

14. Archaeological and waahi tapu sites

14.1 THE ISLAND'S HUMAN HISTORY

Mana Island has a long and fascinating history of human occupation (Day 1987; Horwood 1991). The island's name is a contraction of Te Mana o Kupe ki Aotearoa, which refers to the ability of the explorer Kupe to cross the ocean to Aotearoa. The island was inhabited around 1400A.D. (Chester & Raine 1990; Horwood 1991), but little is known of the Maori history prior to its occupation by Ngati Toa in the 1820s. During the 1840s Te Rangihaeata (a nephew of Te Rauparaha) lived in an elaborately carved wharepuni near the site of the current boatshed (Day 1987; Horwood 1991). Archaeological excavation of the beach ridge revealed evidence of two periods of occupation: the fifteenth century and the early nineteenth century through to the present (Horwood 1991).

In 1832 the island was sold by Te Rauparaha, Te Rangihaeata and Nohoroa (Te Rauparaha's brother) to Alexander Davidson, George Bell and Archibald Mossman for goods to a collective value of £24. Soon after this Davidson sold his share to Bell, and Mossman sold his share to Frederick Peterson (Day 1987). Bell was the first European settler on the island, where he resided from 1832 until his death there in 1838. The first wool clip from the island was exported to Sydney in June 1835, and is believed to be among the earliest wool exported from New Zealand. Bell also established a small whaling station which was taken over in 1837 by Alec and Thomas Fraser, who leased the station from Peterson. Whaling continued at the island until at least 1845 (Day 1987).

Following Bell's death his two third share in the island passed to his father Thomas Bell, who then sold it to Henry Moreing for £750. Moreing acquired the remainder of the island from Peterson for £250 in 1841. The purchase of Mana Island was investigated by Commissioner Spain in 1843, who awarded title to Moreing despite Ngati Toa and the Fraser brothers disputing Moreing's claim. This dispute continued until 1865 when the Crown purchased Mana Island and paid £300 compensation to Ngati Toa (Day 1987). Following Crown purchase the island was leased as a sheep farm for 100 years from 1873. Leaseholders were J.F Wright (1873-1893), the Vella family (1893-1953, although Mariano Vella had earlier sub-leased the island from Wright) and John Gault (1953-1973). The woolshed that still stands at the base of Shingle Point was apparently built by Mariano Vella in 1887 (Day 1987).

A lighthouse was erected on the summit of Mana Island in 1864 and was operational from 1865 until 1877, following which it was dismantled and moved to Cape Egmont. Several ditch and bank structures near the lighthouse site are thought to have been constructed to protect the lighthouse keepers' gardens from wandering stock (Jones 1987), and a similar structure near the landing may represent the site of Bell's garden from the 1830s.

In 1973 the island was taken over by the Ministry of Agriculture and Fisheries as an exotic sheep quarantine and breeding research station. However, a suspected scrapie outbreak in 1978 led to all the sheep being slaughtered and control of the

island passed to the Department of Lands and Survey. Following removal of the last cattle in 1986 the island has been managed purely for conservation purposes.

14.2 CURRENT SITUATION

Our knowledge of archaeological sites on Mana Island is based on historical maps (particularly Mantell 1865), and archaeological surveys carried out since 1963 (particularly Jones 1987 and Horwood 1991). Documented sites on the island include:

- early Maori occupation sites (15th century) on the beach ridge near the landing
- evidence of Maori gardens and pits, particularly on the low hill north of the houses
- Ngati Toa occupation sites (1820-1850) on the beach ridge, particularly Te Rangihaeata's house site
- Bell's settlement (1830s) including the earliest evidence of European gardening in New Zealand
- the whaling station (1830-1850) to the north of Shingle Point
- the lighthouse site (1865-1880) including the lighthouse base, house site, and ditch and bank enclosures
- the woolshed (c.1887)

Management of three sites (the woolshed, the lighthouse site and the beach ridge habitation site) is discussed in the Wellington Conservancy Historic Resources Strategy (Department of Conservation 1992; note that the beach ridge site includes early Maori, Ngati Toa and European habitation). While most archaeological effort to date on Mana Island has been put into investigation and interpretation, the woolshed was restored in 1986 and is now used as a visitor centre.

14.3 CONFLICTS BETWEEN ECOLOGICAL RESTORATION AND MANAGEMENT OF HISTORIC SITES

Restoration of historic sites is beyond the scope of this ecological restoration plan, but it is important to ensure that the ecological restoration of the island is, as far as possible, compatible with management of historic sites, and conversely that management of historic sites does not unduly compromise other conservation values on the island. There are several areas where ecological restoration and management of historic sites are not fully compatible, and some compromises will be necessary.

1. Impact of revegetation on historic sites

Revegetation and regeneration can obscure and/or disturb archaeological sites. Tall vegetation can hide surface features, while root damage can disturb subsurface features. Digging holes to plant trees also has direct impacts on soil stratification. As

recognised sites with surface features are quite localised on Mana Island (mainly near the trig and near the houses) excluding these areas from planting will have little effect on the overall restoration programme. The most important sites to exclude from planting are an area surrounding the lighthouse and associated ditch and bank exclosures, horticultural soils on the low spur just north of the houses, the site of Bell's garden near the mouth of Aston's Valley, the habitation site from the base of the wharf along the beach ridge to just north of the houses, and the early Maori occupation site at the old stream mouth south of the worksheds (Fig. 5.1). Island staff need to be aware of where these sites are, and should periodically handpull or spray any woody vegetation that colonise them.

The only archaeological site that will be mown regularly is the beach ridge, which is a major assembly and transition area for people arriving on the island. Maintaining a low sward here makes the area available for shore plover during spring tides and storms, reduces the fire risk from people picnicking on the beach, and improves visibility from the houses out to the landing bay. Other archaeological sites will be covered by rank grass, but could be mowed occasionally to reveal surface features (e.g., for photographic documentation or prior to archaeological excavation) at the discretion of the Area Manager in discussion with the island manager.

