Ōhinepouwera (Karitāne Sand Spit) driftwood windbreak – community-led and sustainable coastal management

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When faced with the decision to construct an engineered sand fence on Karitāne Sand Spit, Dunedin City Council (DCC) staff worked with Kati Huirapa Rūnaka ki Puketeraki and the wider Karitāne community to design and build a nature-based alternative. The work was a true collaboration with Puketeraki Rūnaka and involved using driftwood to construct a natural windbreak to trap windblown sand and encourage the restoration of the sand spit.

The original purpose of the work was to promote sand accumulation on the sand spit to dissipate wave energy and minimise the impact of storm waves on the inland area. As the project progressed, broader community benefits were realised, along with opportunities for shared learnings. This project adopted a true partnership approach with mana whenua, adapting as community values became better understood.

DCC is proud to have been involved in developing an innovative and sustainable method while working towards a stronger partnership with mana whenua and the broader Karitāne community.

Ōhinepouwera (Karitāne Sand Spit), north of Dunedin, is an area of environmental significance to mana whenua and the broader Karitāne community. Located within the East Otago Taiāpure, the sand spit serves as a nesting site for the native black or variable oystercatcher. It is home to a range of indigenous insects and tuatua (shellfish) and provides a safe site for New Zealand's native sea lion to haul-up and find shelter. The shape of the spit and delta also contributes to the quality of two significant surf breaks.

Rarely are coastal communities empowered to engage in coastal management practices. Many of us who do take the time to listen and engage with our communities are so eager to extract value (information) from the engagement that we miss out on the journey.

At the confluence of the Waikouaiti River and the South Pacific Ocean, Karitāne Sand Spit is morphologically dynamic and has, in the past, been eroded and overtopped by storm waves and riverine processes (flood waters). Over the last several decades the southern tip of the vegetated sand spit has been gradually receding northwards. This recession widens the high-tide river mouth and enables waves to enter the harbour and inundate the coastal frontage.

Aerial view of Karitāne Sand Spit and Waikouaiti River, September 2018 (Photo: Shane Flavell).

A small piece of work at Karitāne Sand Spit saw the DCC working with Puketeraki Rūnaka (mana whenua), community groups and individuals on ways to better retain sand and restore habitat to the southern tip of the sand spit. This article talks to this process, partly the innovative sand retention method that was adopted, but more so the community engagement element and the leading role that Puketeraki Rūnaka is now taking.

A volunteer group getting ready to travel across to the sand spit (Photo: Tom Simons-Smith).

The local knowledge and understanding developed around community values/ preferences truly guided this project. By demonstrating a willingness to learn from local knowledge holders, we have been able to be part of a project that has garnered trust and empowered Puketeraki Rūnaka to take a leading role.

Traditional approaches to trapping windblown sand include planting sand-binding grasses and building formal fences that use large posts, wire and cloth. Knowing that the components of any formal sand-trapping structure would inevitably wash up on the beach and riverbanks in a large storm, DCC and Puketeraki Rūnaka decided to jointly develop a method that did without such materials.

Aerial view of the driftwood windbreak on the day of construction. Fence alignment was determined based on the local wind conditions and took into consideration the way that the sand spit has accreted in the past (Photo: Tom Simons-Smith).

Following on from numerous meetings and informal site visits with local fishermen, environmentally-interested groups, and the East Otago Taiāpure Management Group, we decided that a sand-trapping structure could be designed and built entirely out of materials sourced from the sand spit. So, in July last year (2019), Puketeraki Rūnaka and 37 local volunteers built a 75 m long windbreak using driftwood picked up off the beach and slash collected from the nearby sand dune. Everyone was ferried across to the sand spit via waka provided by a local tourism operator. My role on the day (as the DCC) was quite simply to draw a line in the sand (to set the orientation of the fence) and to run the barbeque.

Locals working on the windbreak and a young community member getting ready to do some measurements (Photo: Brendan Flack, Puketeraki Rūnaka).

Since the driftwood windbreak was installed, it has effectively trapped windblown sand. Had an engineered approach been taken, the risk of environmental pollution would have been present, a risk that has been eliminated by using driftwood. In the six months following construction of the driftwood windbreak, we estimate that roughly 500 m^3 of sand accumulated as a direct result of the windbreak and a further 1000 m^3 in the following two months. This rapid increase in accretion rate over the summer has been driven by an extremely windy period of weather, with some areas experiencing more than 1.8 m of vertical accumulation. It is expected that without the driftwood windbreak, this sand would have been blown over the sand spit and reworked by riverine and tidal processes.

The community's role in the work has been evolving across the full life of the project. As sand has accumulated against the windbreak, and people have seen it working, they have become more and more interested. Māori Tours, a local tourism operator that operates using waka, now includes stacking wood on the driftwood windbreak as part of its habitat restoration experience. Local children visiting the sand spit do the same, adding to the fence and allowing it to grow vertically as it is progressively buried by windblown sand. Photo points have been set up by Puketeraki Rūnaka to allow these changes to be monitored, and one young local has even become protective over the type of wood used and the angle of its placement on the structure.

This work is by no means ground-breaking, but the way that the local community has become involved in lending a hand and learning about coastal processes has been a fantastic thing to be a part of. Puketeraki Rūnaka have become proud of their driftwood windbreak and are eager to build a second, parallel fence, with the help of the local community. The intent of the second fence would be to hasten sand accretion and create a zone between the two structures that could be planted with native sand-binding grasses. As with the driftwood windbreak, we know any plants will only last so long – but in that time there are opportunities for learning, for the community to further care for their coast, and for council and community to gain a stronger and shared understanding of how this valued environment changes over time.

Demonstration of the sand accretion between July 2019 (top) and January 2020 (bottom) (Photos: Tom Simons-Smith).

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