

Tiritiri Matangi Open Sanctuary

Introduction

Tiritiri Matangi Island is a 254 ha scientific reserve situated 3km from the mainland in the Hauraki Gulf north of Auckland City, and is administered by the Department of Conservation (DOC), supported by a community group, the Supporters of Tiritiri Matangi (SOTM). The island has a long history of degradation from human activities and habitation, starting with deforestation associated with Polynesian colonisation of New Zealand, and culminating with European farming practices from the 1850s to the mid 1970s. When stock was removed from the island, the remaining vegetation covered only 6% of the area, and much of this was a canopy with little regeneration underneath. Tiritiri Matangi has been free of all introduced mammals since the Pacific rat (kiore) was eradicated in 1983. A programme of vegetation restoration started in 1984, with vegetated cover on the island increasing 60% through the planting of 280,000 trees over the 10-year period to 1994. Translocations of species to the island is an ongoing mechanism of restoration for the island itself – as well as providing refuge for species to be restored to other parts of New Zealand in the future. To date, fifteen fauna species have been introduced (12 native to the local ecological district; 6 being used, or having the potential, to populate other restoration habitats), including some with nationally threatened status.



Aerial view of Tiritiri Matangi Island (Photo: T.Monk)



Track Map

Stakeholders & budget

Tiritiri Matangi Island is managed by the Department of Conservation, and there are two resident staff. Local Maori iwi Kawerau a Maki and Ngati Paoa have traditional guardianship (*mana whenua*) over the island. Many groups and individuals have contributed time, labour, materials and expertise to the island project since its inception in 1984. These include Auckland Central and North Shore branches of the Royal Forest and Bird Protection Society, the Ornithological Society of New Zealand (Auckland Branch), and local schools and businesses. The Supporters of Tiritiri Matangi (SOTM: www.tiritirimatangi.org.nz) formed in 1988, and has a current membership of approximately 1600. Since its inception, the group has shifted its focus from that of primarily a voluntary labour force, to that of management of island's visitors, infrastructure and biodiversity management, and now makes a significant financial contribution to the island. Activities include the contribution of thousands of person-days of labour, focused on planting, weed control, biodiversity management, and guiding. SOTM also plays a significant role in facilitating conservation education.

The island is funded by central government through the Department of Conservation, with SOTM supplementing through income generated from subscriptions, donation and guiding and souvenir shop concessions. The SOTM have funded construction of visitors' centre, an implement shed/workshop, and purchased vehicles and essential equipment not covered by government funding.

Tiritiri Matangi Island history and ecological impacts

Evidence from less modified islands within the Hauraki Gulf suggests that pre-human Tiritiri Matangi Island is likely to have been a seabird-dominated ecosystem, with coastal forest of pohutukawa and kohekohe, remnants of which persist on the island. Archaeological evidence suggests that Maori settled the Hauraki Gulf islands before the mainland, and Tiritiri Matangi Island is likely to have been of strategic importance to monitor canoe traffic along the

coast, but also for a source of greywacke for stone tools. Extensive modification of the island's ecology would have been associated with this occupation.

The Government assumed ownership of the island in 1841 to establish a lighthouse marking the entrance to the Port of Auckland. The island was then farmed until 1971, with regular burning used to maintain a grassland ecosystem. Only 6% of the island remained as woody vegetation, but stock had access to this so there was little understory vegetation. Until its eradication in 1993, the Pacific rat (kiore) was the only introduced mammal present on Tiritiri Matangi Island other than farm stock. Despite the almost total loss of vegetation, small populations of the more resilient bush birds persisted on Tiritiri Matangi Island, including an important local population of bellbird. The island's rugged coastline offered a refuge to a number of coastal bird species, including grey-faced petrel, blue penguin, red-billed and southern black-backed gull, white-fronted tern and variable oystercatcher.



Tiritiri Matangi 1949



Tiritiri Matangi 2000
(Photo: Z. Burdett)



Grey-faced petrel
(*Pterodroma macroptera*)
(Photo: E. Ross)



Variable oystercatcher
(*Haematopus unicolor*)
(Photo: M. Galbraith)

Restoration goals

The restoration goals for Tiritiri Matangi Island are set by the *Conservation Management Strategy, Auckland* (DOC 1995). They are:

- “...
1 *Actively protect and provide for the interests of tangata whenua (traditional guardians), in particular by facilitating their links with the area and its taonga (cultural 'treasures').*
2 *Restore Tiritiri Matangi as an open sanctuary for native fauna and flora, with particular emphasis on the introduction and breeding in the wild of threatened bird species.*
3 *Protect the historic integrity of sites associated with Maori habitation, and the lighthouse complex.*
4 *Continue to develop the island as a focus for community involvement in conservation through the use of volunteers.*”

