

Buffalo Beach Homeowners Seawall Redesign Ecological Impacts

Introduction

This report reviews the ecological impacts of the proposed redesign of the Buffalo Beach Homeowners Seawall, in response to the Thames Coromandel District Council and Waikato Regional Council requests for further information. It takes into consideration the impacts on ecology of the presence of the seawall by assessing the overall ecological value of the Site Area; the impacts on ecology of the construction process; and outlines a landscape mitigation plan to help soften the appearance of the seawall through a planting regime of native species with the intention of increasing the natural biodiversity of the area. Site visits were conducted on 19th June and 26th June.

Ecological Impacts of the Seawall

Initial Observations

The original Ecological Assessment conducted by Brian T. Coffey and Associates Limited, 2001, surmised that the Site Area, being typical of an exposed sandy beach in northern New Zealand, is low in biodiversity. Based on observational findings at my own site visits, I agree with this original conclusion. As outlined by Brian Coffey and Associates, it is typical in nature of this type of ecosystem to be low in biodiversity due to the uniform nature of the habitat and the constantly changing environmental conditions. Few species are able to adapt to these environmental changes that occur on a sandy beach with the influx and recession of the tides; the subsequent changes in temperature and exposure; as well as the changes in wave action. Organic nutrients are continually resuspended as sand is stirred up with wave movement and habitats are in a state of constant fluidity making it a challenging environment for species to colonise.

Several site visits were conducted at various tidal inundations to obtain further observations. On the high tide there is little beach present between the Mean High Water Spring (MHWS) and the foot of the current seawall. No shore birds and very few other species were observed in the immediate Site Area. On the low tide, the initial appearance of the intertidal zone is that of a remarkably barren area, with little detritus on the beach surface. Species observed within the intertidal zone adjacent to the Site Area were two incidences of Red-Billed Gulls (*Larus novaehollandiae*) exhibiting feeding behaviour in the lower intertidal zone, two Variable Oyster Catchers (*Haematopus unicolor*) flying through the area, Ghost shrimp (*Biffarius filholi*), the remains of a Paddle Crab (*Ovalipes catharus*) and several intact bivalve shells including Trough Shells (*Spisula discors*) and Northern Tuatua (*Paphies subtriangulata*). No live bivalve specimens were found. In general, the intertidal zone was observed as being low in species abundance and diversity.

Shorebirds

The original report focused on a survey of the macro-benthos in the surrounding area of the current seawall. It is also important to note that shorebirds utilise the surrounding area for feeding. As mentioned above, in the intertidal zone directly adjacent to the Site Area, few shorebirds were observed, however to the north of the Site Area, at the mouth of the Tarapatiki Stream there was a community of shorebirds present that were feeding in the intertidal zone. These included Southern

Black-Backed Gulls (*Larus dominicanus*) – adults and juveniles, Red-Billed Gulls and Variable Oyster Catchers. This stream mouth is approximately 200m away from the Site Area and with good management, should be unimpacted by both the redesign of the seawall and the preceding construction process.

Erosion

It is apparent that the current seawall is providing an obstacle to the natural progression of the dunes and associated vegetation at the southern end of the wall. There is significant erosion of the natural sand dunes at this terminal end of the wall where an eddying effect has resulted as water is deflected around the end of the seawall. It is unlikely that a natural dune frontage will develop in front of the constructed wall due to the minimal distance between the MHWS and the foot of the seawall, as any build-up of sand will likely soon be removed on the next large coastal storm event. The new design of the seawall sees the footprint of the structure stay mostly the same with the addition of the southern end curving and retracting away from the beach creating a more continuous line with the natural sand dunes to the south. After the construction of the redesigned seawall, and extensive replanting of the area at the southern end and along the crest of the seawall is completed, the ecological value of the Site Area should be enhanced by increasing native vegetative diversity and providing food sources and habitat for native bird and insect species, increasing the overall biodiversity and species abundance of the Site Area. See below, section on landscape mitigation, for further information on dune planting recommendations. This new design combined with the planting regime may help to reduce the erosion of the natural dune system at the end of the seawall and help stabilise the foreshore.

