PROJECT ISLAND SONG

Project Island Song Translocation Feasibility and Action Plan

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AIR NEW ZEALAND ENVIRONMENT TRUST

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1. Summary

A process to identify suitable species to complement the ecosystem restoration of Ipipiri and Rakaumangamanga/Cape Brett in the eastern Bay of Islands has been developed. Twenty species of birds, reptiles, invertebrates, and plants have been identified for translocation. Over time, these introductions in conjunction with the broader restoration have the potential to help create a thriving native island ecosystem, with a diverse forest and numerous seabirds together sustaining an abundance of invertebrates, land birds and reptiles. To aid species management, some of the proposed introductions would also establish new populations of threatened species, and species that are sparse or that have suffered decline on the mainland. The proposed translocations are formulated into a timeline that accommodates a series of priorities, activities, and prerequisites for each species introduction. Consultation and engagement with tāngata whenua and key stakeholders has been identified, and the opportunities for advocacy acknowledged.

2. Introduction

Islands off northeast New Zealand free of introduced mammals are typically characterised by complex plant-invertebrate-reptile-seabird ecosystems in which seabirds are the dominant influencers, fertilising and modifying soils (Daugherty et al. 1990). The islands of Ipipiri would once have looked like this too. The group of islands collectively known as Ipipiri lie adjacent to Rakaumangamanga (Cape Brett) in the eastern Bay of Islands, and include seven main islands: Urupukapuka, Moturua, Motuarohia, Waewaetorea, Motukiekie, Okahu, and Poroporo (see Appendix 1). In the past, human activity has modified and depleted the natural ecosystems of Ipipiri. All have been modified by human activities including some that have been cleared by fires and farming.

Growing concern about the decline in biodiversity on Ipipiri saw the development of Project Island Song as an opportunity for interested parties to restore the islands by combining energies, talents and cultures. Project Island Song is a unique partnership between the Guardians of the Bay of Islands, the local hapu Ngati Kuta and Patukeha, as kaitiaki, and the Department of Conservation. All partners share the same vision: to see the ecosystems of islands of Ipipiri fully restored. In 2009, the Department of Conservation eradicated all rats, mice and stoats from the islands of Ipipiri.

The pest free status of Ipipiri now offers a unique suite of islands that are visited by over 150,000 people annually. A desirable outcome for Ipipiri might include seabird-driven ecosystems supporting representative coastal broadleaf forest, with native species embedded within a pest-free environment that is able to act as a refuge to aid species viability and enhance biodiversity.

This project covers the development of a Project Island Song Translocation Feasibility and Action Plan for a range of native fauna and flora that will be relocated to the island ecological sanctuaries of Project Island Song over the next 15 to 20 years. To achieve this goal the plan develops a strategy to conserve rare, endangered or threatened species in their natural habitat on the island sanctuaries. The plan examines the four key groups that need to be considered to aid the restoration of Ipipiri: birds, reptiles, invertebrates, and plants. Habitat requirements, potential interactions with other species, translocation prerequisites and practicalities, susceptibility to pest incursion, and availability of source populations are outlined.

In contrast to a restoration plan, this plan is intended to be a practical working document to guide the initiation of the Ipipiri biological communities' restoration across the island group, and complements the broader ecological restoration programme developed by individual island plans. The plan sets out to define what can be achieved over a set timeframe, and acknowledges the practical realities related to the availability of resources and the capabilities to meet those goals. Careful consideration has been made so that the plan can accommodate supplementary translocation, and does not limit future options.

Species proposed for translocation include those typical of the area (e.g. North Island brown kiwi, pupuharakeke), ecologically important species (e.g. seabird species that introduce marine nutrients into the island ecosystem), as well as threatened species (e.g. tuatara, takahē, Cook's scurvy grass). In order to preserve as much ecological integrity on Ipipiri as possible, priority was given in the plan to species that are likely to have been on Ipipiri prior to human activity. Although there is little direct evidence of Ipipiri's early flora and fauna, these species have been inferred from those present on other less modified local islands (Motukōkako/Piercy Island) and the adjacent mainland. Particular attention has been given to species that are unlikely to re-colonise Ipipiri without human assistance. In addition, species under threat regionally (e.g. tītipounamu, Northland green gecko) or nationally (e.g. hihi, flax weevil) have also been recommended for introduction if the recovering ecosystems on Ipipiri are able to provide suitable refuge for them.

