

What is MTM?

Manaaki Taha Moana (MTM) is a research programme to restore and enhance coastal ecosystems and their services of importance to iwi/hapu, through a better knowledge of these ecosystems and the degradation processes that affect them.

We utilise Western Science and Mātauranga Maori knowledge and participatory modelling tools and processes to assist iwi/hapu to evaluate and define preferred options for enhancing/restoring coastal ecosystems. This evaluation of options is assisted by innovative IT and decision support tools (e.g. digital libraries, simulation modelling, interactive mapping, 3D depiction, real-time monitoring).

Action plans are being produced for improving coastal ecosystems in each rohe.

The research team works closely with iwi/hapu in the case study regions to develop tools and approaches to facilitate the uptake of this knowledge and its practical implementation.

Mechanisms will also be put in place to facilitate uptake amongst other iwi throughout NZ.



Research Providers:

School of People Environment and Planning,
Massey University

Taiao Raukawa Trust

Manaaki Te Awanui Trust

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MANAAKI TAHA MOANA: ENHANCING COASTAL ECOSYSTEMS FOR IWI

MTM Report No. 20

PROPOSAL FOR HOROWHENUA SURF ZONE SHELLFISH STUDY



Recommended citation:
Clark D, Ellis J, Sinner J, Poutama M, Smith H, Spinks A. 2013. Proposal for Horowhenua surf zone shellfish study. Prepared for Manaaki Taha Moana (MTM). MTM Report No.20. MTM Research Team, Massey University, Palmerston North.11p.

Proposal for Horowhenua Surf Zone Shellfish Study

Tangata whenua are concerned about the decline of toheroa (*Paphies ventricosa*), tohemanga (*Oxyperas elongata*) and other surf clam species (e.g. tuatua, pipi) along the Horowhenua coastline. Kaitiaki, customary fisheries representatives and kaumātua have expressed concern about the safety of eating shellfish harvested along the Horowhenua coastline, since poor water quality and faecal contamination were evident in a recent report on water quality in Waiwiri Stream (Allen et al. 2012).

Tangata whenua have considerable local knowledge about both historical and current populations of surf zone shellfish on the Horowhenua beaches. For this study, they will play a key role in identifying sampling sites, and the hands-on sampling work to investigate factors affecting the population and health of shellfish from Hokio to Ōtaki.

A recent report produced by a Ngāti Raukawa Māori environmental consultancy commented on the severe decline in shellfish populations, particularly “the total absence of Tohemanga... (in areas) ... once revered as a place of abundance for the large delicacy. It is now devoid of Tohemanga, which is an alarming finding” (Moore and Royal 2012).

A study by National Institute of Water and Atmospheric Research (NIWA; Williams et al. 2013) has identified a number of factors that could help to explain the decline of toheroa, including land use change and associated changes to the freshwater flows coming onto the beaches, food availability, climate and weather, sand smothering/sediment instability, damage caused by vehicle traffic, predation, harvesting, toxic algal blooms and disease. A literature review by Cawthron (Heasman et al. 2012) identified many of these same potential factors, plus the possibility that ghost shrimp (*Biffarius filholi*) are preying or otherwise displacing toheroa and other shellfish or may be correlated with other changes that are causing shellfish decline.

Toheroa appear to be associated with freshwater seepage and beds are often located close to fresh-

water streams, near seepage from brackish lagoons behind adjacent sand dunes or where the water table lies close to the surface (Williams et al. 2013; Heasman et al. 2012). Groundwater flow supplies nutrients to benthic diatoms, an important food source for toheroa, and increases the area able to be inhabited without desiccation. Land use changes adjacent to the beach have the potential to alter the amount and/or quality of the freshwater seepage and will be investigated within this survey.

Together with local kaitiaki, we propose an intensive survey of Horowhenua surf zone habitat to investigate one of these factors: changes in land use and freshwater flows. As secondary objectives, we would explore habitat changes associated with increase in ghost shrimp and investigate the prevalence of faecal contamination of shellfish. The study will target the intertidal zone and the shellfish found therein, but will also document tohemanga that are encountered during sampling.

Site selection

The proposed study would involve a detailed one-off habitat survey (16 sites). Sampling would target sites near the mouths of local rivers (for example, Hokio, Waiwiri, Ohau, Wai-kawa, Waiorongomai, Waitohu) as well as sites away from this influence, and sites with varying degrees of land use change in the nearby dunes and adjacent areas (Table 1). Site selection would also take into account the location of current and historic shellfish beds and incorporate some areas colonized by ghost shrimp. Tangata whenua would identify sites.

Land use change

To determine the influence of land use practices on freshwater flows and toheroa/shellfish populations, we would map the historical and current land use of the catchments/inland coastal zones adjacent to the study area, as done in Northland by Williams et al. (2013a). For each shellfish sampling site, aerial photographs

would be used to generate a variable (e.g. distance from freshwater seeps and streams, or proportion of catchment in pine trees) that we would include in our statistical models to assess the influence of land use on shellfish populations.

Sampling methods

At each shoreline level, three replicate 0.5 m² quadrats dug to 30 cm would be sampled, similar to methods employed in other toheroa/shellfish surveys. The excavated sand would be spread out onto a tarpaulin (see Beentjes 2010a, b) and searched for toheroa, tohemanga, tuatua (*Paphies subtriangulata*), pipi (*Paphies australis*) and any other species of importance to the local tangata whenua. The size frequency of these species would then be recorded and the shellfish returned to the substrate.

A sub-sample of adult shellfish would be taken to Cawthron to measure concentrations of faecal indicator bacteria (FIB).