Ecological Impacts from Construction

Benthic Species

The redesign of the Buffalo Beach seawall requires that the current structure be deconstructed in order for the new design to be instated. During the reconstruction process, and the subsequent vehicle and machinery movement on the beach, there will be a temporary high level of impact on the intertidal zone. However, as mentioned above, the Site Area has low overall biodiversity so the impact on overall community structure will be minimal. Most affected will be those benthic species that inhabit the intertidal zone as there is likely to be an increase in the mobility of substrate due to the movement of sand, as well as compaction of sand under machinery during this construction process. As outlined in the original Ecological Assessment Report, most intertidal species present in the Site Area are expected to recolonise the area from adjacent habitat that has been left undisturbed within 3-4months, re-establishing healthy communities. Where possible, sand disturbance work should occur above MHWS to ensure as little disturbance to benthic populations as possible.

Shorebirds

The presence of several shorebird species exhibiting feeding behaviour near to the Site Area and the potential impact to their feeding grounds as a result of the construction process needs to be taken into consideration. New Zealand gulls are often disregarded as an important conservation species due to their perceived commonality, however Red-Billed Gulls whilst appearing common, are known to be declining nationally and are listed on the New Zealand Threat Classification System (NZTCS) as “Declining”; Further, Variable Oyster Catchers are listed on the NZTCS as “Recovering” having previously undergone a significant decline in population. Shorebirds often have a highly variable diet, including utilising the intertidal zone to feed on small invertebrates. There is potential there will be short term displacement of the few individual birds utilising the lower intertidal zone directly adjacent

to the Site Area for feeding through the duration of the construction process. However, the expanse of beach to either side of the Site Area offers alternative feeding grounds as well as the established feeding area situated around the mouth of the Tarapatiki Stream. It is imperative that vehicle access and construction disturbance is restricted to south of the Tarapatiki Stream so as to cause as little interference with these feeding areas for shorebirds as possible and subsequently minimising any resulting ecological impact. Further, vehicles should be used on the beach area in a manner that minimises disturbance as much as possible. It should be noted that there is a “tow zone” in place immediately to the north of the Site Area, where vehicle access is already permitted on to the beach.

Existing Vegetation

There are several Pōhutukawa trees of varying maturity present on the landward side of the current seawall. These trees provide important habitat and food source for several native bird and insect species; therefore, every effort should be taken to preserve these trees and their root systems during the construction process.

Landscape Mitigation Plan

Seawall Vegetation Plan

The upper section and crest of the current seawall comprises smaller rock which has established a degree of vegetative cover, softening the visual impact of the wall to an extent. However, the vegetation at present is an assortment of different planting strategies, that includes some native species but mostly utilises exotic grasses and plants. The new seawall design incorporates larger boulders across the entirety of the wall, increasing the bulk and scale. In order to soften the appearance of the seawall and create a cohesive landscape across the bay, it is recommended that a planting regime utilising native plants, similar to those used in the council and community plantings at Taputapuātea Reserve, Buffalo Beach, be implemented along the crest of the wall and, where possible, on the face of the wall. Planting of introduced species would be inappropriate as these are likely to outcompete native species and monopolise the habitat and resources. Planting native species will create reciprocal benefits for conservation by increasing the natural biodiversity in the area and encouraging native birds and insects into the area by providing a food source and habitat.

The following recommended native species are commonly found on sand dunes and many have the ability to trap and accumulate sand, are tolerant of high wind, salt spray, periods of dryness and high light intensity. Please see Appendix 1 for an example layout of planting for this type of environment utilising the following species:

- Pīngao (Golden sand sedge) *Ficinia spiralis* – This is a native orange sedge with distinct golden orange leaves that grow in stiff tufts along horizontal runners under the sand. These are often found at the front face of dunes as they are highly effective at trapping sand. Will grow to a height of up to 1m. Pīngao was once common across sand dunes however competition and habitat modification has reduced its abundance. Replanting will help to increase natural abundance again.
- Knobby Club Rush (Wīwī) *Ficinia nodosa* – This is a sedge with unjointed wire like stems with flower heads near the tip. Prefer moist, sandy areas. Grow 50-70cm tall.
- Harakeke (New Zealand Flax) *Phormium tenax* – Occurs in a wide range of habitats including coastal areas. Tui and Bellbirds feed on the nectar when in season.
- Pōhutukawa *Metrosideros excelsa* – There are already some pōhutukawa trees of varying maturities along the top of the current seawall. Every effort should be taken to preserve these individual specimens to increase biodiversity and maintain a food source for native

birds and insects. The abundant seasonal flowers attract a wide range of nectar-feeding birds such as tui and bellbirds; a large number of mostly endemic insects feed on the foliage, fruit, bark and wood as well as dead leaves and twigs beneath the canopy. These insects attract a range of insectivorous birds also.