2. Disturbance to the beach ridge

The beach ridge behind the landing bay and about the former stream exit contains extremely important archaeological sites. Although few surface features remain, stratified deposits reveal a chronological sequence from early Maori occupation through to Maori occupation at the time of European colonisation, and early European settlement. Over the years these deposits have been disturbed by other management activities on the island, including construction of a road along the beach ridge, cutting of drainage ditches, and construction of the boatshed. Root damage and wind-throw of the large macrocarpas growing on the beach ridge also disturb stratification. Future management should ensure that disturbance of subsurface deposits is minimised, including removal of large trees growing on the site. Stems should be cut near ground level and roots left to rot *in situ* to reduce disturbance caused by uprooting.

3. Wetland restoration

Wetland restoration could potentially disturb or destroy archaeological sites during recontouring to creating pools and channels. Raising the water table in itself is unlikely to disturb subsurface features, and may even preserve some sites.

Known archaeological sites will not be affected by the proposed wetland restoration, which is situated between the beach ridge and the presumed site of Bell's garden. However, care should be taken during any excavations in case any archaeological deposits are revealed. The Historic Places Act (1993) requires that any site disturbed during development be assessed by the Historic Places Trust before work proceeds.

4. Woolshed interpretation

The historic woolshed would have originally stood in a pastoral setting. This restoration plan recommends natural regeneration of shrub communities on Shingle

Point, and planting of forest species on the adjacent scarp. It is foreseeable that in the future shrubs and trees will surround the woolshed, analogous to the situation around the whale on Kapiti Island. While having a woolshed sited among tall vegetation may appear contextually inappropriate, this situation mirrors changing land use and public perception of the values of Mana Island. The historical significance and setting of the woolshed could be enhanced by ensuring that historical photographs of the woolshed in a pastoral setting are included in interpretative displays within the building.

5. Whaling site interpretation

The presumed site of the whaling station on Mana Island is at the northern base of Shingle Point (Day 1987), and fragments of whale bone are still present at this site. This area is currently off limits to the public, as it contains the core of the remnant McGregor's skink population, including permanently installed pitfall traps for monitoring purposes that are extremely vulnerable to disturbance. Public access to this site is inappropriate while monitoring of the McGregor's skinks at the site is considered necessary.

As the landforms and vegetation at the southern side of Shingle Point (near the woolshed) are similar to the northern side, interpretation of whaling, including display of relicts, would be contextually appropriate in or near the woolshed.

14.4 WAAHI TAPU

Although Ngati Toa apparently inhabited Mana Island for a period of only about 30 years from 1820, the island was obviously extremely important to them during this period (Day 1987). The painter George French Angus visited the island in 1844 and painted both "Kai Tangata" (Te Rangihaeata's house) and a mausoleum for Waitohi, who was both Te Rangihaeata's mother and Te Rauparaha's elder sister. Te Rauparaha also had a house nearby, though usually residing on Kapiti Island.

Ngati Toa are the tangata whenua and are consulted on all major management initiatives there, both through their representation on the Wellington Conservation Board, and direct contact between departmental staff and the Kaumatua Council at Takapuwahia Marae.

Specific waahi tapu sites on Mana island have not been brought to the department's attention to date, but there are two mechanisms by which appropriate management of sites of significance could be incorporated in development proposals on the island. Under the current management regime, management proposals are discussed with both the Wellington Conservation Board and directly with Ngati Toa, and so inappropriate actions at particular sites can be avoided. The department has commissioned Ngati Toa researchers to prepare a waahi tapu file on Kapiti Island, and the possibility of conducting a similar exercise on Mana Island should be discussed with Ngati Toa.

14.5 MANAGEMENT ACTIONS

Management of important historic sites on Mana Island is outlined in the Wellington Conservancy Historic Resources Strategy and Conservation Management Strategy (Department of Conservation 1992 & 1996). The following summary highlights management actions for historic sites that impact on ecological restoration of the island (or vice versa):

- remove macrocarpas from the beach ridge, and maintain a mown sward there
- avoid subsurface disturbance of the beach ridge
- exclude archaeological sites (particularly the lighthouse complex, Bell's garden and the beach ridge) from the planting programme, and maintain these areas free of woody vegetation
- check for archaeological sites during wetland restoration, and liaise with Historic Places Trust if any sites are found
- discuss compilation of a Mana Island waahi tapu file with NgatiToa
- limit any on site interpretation of whaling on Mana Island to the area around the woolshed

15. Fire

Fire is the second highest risk to the ecological restoration of Mana Island (the highest risk being colonisation by mammalian predators), and it is the highest risk to human safety and infrastructure on the island. A fire could spread rapidly through the rank grass at any time of year, but the risk is highest during drought conditions in late summer. The potential damage that a fire is likely to cause should reduce over time as revegetation with less flammable plant species progresses, but fire risk will remain high in the 57 ha of grassland on the plateau and in the upper valleys.

A fire plan for Mana Island is maintained by Wellington Conservancy, identifying the resources available for fire suppression and key personnel.

15.1 REDUCING THE RISK OF A FIRE OCCURRING OR SPREADING

Potential fire sources on Mana Island include cigarette butts, machinery, the diesel generator, fireplaces in the houses, barbecues, rubbish fires, illegal bonfires/cooking fires and rescue flares. The risk of any of these potential fire sources causing a wild fire can be reduced by a combination of the following management actions:

- maintain a mown sward at the sole public landing point
- restrict cigarette smoking to the landing beach and houses
- meet and inform visiting public of restrictions on smoking and fire lighting (including use of barbecues)
- limit use of fires (heating and rubbish disposal) to times of low fire risk
- set up fire-fighting equipment next to any planned controlled fire (e.g., rubbish fire)
- regular maintenance of machinery (including the generator) to reduce the risk of spark discharge
- regular maintenance of woodburners and chimneys in the houses, including maintenance of spark catchers on the chimneys
- ban use of machinery away from the buildings during times of high fire risk
- keep boat owners aware of landing and fire restrictions on the island, including maintenance of signs at possible landing sites
- restrict public access to part/all of the island during periods of extreme fire risk

15.2 FIRE SUPPRESSION

A fire store is maintained on the island and all resident staff are trained in the use of fire-fighting equipment. However, a major fire would require additional personnel and equipment (particular helicopters with monsoon buckets) to be brought from off site. Maintaining a network of small ponds on the plateau and in the valleys will provide a water supply for fighting small fires as well as providing drinking/bathing water for birds and habitat for wetland animals and plants.

