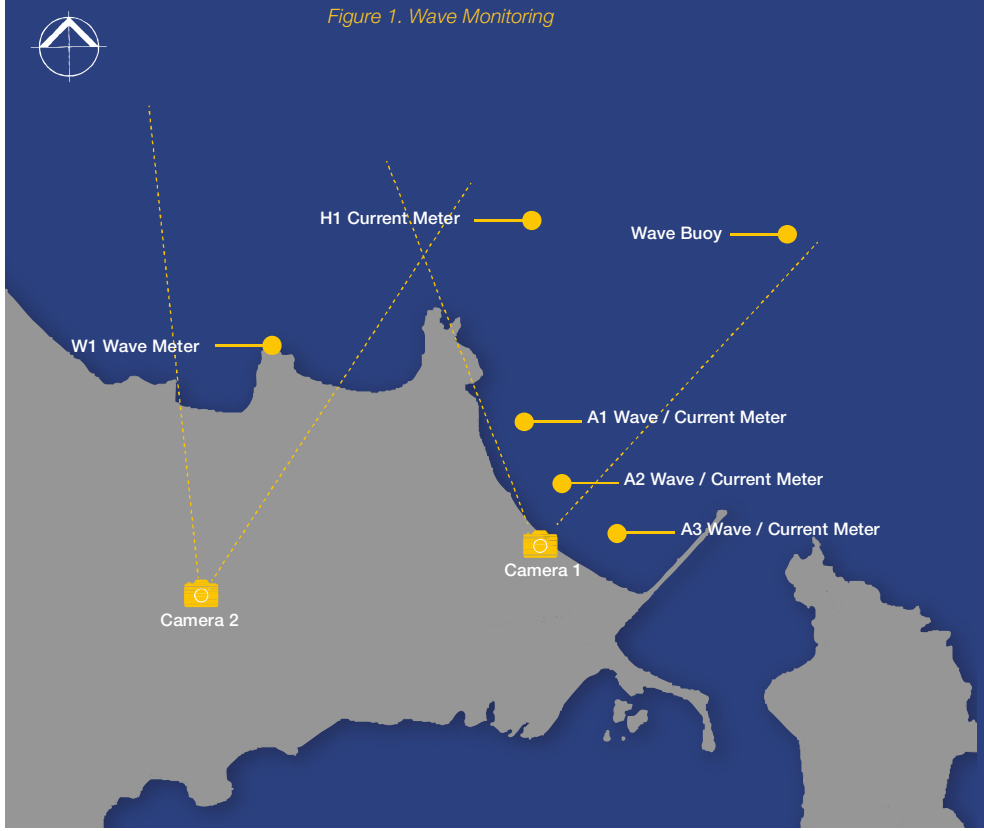
Port Otago Limited.

Inshore Dredging Disposal Monitoring Factsheet - Surf

Aramoaana Surf Camera 1

Figure 1. Wave Monitoring



Background

Port Otago Limited has disposed historically less than 450,000m3 per year of dredged material (sand, rock and silt) to the inshore disposal grounds. This material being derived from dredging the harbour channel and berth areas to maintain the required depths, as well as minor capital dredging works.

The environmental effects of disposal are monitored on a regular basis, including the seabed depth contours in the vicinity of the current disposal areas.

Surf

Surfing is a popular pastime at many locations along the Otago coastline including the beaches and points along the north coast, from the harbour entrance through to Karitane. Of particular note are Aramoana, Murderers (Whareakeake) and Karitane, which are recognised in the New Zealand Coastal Policy Statement 2010 as surf breaks of national significance.

What is the issue?

Disposal of the dredged material has the potential to alter the shape of the seabed and the amount of sediment available for the adjacent beaches. The shape of the seabed is very important to the surfing wave quality, and future disposal activities need to consider the effects disposal on the swell wave corridors as well as the sediment supply to the beaches. Quality surf conditions at Aramoana Beach are produced by the strong refraction that occurs on the offshore harbour entrance bar, which distorts the wave crests and allows A-frame peaks and wave focusing and peeling zones to form along the western half of the beach.

Sediment dumped behind the surf break in the Aramoana Ground has the potential to change the wave shoaling characteristics. These effects on surf quality could be positive or negative, depending on how the dumped sand gets shifted over time.