The species introductions outlined in this plan are likely to create significant opportunities for both conservation and people. The absence of introduced mammalian browsers and predators on Ipipiri has created an ideal opportunity to restore a coastal forest ecosystem representative of the one present prior to human arrival. Establishing populations of threatened species on Ipipiri will not only provide greater security for those species but in time will also offer an additional source for establishing populations elsewhere.

Consultation and engagement with tāngata whenua and key stakeholders will be critical to ensuring the success of the translocation programme. Tāngata whenua and key stakeholders of Ipipiri and those concerned with source populations need to be involved at an early stage in translocation planning. Consultation and engagement will not only ensure that translocations are possible, but may open up other opportunities in the future. Each individual translocation identified will go through consultation and the formal translocation process prior to it taking place.

With the introduction of new species, particularly threatened species, the opportunities for advocacy are extensive. It is anticipated that the profile of Project Island Song will be raised and the restoration programme will receive more exposure. Securing funding and attracting sponsorship is likely to get easier and other opportunities for earning revenue may become available. Volunteer involvement in the restoration programme is likely to increase and Project Island Song's appeal to volunteers already involved will be enhanced. Introductions of threatened species will generate greater public interest in the islands as a destination and more visitors to the islands are expected.

3. Seabirds

Seabirds have biological characteristics that differ dramatically to most land birds. These characteristics reflect the difficulties of surviving in the unpredictable marine environment and the evolution of many species in the absence of mammalian predators (Schreiber and Burger 2002). The life-history characteristics of seabirds are often referred to as extreme including long life spans (20-60 years), delayed maturity (breeding delayed up to 3-15 years), small clutch sizes (often only one egg) and long chick development periods (Imber 1985; Warham 1990). By comparison, many terrestrial birds such as passerines have shorter lives, lay larger clutches of eggs and have chicks that mature more rapidly.

New Zealand is ideally suited to seabirds; surrounded by productive oceans, presenting a multitude of breeding habitats and having been isolated from mammalian predators for millions of years prior to human arrival. It is thus no surprise that the New Zealand archipelago has great seabird diversity with 85 breeding species of which 36 are endemic species (42%) breeding nowhere else in the world. Indeed of 359 seabird species worldwide, approximately one quarter breed in New Zealand and 10% are endemic to New Zealand breeding grounds, making the country a world centre of seabird diversity (Gaskin and Rayner 2013).

Seabirds come ashore to breed. Most nest in colonies, mainly on offshore islands. Mainland colonies have been ravaged by introduced predators. Seabird colonies are rich in nutrients and support an abundance of invertebrates, both below and above ground; these in turn support other predatory species, such as tuatara. Seabirds are therefore keystone species, in that they create favourable conditions for a range of other animals (and plants) that would otherwise struggle to survive in their absence. Seabird activities alter nutrients in the soil, change the type of plants that grow, and make homes for invertebrates and reptiles (many of which are endangered):

- Seabirds disperse seeds and spores from their feathers and droppings (guano).
- Seabirds disturb the soil as they are building their nests, and this may be important to some native plants e.g. tōwai, Cook's scurvy grass
- The burrows of ground nesting seabirds can be safe, sheltered and humid habitats for lizards, tuatara and invertebrates.

Seabirds would have once been a key ecosystem component of the islands of Ipipiri. A low density remnant or recolonising population of the Procellariidae species oi/grey faced petrel (*Pterodroma macroptera*) is currently scattered across Ipipiri, such as Waewaetorea and Urupukapuka Islands, and some rock stacks. This part of the plan aims to initiate the restoration of a seabird-driven ecosystem on Ipipiri, with components of its companion species. Forest succession, soil quality and invertebrate and reptile abundance are all likely beneficiaries of this approach (Towns, 2002).