16. Research

The ecological restoration programme outlined in this document provides many opportunities for research programmes designed to assess the effectiveness or success of management actions. However, the following list summarises specific research projects needed to develop new restoration techniques, to support identified management actions, or to reduce the risk of ecological restoration not succeeding:

- a study of water chemistry following physical restoration of the wetland to guide selection of plant species suitable for restoration plantings
- assessment of Minimum Number of Individuals of different bird and reptile species represented in archaeological material excavated on Mana Island
- development of techniques to re-establish species of burrowing petrels on Mana Island
- assessment of weka bones from archaeological deposits on Mana Island to determine whether they are likely to have been obtained locally
- determine the impacts of weka on reptiles and invertebrates (at other sites)
- assess the disease risk posed by the dense pukeko population on takahe
- monitor the impacts of pukeko on recent plantings
- monitor breeding success of variable oystercatchers in relation to black-backed gull population density
- determine diet of yellow-crowned parakeets post-release to identify any impacts on plantings and threatened plants
- determine whether rock wren can be established in low altitude forest habitats
- monitor robin distribution and diet to identify any potential impact on giant weta
- determine whether Mana Island could provide suitable habitat for stitchbird and kokako
- investigate lizard communities present at release sites proposed for terrestrial reptile species
- monitor southward expansion of the remnant McGregor's skink population
- investigate competition between species of *Cyclodina* skinks
- investigate competition for refuges between speckled skinks and McGregor's skinks
- investigate competition between all *Hoplodactylus* geckos known from the Wellington region
- develop methods to control starlings

17. Community use and involvement

Guidelines for recreation management and advocacy on Mana Island are given in the Wellington Conservancy Conservation Management Strategy (Department of Conservation 1996). The following discussion focusses only on issues where community use and involvement on Mana Island may impact on ecological restoration, and the implications of ecological restoration on public access.

17.1 ACCESS

Mana Island is administered as a Scientific Reserve, and visitors to the island do not require a permit. However, public use of the island is controlled to some extent by by-laws, which currently restrict access to the island to the hours 10:00 a.m. to 5:00 p.m. Wednesday to Sunday and on public holidays. The island is closed on Mondays and Tuesdays as current staffing levels do not allow a seven day per week operation. Visitors can land only near the boat shed, and must report to the island manager on landing. Some small areas of the island (e.g., Forest Valley) are off limits to reduce disturbance to threatened species and communities.

Visitors to the island arrive either by private boat or charter, but there is currently no regular ferry service to the island. Current visitation levels are about 1,500 people per year, mainly as participants in the planting programme.

Continued public access to Mana island (subject to protection of natural and historic resources) is identified as an objective in the Wellington Conservancy CMS. It is anticipated that public interest in and visitation rates to Mana Island will increase as restoration progresses.

Implementation of this ecological restoration plan is considered compatible with high levels of public use, with the following provisos:

- some coastal bird species are vulnerable to disturbance at nesting and roosting sites (e.g., oystercatchers, terns, shags, reef heron, shore plover) and so access to most of the coast may have to be restricted to outside the breeding season
- seabird colonies are vulnerable to trampling of burrows (petrels) or disturbance (gannets); if colonies are successfully established, access to them will have to be restricted to nearby tracks and viewing points
- some reptile species (especially tuatara) are a high security risk, and so release sites should not be made public, and release sites should not be adjacent to public tracks
- as revegetation progresses, visitors should be requested to remain on public tracks to reduce trampling of vegetation and soils, and disturbance to wildlife
- the department will retain the right to close off sections of the island temporarily or permanently if high levels of public use would compromise conservation values at that site
- the department will retain the right to close the island at times of extreme fire risk

17.2 PUBLIC USE AND RECREATION

As a special wildlife habitat, Mana Island is one of the key destinations in Wellington Conservancy for ecotourism and conservation based education and recreation (Department of Conservation 1996). The recreation management approach advocated in the CMS is to develop Mana Island as an opportunity for public involvement in conservation restoration, and as a site for the interpretation of species held on the island. Recreational use of Mana Island is restricted to passive activities such as walking, picnicking and nature appreciation. Dogs and other pets are prohibited on the island apart from their use for management purposes.

Visitors walking the loop track on the island gain access to the historic woolshed (containing some interpretative material), they obtain views over Shingle Point, the building complex, the adjacent mainland, Kapiti Island, Cook Strait and the Marlborough Sounds, they pass through plantings of various ages, and they visit the trig and historic lighthouse site. Most visitors to the island see takahe and will notice basking common skinks on warm days, but they are unlikely to see giant weta and geckos unless shown them by island staff.

The existing loop track will provide adequate public access to most communities and species being restored to the island, while leaving sufficient "off-limits" areas for management and research purposes.

Management action

- maintain tracks at a standard suitable for management needs and for walkers
- develop interpretation signs and material on the special features of the island

17.3 COMMUNITY INVOLVEMENT IN ECOLOGICAL RESTORATION

Volunteers have made an enormous contribution to ecological restoration on Mana Island through their participation in the mouse eradication programme, bird counts, species transfers, nursery work and the planting programme. Continued involvement of community groups and private individuals is essential for this restoration plan to be implemented fully. Groups that have had a close involvement with ecological restoration on Mana Island include the Royal Forest & Bird Protection Society, Ngati Toa, Conservation Corps, Ornithological Society, Wellington Botanical Society, Tararua Tramping Club, Wellington Conservation Board, Victoria University, Mana College, and many other schools, businesses and community groups that have participated in the planting programme.