The implementation of these restoration goals has focused on extending and enhancing pre-existing flora and fauna and ecosystems of Tiritiri Matangi itself. This has included re-establishment of species formerly present on the island through the translocation of populations. Also recognized has been the role that island can play in the conservation of indigenous species threatened elsewhere within New Zealand – given the protected status of the island, the absence of mammalian pests and a range of habitats. Restoration objectives outlined in successive working plans (DOC 1982 & 1997) established the rationale for the translocation of selected species to the island. Many of the objectives of the working plans have been met by the Department of Conservation in cooperation with the Supporters of Tiritiri Matangi.

Future management of biodiversity will include the maintenance of ecological integrity for the island, with translocations tending to focus on locally threatened plant, reptile and invertebrate species.

Moko skink
(*Oligosoma moco*)

– existing population survived human degradation of the island
(Photo: M. Galbraith)



Giant weta
(*Deinacrida heteracantha*)

– potential for future establishment; nationally endangered status
(Photo: M. Galbraith)



Ecological communities

Restoration has aspired towards an ecosystem representative of the Inner Hauraki Gulf Islands Ecological District. Remnant vegetation was used as reference plant communities, although the restoration of Tiritiri Matangi initially focused on planting native salt-resistant coastal plant species for rapid establishment of a canopy that would then act as a nursery for further vegetation growth. Seeds for propagation were sourced on the island or from the next nearest source.

Historical records were used to infer potential fauna communities on the island, although the application of ecological districts has not been as easily achieved since the distribution of terrestrial animal populations in New Zealand (especially birds and reptiles) is often fragmented and isolated. At times, the needs of threatened species have over-ridden the intention to recognise ecological districts - for example the takahe is a South Island species, but dependent on mammal-free refuges including managed islands as a strategy to boost populations.

Project implementation

Tiritiri Matangi Island was gazetted as a scientific reserve in stages 1970-75. Following the removal of farm stock in 1971, bracken and matting native grasses proliferated. This rampant growth, plus the presence of seed-eating rats and the low numbers of seed-dispersing birds, prevented the natural regeneration of native woody vegetation. This lack of natural regeneration was the stimulus to initiate a restoration programme enlisting the help of volunteers.

The replanting programme began in 1984, with seeds ecosourced from the remnant vegetation on the island. A plant nursery was established on the island in 1983, with volunteers managing all stages of the plant propagation process from sowing to planting. The bracken and rank grassland was mowed prior to planting, an action that not only cleared the way for new seedlings, but also generated a rich mulch to maintain soil moisture. (Management actions and planning ensured that archaeological sites were not compromised by the ecological restoration work.) The initial involvement of volunteers in the revegetation process led to the formation of the Supporters of Tiritiri Matangi in 1988.



Nursery shade house c.1986 (Photo: M.Galbraith)



Volunteers planting seedlings c.1990 (Photo: M.Galbraith)

Department of Conservation regional Conservation Management Strategy (CMS, 1995) outlines broad goals for the island. These goals are implemented through a working plan for the island (Dept of Conservation 1997) that outlines mechanisms to facilitate habitat protection - weed control and eradication; animal pest control, eradication and exclusion; fire prevention. The island is managed by two resident Department of Conservation (DOC) staff. The CMS limits visitor arriving by commercial operators to 150 per day / 35,000 per year, with all commercial activities regulated through a concession process. The Department of Conservation also has a number of standard operating procedures that ensure ecological standards are maintained, eg. a biosecurity plan for islands of the Hauraki Gulf and species translocation proposals.

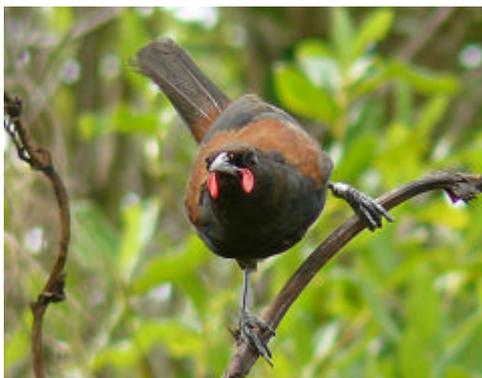
On-going management includes:

- Planning for vegetation management - identification of species gaps; strategies for managing existing and potential plant pests.
- Fauna management – monitoring of specific populations; translocations to achieve biodiversity goals; translocations to ensure appropriate genetic diversity of existing populations.
- Biosecurity - monitoring for presence of mammals pest (rodents in particular), and strategies to prevent incursions of invasive species (including invertebrates).