Seabirds are highly philopatric (site faithful) in that the great majority of birds return to their natal colonies to breed. Pioneers of new colonies tend to be first-time breeders who have not established themselves at other breeding sites (Podolsky 1990). Many seabirds spend their pre-breeding years visiting potential breeding sites before reaching sexual maturity (Podolsky 1990). Podolsky (1990) suggests that sustained artificial stimulation of a prospected site for several years could result in the establishment of a breeding colony. However, many suitable sites, some with a history of occupation, are not visited by non-breeding members of a population. Seabird colony establishment techniques include habitat creation or modification, a range of social attraction methods, and also translocation of chicks at various stages of growth (Gummer 2003).

Method

As a priority, the seabird restoration effort on Ipipiri should initially focus on encouraging seabirds to recolonise Ipipiri through habitat creation and social attractants. If after a number of years this method does not initiate colony

reestablishment, then a programme to translocate appropriate seabird species should be considered. Initially, potentially suitable colony sites should be selected and modified through appropriate revegetation to create favourable habitat incorporating social attractants. A Social attractant can be visual (decoys, mirrors) or acoustic (sound playback systems). Visual attractants are required for diurnal species to give the impression of a currently active site. Realistic models in a range of breeding behaviour postures tend to be positioned in a formation appropriate to the species; more rather than fewer decoys are usually recommended. Decoy nests, eggs and chicks, and even simulated guano have also been used. Acoustic attraction is employed for both diurnal and nocturnal species; it is a particularly important method for attracting nocturnal species and tends to be used in conjunction with provision of nest-sites in the near proximity of the sound source. The vocalisation call that established pairs of a species use exclusively underground is suggested as the most effective for attracting prospecting conspecifics, as opposed to aerial calls (Kress 1997).

Assisted introductions may be required because the likelihood of a species self-introducing is low (Gummer 2003). Chick translocations are now an established method of seeding new burrow-nesting seabird colony sites. The major prerequisites required when translocating highly philopatric seabirds are: to ensure habitat quality at the release site is suitable for breeding birds, and to ensure that translocated birds imprint upon the locality at the release site (Numata 1996). For all seabird introductions chicks are captured from nesting colonies, and transferred to artificial nesting sites and hand raised until fledging. Chick transfer is necessary as seabirds return to the site they imprint on. Burrow-nesting species appear to gain cues following emergence from the burrow during a relatively narrow visual sensitive period (Serventy et al. 1989). Chicks of surface-nesting seabirds are likely to have a much broader period during which to imprint on natal locality. As the imprinting of burrow-nesting species is easier to control than surface nesting species, it is therefore suggested that translocations should be carried out with burrow-nesting birds. In most instances, the transferees are moved 10-20 days before fledging. They are housed in artificial burrows (wooden or plastic) in their new location, and are handfed one to three times while they are there. With assisted introductions, it is estimated seabird populations will take as long as four to five years to establish (Gummer 2003), requiring more than one translocation.

Since chick translocations require long-term commitment, and would be costly in terms of location, logistics and labour, translocations are recommended only if other social attraction methods prove unsuccessful. Even then, the growth of such artificially established colonies might be expected to be extremely slow. Most members of the Procellariidae – the largest and most diverse family of seabirds, and the less diverse Pelecanoididae – nest in burrows, and large colonies often contain several species living side by side in an extensive labyrinth of tunnels and underground chambers. Two burrow-nesting species have been identified for potential introduction if habitat creation and social attractants do not activate recolonization. Pakahā/fluttering shearwater (*Procellariidae*) and northern diving petrel (*Pelecanoididae*) have been selected because of their different habitat preferences, and as adverse competition between oi/grey faced petrels is not anticipated (Gummer 2003). Potential available habitat on Ipipiri for both northern diving petrels and fluttering shearwaters is extensive. It is recommended that the initial focus for restoration should concentrate on Okahu, Waewaetorea, and Motuarohia because of the beneficial influence they will bring to other companion species that are planned to be translocated (tuatara, skink).