Table 17.1 highlights future ecological restoration activities where community groups, students and interested individuals could contribute.

TABLE 17.1 OPPORTUNITIES FOR VOLUNTEER PARTICIPATION IN ECOLOGICAL RESTORATION ON MANA ISLAND. SRARNZ = SOCIETY FOR RESEARCH ON AMPHIBIANS & REPTILES IN NEW ZEALAND.

ACTIVITY	RECOMMENDED INTEREST GROUP OR SKILL
Nursery work	Forest & Bird, Botanical Society, interested individuals
Planting	Any interested groups and individuals
Threatened plant propagation, introduction and monitoring	Botanical Society, Forest & Bird
Monitoring revegetation/succession	Victoria University, Botanical Society
Wetland restoration	Ducks Unlimited, Botanical Society
Bird introductions	NgatiToa, Ornithological Society, Forest & Bird
Attracting seabirds	Ornithological Society, Forest & Bird
Bird monitoring	Ornithological Society Victoria University, Forest & Bird
Reptile introductions	Ngati Toa, captive breeders, SRARNZ
Reptile monitoring	SRARNZ, Victoria University
Invertebrate monitoring	Victoria University, interested individuals
Weed control	Forest & Bird, interested individuals and groups

18. Summary and action plan

18.1 CRUCIAL TASKS

There are six key restorative actions required to provide the basis for recreating viable ecosystems on Mana Island that will be representative of what may have existed on the island prior to human disturbance. While introductions of other plants and animals will provide detail, and increase the island's potential for maintaining indigenous biodiversity, these six actions are fundamental to restoring ecosystem viability because of the species and processes that are dependent on their successful implementation.

1. Restore forest

It is presumed that most of Mana Island was forested originally. Restoration of forest to at least a third of the island will provide habitat for many plants, invertebrates, birds and reptiles, most of which are no longer present on the island and will have to be reintroduced.

2. Attract nesting seabirds

Terrestrial ecosystems on New Zealand islands that have never had introduced predators are dominated by the presence of dense nesting colonies of seabirds, especially burrowing petrels. These birds have an enormous impact on other components of the ecosystem through their burrowing, trampling, gathering of nest material and, especially, through the input of nutrients. The droppings, regurgitations and corpses generated by dense seabird colonies support dense and diverse communities of invertebrate scavengers and predators, which are in turn preyed on by lizards and birds. The top predator in these seabird-dominated ecosystems is the tuatara, which preys directly on the seabirds, as well as taking large invertebrates and lizards. Seabird burrows also provide sheltered microhabitats of relatively constant temperature and high humidity that provide homes for a diversity of obligate and facultative burrow-dwellers including cave and ground weta, skinks and tuatara.

3. Restore Waikoko wetland

Wetlands on islands are a rare habitat, and so there are few wetland habitats in New Zealand that are free of the effects of introduced mammals. Restoring the wetland on Mana Island will provide habitat for a variety of threatened wetland plants, two locally extinct birds (brown teal and fernbird) and possibly the threatened brown mudfish.

4. Reintroduce avian pollinators and seed dispersers

The composition and distribution of tree and shrub species within the forest on Mana Island will reflect the minds and methods of the people who created it for many decades. Over time the natural processes of pollination, seed dispersal, germination and seedling survival will gradually create a more natural forest, with local community structure suited to the microclimate at each site. While there are many potential invertebrate pollinators on the island, the only bird pollinators present are recently arrived generalists such as silvereyes and starlings, rather than species like bellbird, tui and kaka that co-evolved with New Zealand forest plants.

Similarly with seed dispersal, introduced passerines and silvereyes can only cope with small fruits, while the reintroduction of kereru will ensure a seed dispersal agent is present for the large-fruited dominant canopy species tawa, karaka and kohekohe.

5. Introduce a diversity of forest-dwelling invertebrates

Invertebrates have crucial roles in nutrient cycling and pollination as well as providing a prey source for most vertebrates proposed for introduction. Diverse invertebrate communities are essential for the functioning of terrestrial ecosystems, providing (along with fungi) the means by which organic material is broken down and made available to plants or higher trophic levels. The sheer number of invertebrate species present in a healthy ecosystem is far too vast to consider a species-by-species approach to restoration, but the community approach advocated here should ensure that the dominant invertebrate species characteristic of the three main forest types (kohekohe, tawa and karaka) are restored to Mana Island.

6. Weed control

There is a real risk that plant communities on Mana Island will become dominated by inappropriate species before restoration has proceeded sufficiently far for natural processes to ensure the spread of plant species typical of the eastern Cook Strait Ecological District. While there will be a long term need for maintenance control of aggressive weed species, intensive weed control is crucial during the early stages of ecological restoration on Mana Island. Continual vigilance will be required to ensure that colonising (and recolonising) weed species are destroyed before they become established.

18.2 TIME FRAME

The rate at which ecological restoration proceeds on Mana Island is dependent on funding levels (both governmental and sponsorship) and the extent of community involvement. Specialist interest groups such as the Wellington Botanical Society, Forest & Bird, the Ornithological Society, Ducks Unlimited and the Society for Research on Amphibians and Reptiles have the skills, knowledge and, in some cases, financial resources to implement components of the restoration plan with little financial input from the Department of Conservation. Because of the difficulties of forecasting funding levels and the level of specialist interest group involvement in the restoration of Mana Island, the following time frame (Table 18.1) is based on five-year time blocks rather than a detailed annual work plan. Crucial steps that must be completed before dependent actions can proceed are forest restoration, wetland restoration, gull control and speargrass planting, as failure to complete these tasks will prevent dependent animal and plant introductions occurring.

TABLE 18.1 ACTION PLAN FOR MAIN TASKS REQUIRED TO IMPLEMENT ECOLOGICAL RESTORATION ON MANA ISLAND.