Progress to date

- 1975-78 - island added to the Hauraki Gulf Maritime Park in stages.
- 1983 - restoration concept and vision goes public, nursery established.
- 1984 - restoration planting starts.
- 1984-94 - vegetated cover increased from 6% to approx. 60% through the planting of 280,000 trees. These plantings have formed dense canopies in most places, shading out grass communities and creating leaf-litter communities favoured by native birds such as North Island saddleback and North Island robin. Natural regeneration is evident as seeds of bird-dispersed plants germinate in the leaf-litter. The unplanted portion of the island is either regenerating naturally (at a slower rate), or left as grassland to provide a diversity of habitats (also, archaeological sites are not disturbed through planting).
- 1993 - eradication of Pacific rat (*Rattus exulans*).
- recovery of fauna species extant on the island, with some species formerly unknown to be present only showing up after a long period of recovery, eg. common gecko (*Hoplodactylus maculatus*), giant centipede (*Cormocephalus rubriceps*).
- translocation of 15 fauna species (restoration of local biodiversity (bold type), or part of national species recovery planning) [threat classification from Hitchmough *et al.* 2007]:
 - **1973 kakariki / red-crowned parakeet (*Cyanoramphus novaezelandiae novaezelandiae*)**
 - **1984 tieke / North Island saddleback (*Philesturnus carunculatus rufusater*)** [range restricted]
 - **1989 popokotea / whitehead (*Mohoua albigilla*)**
 - **1990 pateke / brown teal (*Anas aucklandica chlorotis*)** [nationally endangered]
 - 1991 takahe (*Porphyrio hochstetteri*) [nationally critical]
 - **1992 toutouwai / North Island robin (*Petroica australis longipes*)**
 - 1993 kiwi pukupuku / little spotted kiwi (*Apteryx owenii*) [range restricted]
 - **1995 hihi / stitchbird (*Notiomystis cincta*)** [nationally endangered]
 - 1997 North Island kokako (*Calleas cinerea wilsoni*) [nationally endangered]
 - **2001 matata / North Island fernbird (*Bowdleria punctata vealeae*)** [sparse]
 - **2003 northern tuatara (*Sphenodon punctatus punctatus*)** [sparse]
 - **2004 miromiro / North Island tomtit (*Petroica macrocephala toitoi*)**
 - **2006 Duvaucel's gecko (*Hoplodactylus duvaucelii*)** [sparse]
 - **2006 shore skink (*Oligosoma smithi*)**
 - **2009 North Island rifleman (*Acanthisitta chloris*)**
- translocation on/off the island of takahe (*Porphyrio hochstetteri*) and kokako (*Calleas cinerea wilsoni*) to maintain genetic diversity.
- some species have reached population levels that can sustain 'harvest' for translocation to other restoration projects:
 - popokotea / whitehead (*Mohoua albigilla*)
 - kakariki / red crowned parakeet (*Cyanoramphus novaezelandiae novaezelandiae*)
 - hihi / stitchbird (*Notiomystis cincta*)
- since 1984 there have been ongoing programmes of weed control.
- management of Argentine ants (*Linepithema humile*) since discovery of an incursion in 2000 (expectation to reach eradication goal).

Tiritiri Matangi Island is now recognised a premier site for conservation advocacy, with inexpensive guided tours available to facilitate conservation education. Although the involvement of public in the early phase of the restoration project was controversial, its success is now recognised as a model of community participation in conservation, and has inspired many other initiatives in New Zealand and worldwide.



North Island saddleback (*Philesturnus carunculatus*)
– translocated 1984 (Photo: M. Galbraith)



Little spotted kiwi (*Apteryx owenii*)
– translocated 1993 (Photo: S. Fordham)



North Island kokako (*Calleas cinerea*)
– translocated 1997 (Photo: S.Fordham)



Tuatara (*Sphenodon punctatus*)
– translocated 2003 (Photo: A Bullas)

Monitoring and research links

Restoration of Tiritiri Matangi has always been underpinned by a firm scientific basis. The island is used as a research site by 7 universities and polytechnics, demonstrated by the completion of c.67 post-graduate research projects with Tiritiri Matangi as the principal focus. The ecology underpinning the restoration of the island was presented through a symposium at the NZ Ecological Society annual conference, 29 Sept - 2 Oct 2008. It is the intention that a special edition of the NZ Journal of Ecology will be an outcome of this symposium.