In a natural dune system there would be a degree of zonation of these plant species across the dunes from the foredunes to the landward dunes. In this planting regime there can be less focus on zonation and the species can be inter-planted together due to the narrow space along the crest of the wall compared with the natural dune system. Instead the focus is on increasing biodiversity of the Site Area and helping to restore some dune species that have been declining from their natural habitat.

Southern Dune System Vegetation Plan

At the southern end of the Site Area where the wall will retract back from the beach, restoration of the natural dunes system can occur. Here the focus should be placed on planting those species with deep roots, surface runners and aggressive shoot growth that will help with sand accumulation and continued stabilisation of the foredunes. See Appendix 2 for an example planting layout of this type of environment utilising the following recommended species:

- Coastal Spinifex *Spinifex sericeus* – native foredune sand stabilising plant, planted on the face of the foredune. Hairy grey/silver leaves that grow into long rhizomes trapping the sand.
- Pingao – utilised on the face of the foredune for its sand binding properties
- Knobby Club Rush – prefers semi-stabilised sand on the landward side of foredunes. It is a successful early colonising species that will commonly establish dense colonies within 1-2 years of planting.
- Pohuehue (*Muehlenbeckia spp*) – Drought resistant wiry vine, grows as a sprawling shrub, providing ideal coastal ground cover.
- Sand Coprosma (*Coprosma acerosa*) – a small scrambling shrub with yellow/green leaves. Grows best in open exposed locations.
- Harakeke – Successful at attracting native bird and insect species.

Some manual reconstruction of the natural dune shape may need to be done prior to planting to provide a suitable habitat for these species to establish.

Conclusions

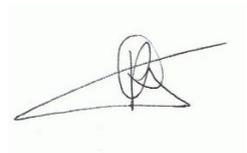
Overall the Site Area and adjacent intertidal zone is low in biodiversity and species abundance as would be expected in this type of exposed sandy intertidal environment. There is a benthic community present in the intertidal zone that will be affected as a result of the construction process, however it is expected that many species will recolonise the area in 3-4 months after the completion of construction. This is in line with the original Ecological Assessment Report done by Brian T. Coffey and Associates, 2001.

The seawall does not allow for the natural build up of a dune system on the seaward side of the wall due to the minimal spacing between the foot of the wall and the MHWS. The infrastructure and road on the landward side of the wall would have presented the same obstacle had the wall not been present.

There is a population of shorebirds that use the mouth of the Tarapatiki Stream to feed, in order to preserve this feeding ground, it is imperative that construction works and machinery are isolated from this area.

There is an opportunity to increase the native biodiversity of the Site Area after the construction process by incorporating native plantings of sand binding species to the crest of the wall, encouraging more native birds and insects back to the area. As well as contribute to the restoration and stabilisation of the natural dune system at the southern end of the seawall through planting of native sand binding species.

Providing every effort is made to minimise the impact of construction machinery on the environment, any negative effects to the ecological value of the Site Area should be temporary and remedied after a short period of time as a result of ongoing natural coastal processes. As this is a proposal for a renewal of the seawall at the Site Area there is unlikely to be further long term ecological impacts, especially as the footprint of the redesigned seawall mostly reflects the current structure.