		1996-2000	2001-2005	2006-2010	2011-2015	2016-2020
Forest restoration	Planting ¹	Intensive (175,000)	Intensive (175,000)	70,000 + ground covers and lianes	Ground covers and lianes	
	Pukeko control	Localised	Localised			
	Weed control	Intensive	Maintenance	Maintenance	Maintenance	Maintenance
	Animal introductions	Little spotted kiwi, yellow-crowned parakeet, robin, robust skink, Duvaucel's gecko, green gecko, <i>Rhytida</i>	Kereru, bellbird, tui, whitehead, giant pill millipede, <i>Waimua</i>	Kaka, stag beetle, forest invertebrates from Kapiti Island	Forest invertebrates from Kapiti Island	<i>Powelliphanta</i>
Grassland/shrubland/ coastal restoration	Planting ¹	Speargrass, flax	Speargrass, flax			
	Gull control	Intensive	Maintenance	Maintenance	Maintenance	Maintenance
	Weed control	Intensive	Intensive	Maintenance	Maintenance	Maintenance
	Animal introductions	Shore plover ² , snipe, tuatara, spotted skink, flax weevil; attract seabirds	Whitaker's skink, speckled skink; attract seabirds	Rock wren ³ , speargrass weevil ³ ; attract seabirds	Attract seabirds	Attract seabirds
Wetland restoration	Create wetland	Plan and implement	Maintain	Maintain	Maintain	Maintain
	Planting ¹	Intensive	Intensive	Threatened plants	Threatened plants	Threatened plants
	Animal introductions		Brown teal, fernbird, mudfish			
Threatened plants	Planting ¹	Constant effort throughout				

¹Most planting requires at least two years lead in time to allow for seed collection, propagation and growing-on

²Dependent on successful gull control

³Dependent on success of trials on Matiu/Somes Island

18.3 RESPONSIBILITIES

The Kapiti Area Manager (Wellington Conservancy, Department of Conservation) is responsible for securing the resources to implement the ecological restoration plan. The actual work will be carried out or supervised by Mana Island Field Centre staff accountable to the Kapiti Area Manager. Technical Support staff (Wellington Conservancy) will provide specialist technical advice, including planning and permitting, to assist with delivery of conservation outputs in the field.

The Mana Island Field Centre Supervisor will be responsible for supervision of volunteer groups on the island and liaison with organisations involved in implementation of this plan.

Acknowledgements

This plan, or portions of it, has benefited from contributions and comments from Ian Atkinson, Jason Christensen, Peter de Lange, Geoff de Lisle (Ornithological Society of NZ), Raewyn Empson, Isobel Gabites, Robin Gay, George Gibbs, Kevin Jones, Jim Lynch (Royal Forest & Bird Protection Society), Barbara Marshall (Tararua Tramping Club), Ian McFadden, Barbara Mitcalfe (Wellington Botanical Society), Don Newman, Colin Ogle, Brian Patrick, Allan Ross, John Sawyer, Te Runanga oToa Rangatira, Susan Timmins, Phil Todd, Dave Towns, Ian Townsend, Kath Walker, Wellington Conservation Board and Tony Whitaker.

The maps were prepared by Chris Edkins, and the document was formatted by Jeremy Rolfe.

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Appendix 1: Scientific names of animals mentioned in text

Antipodes Island parakeet	<i>Cyanoramphus unicolor</i>
Antipodes Island pipit	<i>Anthus novaeseelandiae steindachneri</i>
Antipodes Island snipe	<i>Coenocorypha aucklandica meinertzhagenae</i>
Auckland Island banded dotterel	<i>Charadrius bicinctus exilis</i>
Auckland Island rail	<i>Rallus pectoralis muelleri</i>
Auckland Island snipe	<i>Coenocorypha aucklandica aucklandica</i>
Auckland Island teal	<i>Anas aucklandica</i>
Auckland Island tomtit	<i>Petroica macrocephala marrineri</i>
Australasian gannet	<i>Morus serrator</i>
Australasian harrier	<i>Circus approximans</i>
Australian magpie	<i>Gymnorhina tibicen</i>
Axis deer	<i>Axis axis</i>
Banded kokopu	<i>Galaxias fasciatus</i>
Banded rail	<i>Rallus philippensis</i>
Bellbird	<i>Anthornis melanura</i>
Black robin	<i>Petroica traversi</i>
Black shag	<i>Phalacrocorax carbo</i>
Black swan	<i>Cygnus atratus</i>
Black-backed gull	<i>Larus dominicanus</i>
Blackbird	<i>Turdus merula</i>
Black-fronted tern	<i>Sterna albobristata</i>
Blue duck	<i>Hymenolaimus malacorhynchus</i>
Blue penguin	<i>Eudyptula minor</i>
Broad-billed prion	<i>Pachyptila vittata</i>
Brothers island tuatara	<i>Sphenodon guntheri</i>
Brown kiwi	<i>Apteryx mantelli</i>
Brown mudfish	<i>Neochanna apoda</i>
Brown skink	<i>Oligosoma zelandicum</i>
Brown teal	<i>Anas chlorotis</i>
Bush wren	<i>Xenicus longipes</i>
Campbell Island snipe	<i>Coenocorypha aucklandica</i> n. subsp.
Campbell Island teal	<i>Anas nesiotis</i>
Caspian tern	<i>Sterna striata</i>

