculatus*
Ngaio	*Myoporum laetum*
Nihinihi, shore bindweed	*Calystegia soldanella*
oioi	*Apodasmia similis*
Pingao	*Ficinia spiralis*
Pohuehue	*Muehlenbeckia complexa* var. *complexa*
Pohutukawa	*Metrosideros excelsa*
Pukani	*Meryta sinclairii*
Puriri	*Vitex lucens*
Raupo	*Typha orientalis*
Rengarenga lily	*Arthropodium bifurcatum*
Rewarewa	*Knightia excelsa*
Saltmarsh ribbonwood	*Plagianthus divaricatus*
Sand daphne	*Pimelea villosa*
Sand coprosma	*Coprosma acerosa*
Sand wind grass	*Lachnagrostis billardierei* subsp. *billardierei*
Tauhinu	*Ozothamnus leptophyllus*
Taupata	*Coprosma repens*
Tawapou	*Planchonella costata*
Ti kouka, cabbage tree	*Cordyline australis*
Titirangi	*Hebe speciosa*
Toetoe	*Austroderia splendens*
Totara	*Podocarpus totara*
Sand spurge	*Euphorbia glauca*
Speckled sedge	*Carex testacea*
Spinifex, kowhangatara	*Spinifex sericeus*
Tussock swamp twig rush	*Machaerina juncea*
Umbrella sedge	*Cyperus ustulatus*
Wiwi	*Ficinia nodosa*

APPENDIX 2 – Ecological Landscape Plan for the Waipu Cove Recreational Reserve

(fold-out A3-sized plan next page).