The classic surf conditions at Murderers are due to a different mechanism. This point break requires long clean wave crests to refract and peel down the rocky headland. Any disruptions to the wave crest will likely have a negative effect on the quality of the ride. The swell waves arriving at Murderers usually pass through the Heyward ground, where previous dumping over about 100 years has produced a mound on the seabed. This mound generally has a beneficial effect on the surf at Murderers; acting as an energy focus to increase the wave height at the break. However, the shape of this mound needs to be carefully maintained to ensure negative surf effects are not produced.

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Aramoana

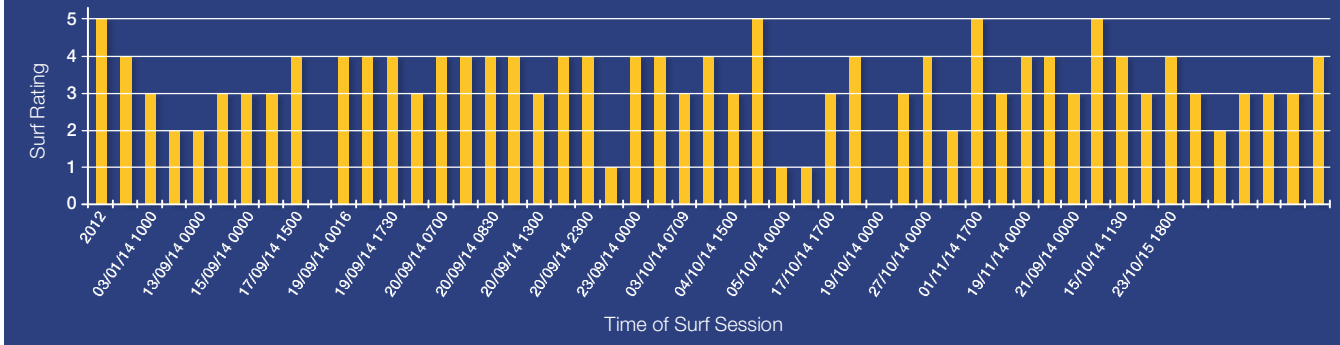
What has the monitoring involved?

Since 2013 Port Otago has been working with the surf community to better understand the physical environment that creates the exceptional surfing conditions on the north coast, with a view to preserving those features into the future. Cameras have been installed to monitor the surf at Aramoana and Murderers, and a programme of wave and current modelling has been used to adaptively manage the disposal at the Heyward ground. A website to receive surfer feedback on wave conditions and other observations has been established and initial results collated.

Careful attention to the sediment dumping over the past two years has been made. No material has been dumped at Aramoana to allow the slow evolution of the seabed to be observed, and assess the baseline conditions for this beach.

At Heywards, a precise pattern of dumping has been conducted, with seabed surveys and wave modelling undertaken every 6 months to ensure that negative effects on the surf at Murderers are avoided.

Figure 2. Surf Quality at Aramoana



What has the monitoring shown?

Surfer feedback

Over 100 surf surveys have been submitted rating the surf conditions at Aramoana and Murderers Beach. Surfers rate the surf as epic, good, average, bad or terrible.

These reports have been correlated against photos from the surf cameras at the time of the report. The results show a correlation between higher surf ratings and the presence of barrelling waves.

The photos also show that surfers prefer regular linear waves that are well spaced and break in an organised fashion. The bad surfing days generally show small disorganised surf breaking closer to the shore. Results have shown that it is particularly helpful when surfers identify the exact time of day when the surf session took place, and also provide comments describing the shape and condition of the waves. Port Otago is grateful to those who have already completed surveys. The survey remains open on the Port Otago website and surfers are encouraged to continue to use this.

Wave monitoring

To date, the monitoring has confirmed the functional aspects of wave dynamics identified in earlier modelling studies. The key mechanisms that produce quality on the north coast are now better understood. A baseline for effects on surf quality has been established, with thousands of camera images available for analysis, along with regular surveys of the seabed shape. While there have been no adverse effects in the last two years, it has become clear that the existing Heyward ground is too small to accommodate a modern adaptive management plan for the future. Areas also need to be set aside to accommodate slow release of sand to feed the adjacent beaches, as well as places for silty material to not move onshore to beaches or sensitive nearshore habitats.

A wider zone surrounding the historical Heyward mound needs to be established so the functional aspects of wave focussing to Murderers can be maintained and optimised for the future. A larger ground allows the capacity to better manage the dredged material and provide disposal options in shallow and deeper water.

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