Cat	<i>Felis catus</i>
Cattle	<i>Bos taurus</i>
Chaffinch	<i>Fringilla coelebs</i>
Chatham Island bellbird	<i>Anthornis melanura melanocephala</i>
Chatham Island fantail	<i>Rhipidura fuliginosa penita</i>
Chatham Island fernbird	<i>Bowdleria rufescens</i>
Chatham Island oystercatcher	<i>Haematopus chathamensis</i>
Chatham Island pigeon	<i>Hemiphaga novaeseelandiae chathamensis</i>
Chatham Island pipit	<i>Anthus novaeseelandiae chathamensis</i>
Chatham Island red-crowned parakeet	<i>Cyanoramphus novaezealandiae chathamensis</i>
Chatham Island snipe	<i>Coenocorypha pusilla</i>
Chatham Island tomtit	<i>Petroica macrocephala chathamensis</i>
Chatham Island tui	<i>Prothemadera novaeseelandiae chathamensis</i>
Chatham Island warbler	<i>Gerygone albofrontata</i>
Cirl bunting	<i>Emberiza cirrus</i>
Coastal moa	<i>Euryapteryx curtus</i>
Codfish Island fernbird	<i>Bowdleria punctata wilsoni</i>
Common diving petrel	<i>Pelecanoides urinatrix</i>
Common gecko	<i>Hoplodactylus maculatus</i>
Common skink	<i>Oligosoma nigriplantare polychrome</i>
Common wasp	<i>Vespula vulgaris</i>
Cook Strait amychus	<i>Amychus granulatus</i>
Cook Strait giant weta	<i>Deinacrida rugosa</i>
Cook Strait tuatara	<i>Sphenodon punctatus</i> subsp.
Cook's petrel	<i>Pterodroma cookii</i>
Copper skink	<i>Cyclodina aenea</i>
Diving petrel	<i>Pelecanoides</i> sp.
Domestic fowl	<i>Gallus gallus</i>
Duvaucel's gecko	<i>Hoplodactylus duvaucelii</i>
Erect-crested penguin	<i>Eudyptes sclateri</i>
Fairy prion	<i>Pachyptila turtur</i>
Falcon	<i>Falco novaeseelandiae</i>
Fernbird	<i>Bowdleria punctata</i>
Fiordland crested penguin	<i>Eudyptes pachyrhynchus</i>
Flax weevil	<i>Anagotus fairburni</i>
Flesh-footed shearwater	<i>Puffinus carneipes</i>
Fluttering shearwater	<i>Puffinus gavia</i>
Forbe's parakeet	<i>Cyanoramphus auriceps forbesi</i>

Forest gecko	<i>Hoplodactylus granulatus</i>
Fulmar prion	<i>Pachyptila crassirostris</i>
Gannet	<i>Morus serrator</i>
German wasp	<i>Vespula germanica</i>
Giant kokopu	<i>Galaxias argenteus</i>
Giant pill millipede	<i>Procyliosoma tuberculata tuberculata</i>
Giant weta	<i>Deinacrida rugosa</i>
Goat	<i>Capra hircus</i>
Goldfinch	<i>Carduelis carduelis</i>
Goldstripe gecko	<i>Hoplodactylus chrysosireticus</i>
Grayling	<i>Prototroctes oxyrhynchus</i>
Greater short-tailed bat	<i>Mystacina robusta</i>
Green gecko	<i>Naultinus</i> sp.
Greenfinch	<i>Carduelis chloris</i>
Grey duck	<i>Anas superciliosa</i>
Grey warbler	<i>Gerygone igata</i>
Haast tokoeka	<i>Apteryx australis</i> subsp.
Hamilton's frog	<i>Leiopelma hamiltoni</i>
Harrier	<i>Circus approximans</i>
Hedge sparrow	<i>Prunella modularis</i>
Hochstetter's frog	<i>Leiopelma hochstetteri</i>
House sparrow	<i>Passer domesticus</i>
Hutton's shear-water	<i>Puffinus huttoni</i>
Kaka	<i>Nestor meridionalis</i>
Kakapo	<i>Strigops habroptilus</i>
Kermadec parakeet	<i>Cyanoramphus novaezelandiae cyanurus</i>
Kingfisher	<i>Halcyon sancta</i>
Kiore	<i>Rattus exulans</i>
<i>Kiwi</i> sp.	<i>Apteryx</i> sp.
Koaro	<i>Galaxias brevipinnis</i>
Kokako	<i>Callaeas cinerea</i>
Lesser knot	<i>Calidris canutus</i>
Lesser short-tailed bat	<i>Mystacina tuberculata</i>
Little Barrier snipe	<i>Coenocorypha aucklandica barrierensis</i>
Little shag	<i>Phalacrocorax melanoleucos</i>
Little spotted kiwi	<i>Apteryx owenii</i>
Long-tailed bat	<i>Chalinolobus tuberculatus</i>
Long-tailed cuckoo	<i>Eudynamys taitensis</i>
Macquarie Island parakeet	<i>Cyanoramphus novaezelandiae erythrotis</i>
Magpie	<i>Gymnorhina tibicen</i>

Mallard	<i>Anas platyrhynchos</i>
Marbled skink	<i>Cyclodina oliveri</i>
Marlborough green gecko	<i>Naultinus manukanus</i>
"Marlborough mini" gecko	<i>Hoplodactylus</i> n. sp.
Maud Island frog	<i>Leiopelma pakeka</i>
McGregor's skink	<i>Cyclodina macgregori</i>
Morepork	<i>Ninox novaeseelandiae</i>
Mouse	<i>Mus musculus</i>
New Zealand dotterel	<i>Charadrius obscurus</i>
New Zealand falcon	<i>Falco novaeseelandiae</i>
New Zealand kingfisher	<i>Halcyon sancta vagans</i>
New Zealand pigeon (kereru)	<i>Hemiphaga novaeseelandiae</i> <i>novaeseelandiae</i>
New Zealand pipit	<i>Anthus novaeseelandiae novaeseelandiae</i>
New Zealand quail	<i>Coturnix novaezelandiae novaezelandiae</i>
New Zealand robin	<i>Petroica australis</i>
North Island bush wren	<i>Xenicus longipes stokesii</i>
North Island fantail	<i>Rhipidura fuliginosa placabilis</i>
North Island fernbird	<i>Bowdleria punctata vealeae</i>
North island kaka	<i>Nestor meridionalis septentrionalis</i>
North Island kokako	<i>Callaeas cinerea wilsoni</i>
North Island rifleman	<i>Acanthisitta chloris granti</i>
North Island robin	<i>Petroica australis longipes</i>
North Island saddleback	<i>Philesturnus carunculatus rufusater</i>
North Island stout-legged wren	<i>Pachyplichas jagmi</i>
North Island takahe	<i>Porphyrio mantelli mantelli</i>
North Island tomtit	<i>Petroica macrocephala toitoi</i>
North Island weka	<i>Gallirallus australis greyi</i>
Northern giant petrel	<i>Macronectes halli</i>
Norway rat	<i>Rattus norvegicus</i>
Okarito brown kiwi	<i>Apteryx mantelli</i> subsp.
Orange-fronted parakeet	<i>Cyanoramphus [auriceps] malherbi</i>
Ornate skink	<i>Cyclodina ornata</i>
Pacific gecko	<i>Hoplodactylus pacificus</i>
Paradise shelduck	<i>Tadorna variegata</i>
Pied shag	<i>Phalacrocorax varius</i>
Pied stilt	<i>Himantopus himantopus</i>
Pig	<i>Sus scrofa</i>
Poor Knights bellbird	<i>Anthornis melanura oneho</i>
Possum	<i>Trichosurus vulpecula</i>