Pakahā/Fluttering Shearwater

Scientific name: *Puffinus gavial*
Conservation status: At Risk - Relict (2012)
Current recovery plan: None

Photos 1 & 2: Pakahā/Fluttering Shearwater

Pakahā, with its distinctive, 'flutter-glide' flight, is a ubiquitous seabird of inshore waters in the top half of New Zealand, especially in the northern-eastern North Island and Marlborough Sounds-Cook Strait regions. It is often seen in flocks, sometimes numbering thousands of birds, moving rapidly while foraging. Pakahā feeds in association with schools of fish (e.g. kahawai, trevally) or in massive groups at the surface on crustaceans; and at times, resting in large, dense rafts. During the post-breeding period, a considerable proportion of the population remain within in local waters where it is a common sight inshore throughout the winter months. Pakahā nest on readily accessible sites such as cliffs. Fledglings migrate to the south-eastern seaboard of Australia in February/March and return again in July/August; adults are non-migratory but range seasonally between inshore waters and the continental shelf. Numbers of pakahā have declined with the spread of predators to headlands and offshore islands.

Pakahā breed in burrows or cavities in coastal slopes and cliffs, often under grass or shrubs, and are nocturnal on land (Marchant and Higgins, 1990). Most return to their colonies in August, with a single egg laid from early September to mid-October, although some will visit throughout the year (Heather and Robertson, 2000). They forage over the continental shelf and inshore waters, and feed by pursuit-plunging, taking predominantly fish as prey (Marchant and Higgins, 1990). Chicks are fed by both parents. After fledging, pakahā have a prolonged period of juvenile development and do not begin breeding until they are 3-6 years old. There is therefore a long delay between nestling transfer and adult return; colonies literally take years to establish. Furthermore, a proportion of the 'transferred juveniles' never return because they die before reaching adulthood.

In New Zealand, pakahā have been the subject of a previous translocation project, led by members of the Ornithological Society of New Zealand (OSNZ) (Bell et al., 2005). A total of 334 chicks were transferred from Long Island to Maud Island, Marlborough Sounds, from 1991 to 1996; they were housed in artificial burrows and hand-fed a diet based on whole salmon smolt. Fledging success was reported as 82%, with 34 of the 273 chicks that fledged returning to Maud Island in subsequent years, and 30 breeding for the first time at an average of 6.8 years (Bell et al., 2005; Miskelly et al., 2009). Chicks returning to Maud Island as adults had fledged at the heavier end of the fledging weight range for this species, and had spent relatively longer on Maud Island than the non-returning chicks prior to fledging.

Pakahā are part of the local avifauna, and Ipipiri is part of its range. Pakahā is an appropriate species to initiate the seabird restoration on Ipipiri for two reasons:

- The populations appear to be limited by the availability of breeding sites rather than by sea-based threats (such as oil spills and commercial fishing)
- The species is relatively numerous, so it should be possible to obtain sufficient fledglings from one or more locations to found a population on Ipipiri.

Potential interactions with other species

Re-establishing colonies of burrow-nesting seabirds, to provide marine-sourced nutrient input to the terrestrial ecosystem (droppings, regurgitations, failed eggs, corpses) and habitat (burrows) for invertebrates and reptiles, is considered to be of major ecological benefit to Ipipiri. Forest succession, soil quality and invertebrate and reptile abundance are likely to benefit from the successful reestablishment of a pakahā colony. Habitat and resource creation for translocated companion species such as tuatara and sink is also advantageous. Adverse competition between oi/grey faced petrels and northern diving petrels is not anticipated.

Translocation prerequisites

As a priority, the seabird restoration effort on Ipipiri should initially focus on encouraging seabirds to recolonise Ipipiri through habitat creation and social attractants. All the islands of Ipipiri contain sympathetic habitat for pakahā. However, preliminary efforts to induce pakahā recolonisation should focus on sites less prone to pest incursion and human disturbance. Theoretically suitable colony sites should be selected and modified through appropriate revegetation to create favourable habitat incorporating social attractants. If after a number of years this method does not initiate colony reestablishment, then a programme to translocate appropriate pakahā should be considered.

