

## 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. 22

### Kaimoana on beaches from Hōkio to Ōtaki, Horowhenua



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## Background

Tangata whenua are concerned about the decline of toheroa (*Paphies ventricosa*) and other kaimoana species along the Horowhenua coastline. A Ngāti Raukawa-based environmental consultancy<sup>3</sup> recently commented on the severe decline in shellfish populations in the region of interest, 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 & Royal 2012). Tuatua / pipi<sup>4</sup> were historically an important food source for hapū and iwi in the Horowhenua and have become increasingly popular with non-Māori. While tuatua / pipi persist, they are found at much lower densities than in the past (Moore & Royal 2013).

Local hapū have aspirations to rebuild toheroa populations, possibly via reseeded, and our project aims to inform that process. Accordingly we undertook a study to assess the status of current shellfish populations and key environmental factors likely to influence the survival of toheroa.

## Objectives

This study aimed to:

- characterise (map and classify) the land use immediately behind the beach, along the coast from Hōkio to Ōtaki.
- describe current and historical land cover along the coastal margin and discuss how these may have affected groundwater hydrology.
- document the current state of toheroa and tuatua / pipi populations on the study beaches.
- examine relationships between landscape, beach characteristics, ghost shrimp, and tuatua / pipi populations.
- contribute to a baseline body of information from which to assess future change in coastal land cover, beach characteristics, and shellfish populations.
- constitute the first step towards an assessment of requirements and recommendations for reseeded of toheroa.

## Methods

The study area was the coastal zone between the Hōkio Stream and Ōtaki. Thirteen sites were identified (by M. Poutama and A. Spinks) to represent a range of land covers and landscape types, and to include mahinga matāitai<sup>6</sup> where kaiiki gathered seafood for the marae. Coming from a whanau of kaimoana gatherers and as a lead ringawera<sup>7</sup> for the purposes of manaakitanga<sup>8</sup>, Moira Poutama had particular insight into the use of different areas of the coast by those who gathered for the kitchen.

Sampling for the shellfish survey was planned to coincide with moderately large tides during daylight hours, but a forecast storm meant that the survey was moved to 3–6 April 2014. Tides were moderate but decreasing in height over the survey period.

Local hapū have aspirations to rebuild toheroa populations, possibly by reseeded. Accordingly this study assessed the status of current shellfish populations and key environmental factors likely to influence their survival and abundance. Survey design was a collaboration between scientists and local Māori researchers to ensure relevance to both groups, and data collection involved 44 hapū volunteers. We surveyed 13 sites for shellfish populations and environmental variables including land use, grain size, organic matter, and salinity.



Figure 1. The study area, stars indicate sites at which the shellfish survey was undertaken, and red dots indicate vehicle access points.

## Discussion of Findings

The number of toheroa encountered in the survey was too low to assess the impact of local land cover or other aspects of the beach environment on toheroa populations. The distribution of tuatua / pipi varied along the beach, and a weak pattern was observed where tuatua / pipi were more abundant with greater distance from access points. This shows that human impacts are capable of depressing these species. Harvesting is a likely cause of this relationship, and it is possible that crushing or other disturbance by vehicles also reduces the survival of shellfish, particularly of juveniles.

The beaches from Hōkio to Ōtaki displayed little variability in grain size, nitrogen and organic content, but there was some variability in the salinity of the interstitial water in sands at the high- and mid-shore levels. Sites with greater freshwater influence had fewer tuatua / pipi than sites with higher salinity, this relationship was particularly apparent in the high shore.

Ghost shrimp (*Biffarius filholi*) modify habitat and possibly predate on tuatua / pipi. Attempts to quantify ghost shrimp numbers were unsuccessful. However, using burrow counts as an indicator of abundance, there was no evidence of a relationship between ghost shrimp and the sediment structure of the beach, or with tuatua / pipi populations.

An associated study assessing *Escherichia coli* (a bacteria that indicates faecal contamination) clearly indicated that shellfish are regularly contaminated with faecal material to the point that they are considered marginally suitable or unsuitable for human consumption. The land cover data showed a dominance of particular land covers, e.g. high intensity farming, which can contribute to this contamination.

This project brought together a range of people and types of information, all relevant to the future of toheroa and other shellfish on beaches from Hōkio to Ōtaki. Cooperation between hapū and scientists was a positive and productive experience and provided an excellent foundation for future collaboration.

## Future Research Possibilities:

- Collection of complementary information in toheroa beds in other parts of the Horowhenua would be useful. This would allow us to assess differences in characteristics of sites with and without toheroa, and to record population structure of the toheroa to assess juvenile survival.
- The abundance of ghost shrimp may be better assessed with improved (larger area, deeper core) sampling units.
- Further investigation of freshwater input at sites would inform site selection for reseeded.
- Analysis of coastal oceanography and microbial source tracking could be used to identify the key sources of faecal contamination so that riparian planting and other land management measures can be targeted to most effectively reduce contamination of coastal waters.

A comparison of freestyle searches with abundance estimates using standard quadrats, and using the same team at multiple sites, would provide an insight into the relationship between these two methods for estimating abundance. While not directly relevant to shellfish management, this is an interesting question with respect to the integration of traditional search methods and standardized scientific methodologies.

To move towards reseeded a series of other aspects of biology, ecology, or management should be assessed.