Biodiversity monitoring is carried out by the governing authority (DOC), post-graduate researchers, and volunteers. This includes assessments of specific populations to establish management actions, and long-term studies of taxa to record changes over time - the Auckland Region of the Ornithological Society of NZ has been carrying out bird surveys on the island since 1984. SOTM support the research and monitoring through funding management actions and research grants.

Two areas of continuous monitoring are weed incursions and rodents. Weeds are surveyed annually, with current data used to develop a work programme to address weed issues current to that time. Weed populations are increasingly under control, and now volunteers monitor specific sites to eradicate seedlings. However, about \$20,000 is still spent annually on weed management. The island has permanent tracking tunnels, monitored on a monthly basis, to detect any rodent incursion. Ironically, it was these tracking tunnels that lead to the discovery of the previously undetected common gecko on the island. Population monitoring is always an element of a species translocation, often carried out as part of a post-graduate research project. This monitoring is essential to assess the post-release survivorship of the population. Research projects, however, typically have a finite time period, so on-going monitoring of species is increasingly being carried out by SOTM volunteers.

There has been a recent resurgence of interest in the status of the island's vegetation. Historical vegetation plots are being resurveyed to compare community composition and productivity between natural and planted revegetation sites. The Department of Conservation has also used Tiritiri Matangi as a pilot study to establish a set of parameters to assess restoration success that can be applied to any site.



Takahe (*Porphyrio hochstetteri*)
– translocated 1991, nationally critical status
(Photo: M.Galbraith)



Stitchbird (*Notiomystis cincta*)
– translocated 1997, nationally endangered status
(Photo: M.Galbraith)

Lessons learned

When the restoration started, the involvement of volunteers was both innovative and controversial. Over 10 years, from 1984–94, volunteers planted over 280,000 trees on Tiritiri Matangi, transforming farmland to a mosaic of ecosystems supporting indigenous biodiversity, including species with threatened status. The island is now held up as a model of community participation in conservation, and has inspired many other initiatives in NZ and worldwide. The project has demonstrated that:

- Large scale community involvement in conservation can be achieved, with both huge conservation and advocacy gains. It shows that active conservation is not just the prerogative of government agencies and 'experts', but can involve successfully the whole spectrum of the community.
- Volunteerism is an appropriate mechanism to achieve large scale outcomes in ecological restoration.
- Provision of 'rewards' in kind is essential to maintain the input of volunteers, eg. being able to view threatened species.
- Public and threatened species can successfully co-exist in a synergistic relationship.
- A mechanism to grow large numbers of native plants and revegetate an island was established through experience.

The major management tasks to ensure the ongoing ecological recovery of Tiritiri Matangi Island are focused on conservation education and the minimisation of biosecurity risks (particularly prevention of pest incursions and ongoing weed control).



Tuatara shown to public prior to release, 2003 (Photo: M.Galbraith)



Public tuatara release, 2003 (Photo: M.Galbraith)

Further reading

- Craig, J., N. Mitchell, R. Walter, M. Galbraith and G. Chalmers. 1995. Involving people in the restoration of a degraded island: Tiritiri Matangi Island. pp 534-41 in *Nature Conservation 4: The role of networks* ed. by D.A. Saunders, J.L. Craig and E.M. Mattiske. Surrey Beatty & Sons, Chipping Norton.
- Galbraith, M. P. and C.R. Hayson. 1995. Tiritiri Matangi Island, New Zealand: public participation in species translocation to an open sanctuary. pp 149-54 in *Reintroduction biology of Australian and New Zealand fauna* ed by M. Serena. Surrey Beatty & Sons, Chipping Norton.
- Rimmer, A. 2004. *Tiritiri Matangi: a model of conservation*. Tandem Press, Auckland.
- Veitch, C.R. 2002. Eradication of Pacific rats (*Rattus exulans*) from Tiritiri Matangi Island, Hauraki Gulf, New Zealand. pp 360-364 in Veitch, C.R. and Clout, M.N. (eds.). *Turning the tide: the eradication of invasive species*. IUCN SSC Invasive Species Specialist Group, IUCN, Gland and Cambridge.

Contact information

Tiritiri Matangi Island hosts volunteers regularly, ranging from biodiversity monitoring to maintenance tasks. If you are interested in being involved, please contact the Supporters of Tiritiri Matangi at enquiries@tiritirimatangi.org.nz, or the Department of Conservation's Warkworth Area Office (aucklandvolunteer@doc.govt.nz / 649-4257812).