Pukeko	<i>Porphyrio porphyrio melanotus</i>
Rabbit	<i>Oryctolagus cuniculus</i>
Rat	<i>Rattus</i> sp.
Red-billed gull	<i>Larus novaehollandiae scopulinus</i>
Red-crowned parakeet	<i>Cyanoramphus novaezealandiae</i>
Redpoll	<i>Carduelis flammea</i>
Red-rumped parrot	<i>Psephotus haematonotus</i>
Reef heron	
Reischek's parakeet	<i>Cyanoramphus novaezealandiae hochstetteri</i>
Rifleman	<i>Acanthisitta chloris</i>
Robin	<i>Petroica australis</i>
Robust skink	<i>Cyclodina alani</i>
Rock pigeon	<i>Columba livia</i>
Rock wren	<i>Xenicus gilviventris</i>
Royal albatross	<i>Diomedea epomophora</i>
Royal spoonbill	<i>Platalea regia</i>
Saddleback	<i>Philesturnus carunculatus</i>
Salvin's prion	<i>Pachyptila salvini</i>
Sheep	<i>Ovis aries</i>
Shining cuckoo	<i>Chrysococcyx lucida</i>
Ship rat	<i>Rattus rattus</i>
Shore plover	<i>Thinornis novaeseelandiae</i>
Shortfinned eel	<i>Anguilla australis</i>
Short-jawed kokopu	<i>Galaxias postvectis</i>
Short-tailed bat	<i>Mystacina tuberculata</i>
Shy mollymawk	<i>Diomedea cauta</i>
Silvereye	<i>Zosterops lateralis</i>
Skylark	<i>A lauda arvensis</i>
Snares Island fernbird	<i>Bowdleria punctata caudata</i>
Snares Island snipe	<i>Coenocorypha aucklandica huegeli</i>
Snares Island tomtit	<i>Petroica macrocephala dannefaerdi</i>
Snipe	<i>Coenocorypha</i> sp.
Song thrush	<i>Turdus philomelos</i>
Sooty shearwater	<i>Puffinus griseus</i>
Southern black-backed gull	<i>Larus dominicanus</i>
Southern giant petrel	<i>Macronectes giganteus</i>
South Island kaka	<i>Nestor meridionalis meridionalis</i>
South Island kokako	<i>Callaeas cinerea cinerea</i>
South Island robin	<i>Petroica australis australis</i>

South Island saddleback	<i>Philesturnus carunculatus carunculatus</i>
South Island takahe	<i>Porphyrio mantelli hochstetteri</i>
Speargrass weevil	<i>Lyperobius huttoni</i>
Speckled skink	<i>Oligosoma infrapunctatum</i>
Spotted shag	<i>Stictocarbo punctatus</i>
Spotless crane	<i>Porzana tabuensis</i>
Spotted skink	<i>Oligosoma lineocellatum</i>
Spur-winged plover	<i>Vanellus miles novaehollandiae</i>
Starling	<i>Sturnus vulgaris</i>
Stephens Island weevil	<i>Anagotus stephenensis</i>
Stewart Island fernbird	<i>Bowdleria punctata stewartiana</i>
Stewart Island robin	<i>Petroica australis rakiura</i>
Stewart Island snipe	<i>Coenocorypha aucklandica iredalei</i>
Stitchbird	<i>Notiomystis cincta</i>
Stoat	<i>Mustela erminea</i>
Stout-legged moa	<i>Euryapteryx geranoides</i>
Striped gecko	<i>Hoplodactylus stephensi</i>
Sulphur-crested cockatoo	<i>Cacatoe galerita</i>
Takahe	<i>Porphyrio mantelli</i>
Three Kings bellbird	<i>Anthornis melanura obscura</i>
Tokoeka	<i>Apteryx australis</i>
Tomtit	<i>Petroica macrocephala</i>
Tuatara	<i>Sphenodon</i> sp.
<i>Tui</i>	<i>Prosthemadera novaeseelandiae</i>
Variable oystercatcher	<i>Haematopus unicolor</i>
Vespulid wasps	<i>Vespula</i> sp.
Wandering albatross	<i>Diomedea exulans</i>
Weka	<i>Gallirallus australis</i>
Welcome swallow	<i>Hirundo tahitica</i>
Wellington green gecko	<i>Naultinus elegans punctatus</i>
Western weka	<i>Gallirallus australis australis</i>
Whitaker's skink	<i>Cyclodina whitakeri</i>
White-faced heron	<i>Ardea novaehollandiae</i>
White-faced storm petrel	<i>Pelagodroma marina</i>
White-fronted tern	<i>Sterna striata</i>
Whitehead	<i>Mohoua albicilla</i>
Yellow-crowned parakeet	<i>Cyanoramphus auriceps</i>
Yellowhammer	<i>Emberiza citrinella</i>
Yellowhead	<i>Mohoua ochrocephala</i>