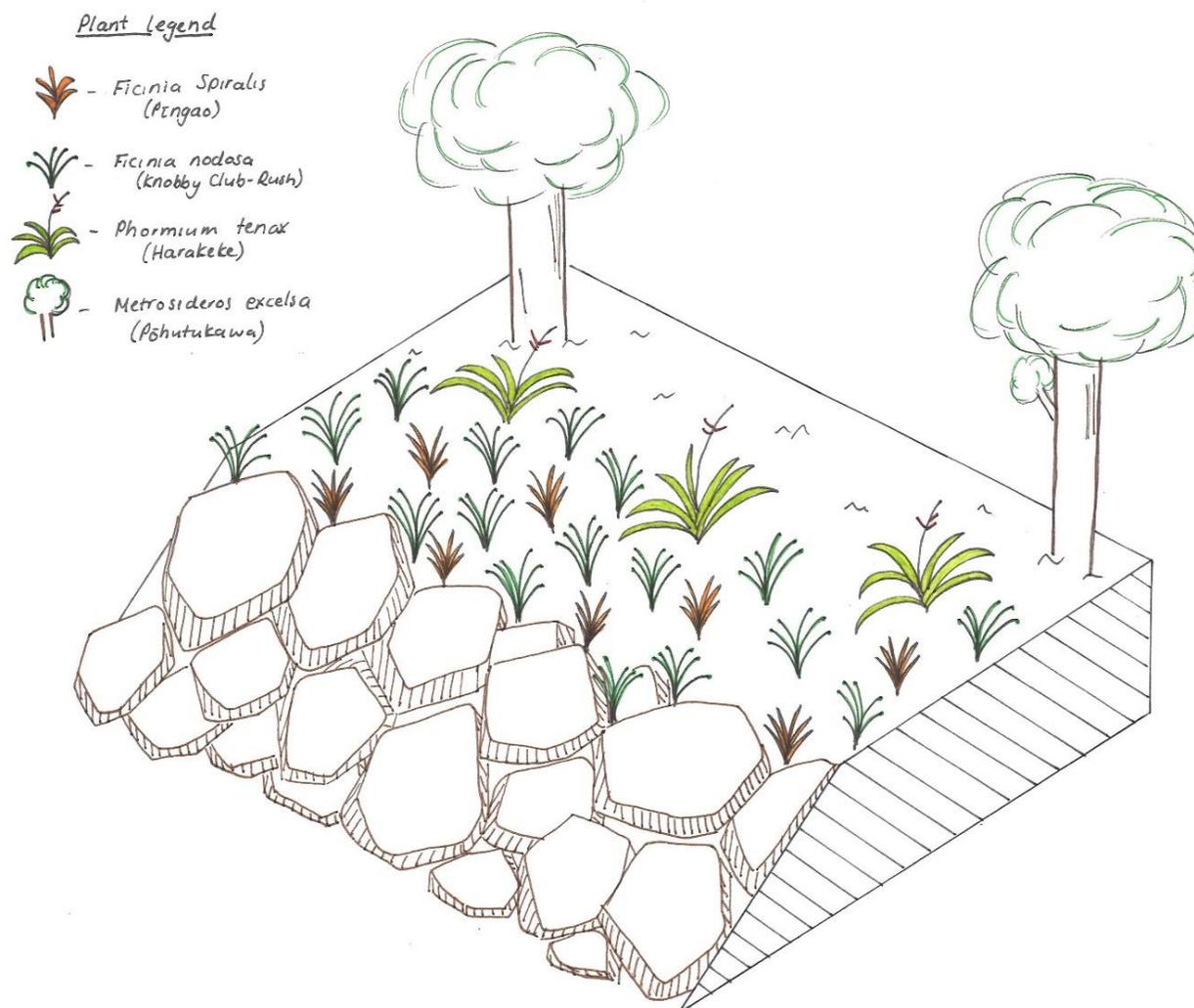


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5th July 2018

Appendix 1 – Planting Plan for Crest of Seawall



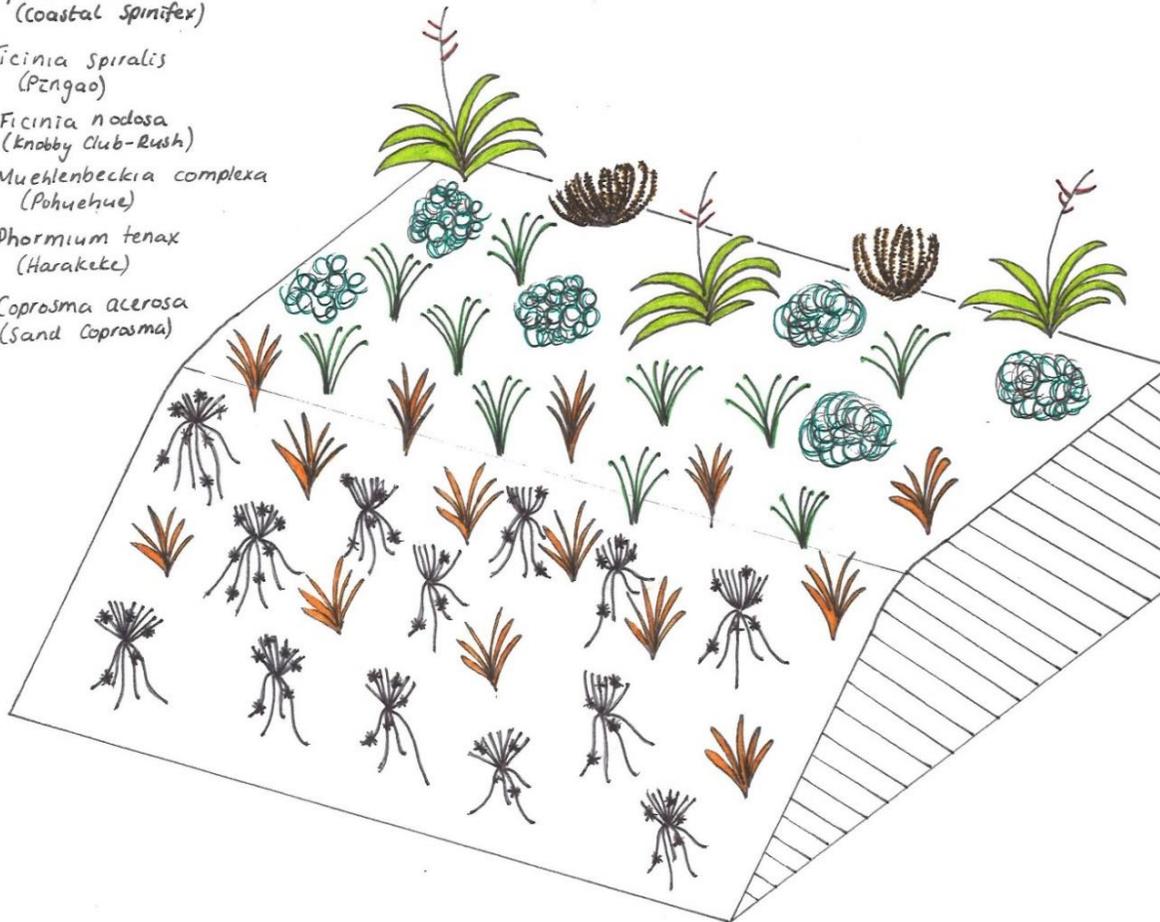
Sample layout of the type of planting that could be done along the crest of the new seawall, and where possible, extending down the face of the wall. This incorporates the existing Pōhutukawa trees present along some parts of the wall and introduces native dune species to encourage an increase in biodiversity in this area. Native plants will further attract native bird and insect species.

Recommended plant species are in line with those used in the council/community plantings done at nearby Taputapuataea Reserve. This will create a cohesive approach to planting across the whole bay and help to reduce the visual impact of the seawall.

Appendix 2 – Planting Plan for Southern End Dune System

Plant Legend

-  - *Spinifex sericeus*
(Coastal Spirophyte)
-  - *Ficinia spiralis*
(Pūngao)
-  - *Ficinia nodosa*
(Knobby Club-Rush)
-  - *Muehlenbeckia complexa*
(Pohuehue)
-  - *Phormium tenax*
(Harakeke)
-  - *Coprosma acerosa*
(Sand Coprosma)



Sample layout of the type of planting that could be done on the natural dune system at the southern end of the seawall. Plants utilised on the face of the foredune are those with strong sand binding qualities that are more resistant to sand movement. These species will help stabilise the foredune. All these species are well adapted to the changing conditions of coastal environments.

Protection of plantings will be important through fencing off and eliminating access through the planted sections of the dunes. A degree of pest management may need to be considered to minimise damage to young plants, allowing them to establish well.