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

Waka Digital Ltd

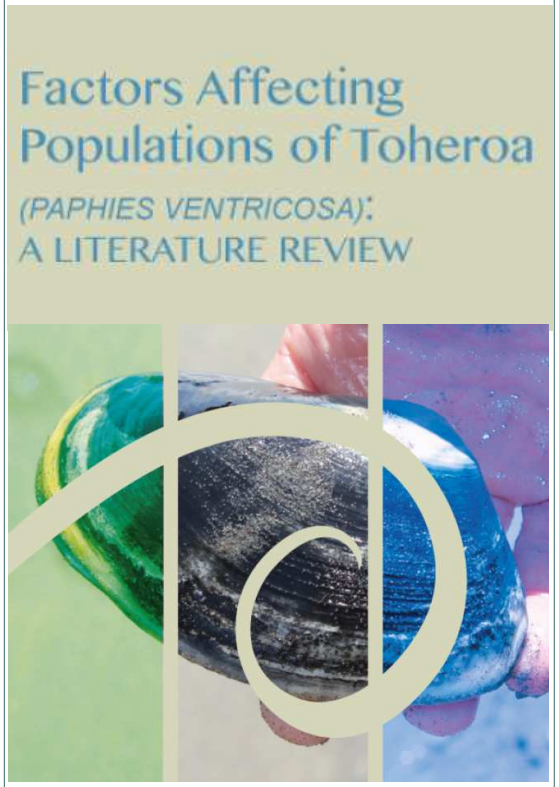
Cawthron Institute

DOWNLOAD full copies of our FREE publications and other toolsets produced in this MBIE-funded research programme from our website:

www.mtm.ac.nz

Manaaki Taha Moana: Enhancing Coastal Ecosystems for Iwi

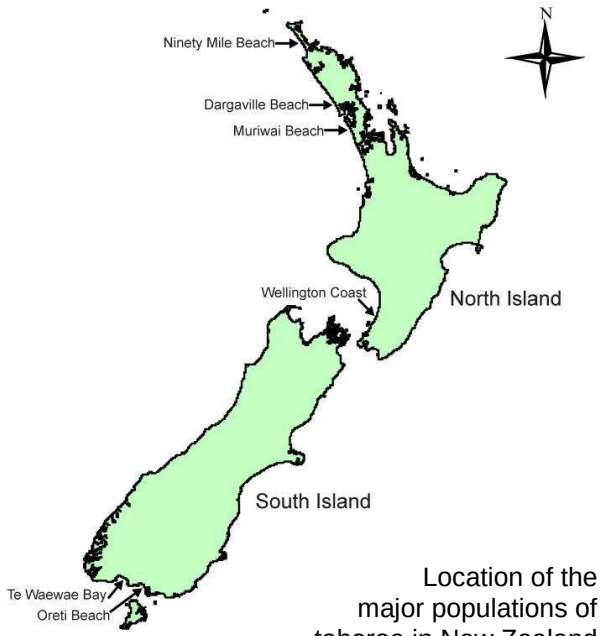
MTM Report No. 10



RECOMMENDED CITATION: Heasman KH, Keeley N, Sinner J. 2012. Factors Affecting Populations of Toheroa (*Paphies ventricosa*): A Literature Review. Manaaki Taha Moana Research Report No. 10. Cawthron Report No. 1997. 29 p. plus appendices.

Factors Affecting Populations of Toheroa (*Paphies ventricosa*): A Literature Review

Data on toheroa populations in New Zealand are available as far back as the early 1920s. Since that time, fluctuations in populations have been significant. Previous research indicates there is no single causative factor responsible for the fluctuations, and that changes in abundance and/or distribution have most likely resulted from the cumulative effects of a range of factors. The importance of different factors may vary across different coastal regions.



Location of the major populations of toheroa in New Zealand

The review highlights that there is insufficient understanding of the biological requirements of the toheroa, which is required to successfully restore populations. In addition, the various factors that have been identified as possibly impacting toheroa populations have not been correlated with the various beach habitats in which they are found. Future work is required to identify suitable habitat conditions and physiological requirements for toheroa. Improving this understanding of the relationship between habitat characteristics and populations, both historically and present day, will significantly enhance the possibility and prospects of restoring toheroa numbers.

The report considers potential factors influencing toheroa decline including:

- Factors relating to climate and weather
  - Desiccation
  - Storm events
  - Temperature and salinity shock
- Availability of food
- Toxic algal blooms
- Groundwater and related processes
- Changes in beach morphology and sediments
- Beach community dynamics
- Vehicle disturbance
- Natural predation
- Harvesting and excavation techniques
- Recruitment variability
- Subtidal populations

Toheroa (*Paphies ventricosa*)

Research Recommendations: The report identifies a possible approach to surveying toheroa populations and the characteristics of their habitat, and another approach aimed at understanding distributions of a species of burrowing shrimp (*Biffarius filholi*) that local kaitiaki have reported as having expanded into areas previously occupied by toheroa.