Appendix 2: Scientific names of plants mentioned in text

Aka	<i>Metrosideros perforata</i>
Aka kiore	<i>Parsonsia capsularis</i>
Akeake	<i>Dodonaea viscosa</i>
Akiraho	<i>Olearia paniculata</i>
Angelica	<i>Angelica pachycarpa</i>
Blackberry	<i>Rubus fruticosus</i>
Bone-seed	<i>Chrysanthemoides monilifera</i>
Boxthorn	<i>Lycium ferocissimum</i>
Broom	<i>Cytisus scoparium</i>
Brush wattle	<i>Paraserianthes lophantha</i>
Cabbage tree	<i>Cordyline australis</i>
Coastal tree daisy	<i>Olearia solandri</i>
Cocksfoot	<i>Dactylis glomerata</i>
Cook's scurvy grass	<i>Lepidium oleraceum</i>
Elderberry	<i>Sambucus nigra</i>
Everlasting pea	<i>Lathyrus latifolius</i>
Fennel	<i>Foeniculum vulgare</i>
Five finger	<i>Pseudopanax arboreus</i>
Flax	<i>Phormium</i> sp.
Gorse	<i>Ulex europaeus</i>
Hangehange	<i>Geniostoma rupestre</i>
Harakeke	<i>Phormium tenax</i>
Heketara	<i>Olearia rani</i>
Hinau	<i>Elaeocarpus dentatus</i>
Holly-leaved senecio	<i>Senecio glast folius</i>
Jersey fern	<i>Anogramma leptophylla</i>
Kahikatea	<i>Dacrycarpus dacrydioides</i>
Kaikomako	<i>Pennantia corymbosa</i>
Kaiwhiria	<i>Parsonsia heterophylla</i>
Kanuka	<i>Kunzea ericoides</i>
Kapuka	<i>Griselinia littoralis</i>
Karaka	<i>Corynocarpus laevigatus</i>
Karamu	<i>Coprosma robusta</i>
Karo	<i>Pittosporum crassifolium</i>

Kawakawa	<i>Macropiper excelsum</i>
Kiekie	<i>Freycinetia baueriana</i>
Kikuyu	<i>Pennisetum clandestinum</i>
Kohekohe	<i>Dysoxylum spectabile</i>
Kohia	<i>Passiflora tetrandra</i>
Kohuhu	<i>Pittosporum tenuifolium</i>
Koromiko	<i>Hebe stricta</i> var. <i>macroura</i>
Kowhai	<i>Sophora microphylla</i>
Lacebark	<i>Hoheria populnea</i>
Lancewood	<i>Pseudopanax crassifolius</i>
Large-leaved milk tree	<i>Streblus banksii</i>
Lemonwood	<i>Pittosporum eugenioides</i>
Macrocarpa	<i>Cupressus macrocarpa</i>
Mahoe	<i>Melicytus ramiflorus</i>
Manuka	<i>Leptospermum scoparium</i>
Mapou	<i>Myrsine australis</i>
Matagouri	<i>Discaria toumatou</i>
Matai	<i>Prumnopitys taxifolia</i>
Mingimingi	<i>Cyathodes juniperina</i>
Miro	<i>Prumnopitys ferruginea</i>
New Zealand broom	<i>Carmichaelia arborea</i>
Ngaio	<i>Myoporum laetum</i>
Nikau	<i>Rhopalostylis sapida</i>
Northern rata	<i>Metrosideros robusta</i>
Ongaonga	<i>Urtica ferox</i>
Pampas grass	<i>Cortaderia jubata</i> and <i>C. selloana</i>
Pate	<i>Schefflera digitata</i>
Patotara	<i>Leucopogon fraseri</i>
Pigeonwood	<i>Hedycarya arborea</i>
Pinatoro	<i>Pimelea prostrata</i>
Pine	<i>Pinus radiata</i>
Pohuehue	<i>Muehlenbeckia complexa</i>
Pohutukawa	<i>Metrosideros excelsa</i>
Poroporo	<i>Solanum aviculare</i> and <i>S. laciniatum</i>
Prairie grass	<i>Bromus willdenowii</i>
Prickly mingimingi	<i>Cyathodes juniperina</i>
Puawananga	<i>Clematis paniculata</i>
Puka	<i>Griselinia lucida</i>
Pukatea	<i>Laurelia novae zelandiae</i>
Putaputaweta	<i>Carpodetus serratus</i>

Ramarama	<i>Lophomyrtus bullata</i>
Rangiora	<i>Brachyglottis repanda</i>
Rata vines	<i>Metrosideros</i> sp.
Raupo	<i>Typha orientalis</i>
Raurekau	<i>Coprosma grandifolia</i>
Rengarenga	<i>Arthropodium cirratum</i>
Rewarewa	<i>Knightia excelsa</i>
Rimu	<i>Dacrydium cupressinum</i>
Rohutu	<i>Lophomyrtus obcordata</i>
Rye grass	<i>Lolium perenne</i>
Shore ribbonwood	<i>Plagianthus divaricatus</i>
Shore spurge	<i>Euphorbia glauca</i>
Speargrass	<i>Aciphylla squarrosa</i>
Supplejack	<i>Ripogonum scandens</i>
Swamp maire	<i>Syzygium maire</i>
Swamp nettle	<i>Urtica linearifolia</i>
Tasmanian ngaio	<i>Myoporum insulare</i>
Tauhinu	<i>Cassinia leptophylla</i>
Taupata	<i>Coprosma repens</i>
Tawa	<i>Beilschmiedia tawa</i>
Titoki	<i>Alectryon excelsus</i>
Toetoe	<i>Cortaderia toetoe</i>
Totara	<i>Podocarpus totara</i>
Tree lucerne	<i>Chamaecytisus palmensis</i>
Tree mallow	<i>Lavatera arborea</i>
Tree tutu	<i>Coriaria arborea</i>
Turutu	<i>Dianella nigra</i>
Wandering Jew	<i>Tradescantia fluminensis</i>
Wharangi	<i>Melicope ternata</i>
Wharariki	<i>Phormium cookianum</i>
White clover	<i>Trifolium repens</i>
White maire	<i>Nestegis lanceolata</i>
Wineberry	<i>Aristotelia serrata</i>
Yorkshire fog	<i>Holcus lanatus</i>