Translocated population dispersion - Inter-island/mainland mobility

Highly mobile – after fledging, pakahā have a prolonged period of juvenile development and do not begin breeding until they are 3-6 years old. There is therefore a long delay between nestling transfer and adult return; colonies literally take years to establish. However, pakahā are highly philopatric (site faithful) in that the great majority of birds return to their natal colonies to breed. A proportion of the 'transferred juveniles' never return because they die before reaching adulthood.

Habitat availability	Translocation composition	Recommend time frame for translocation
Okahu	200 to 250 chicks	From 2026 if unassisted recolonisation has not occurred
Waewaetorea	200 to 250 chicks	From 2026 if unassisted recolonisation has not occurred
Motuarohia	200 to 250 chicks	From 2026 if unassisted recolonisation has not occurred

Potential source populations

Motuharakeke Island (Cavalli Island)

Tāngata whenua

Ngāti Kura

Northern Diving Petrel

Scientific name: *Pelecanoides urinatrix urinatrix*
Conservation status: At Risk - Relict (2012)
Current recovery plan: None

Photos 3 & 4: Northern Diving Petrel

Northern diving petrels often occur in large, dispersed flocks at sea. They are not attracted to boats and are non-migratory, staying in New Zealand waters throughout the year. They are colonial breeders, nesting in short burrows, rock crevices or under dense vegetation. The breeding season is earlier, with peak laying of the single egg in August. Birds can be found ashore at colonies in any month of the year. They excavate their own burrows, and breed as monogamous pairs, which can remain together over many seasons (though divorces are frequent). Northern diving petrels visit breeding sites after dark and depart before dawn, or stay in burrows or nest crevices during daylight. Colonies can be low density, or up to 6 burrows per square metre. Diving petrels are remarkably similar in appearance and behaviour to little auks (dovekies) of Arctic seas, but the two are not closely related (auks are more closely related to gulls and terns). This is the most frequently cited example of convergent evolution among birds.

Burrow-nesting petrels have been removed from many traditional breeding sites by human-induced factors, especially the introduction of predatory mammals. Petrels have proven to be extraordinarily difficult to attract or restore to secure sites due to their strong philopatry, and low intrinsic rates of population growth. Translocation and/or attraction techniques are needed to establish additional populations of endangered petrels to restore species to part or all of their historic range and to restore the keystone role of petrels in terrestrial ecosystems. An attempted to restore a colony of Common Diving Petrels (*Pelecanoides urinatrix*) on Mana Island, New Zealand, by a combination of broadcasting vocalisations, and by transferring and hand-feeding nestlings until they fledged. Calls were broadcast at night almost continuously during 1993–2003, and 239 chicks were transferred during 1997–99. About half the chicks fledged, and 20 of these have returned to Mana Island, along with 51 unbanded birds. Fifteen of the returned chicks have bred on Mana Island, and at least 14 parent-reared chicks fledged in 2002 (Miskelly, C. & Taylor, G. 2004). Common diving petrels have been successfully transferred from Wooded Island to Motuora in the Hauraki Gulf (Gummer, Graham and Gardner-Gee, 2008).

After fledging, petrels have a prolonged period of juvenile development and do not begin breeding until they are 3-6 years old. There is therefore a long delay between nestling transfer and adult return; colonies literally take years to establish. Furthermore, a proportion of the 'transferred juveniles' never return because they die before reaching adulthood.

Potential interactions with other species

Re-establishing colonies of burrow-nesting seabirds, to provide marine-sourced nutrient input to the terrestrial ecosystem (droppings, regurgitations, failed eggs, corpses) and habitat (burrows) for invertebrates and reptiles, is considered to be of major ecological benefit to Ipipiri. Forest succession, soil quality and invertebrate and reptile abundance are likely to benefit from the successful reestablishment of a northern diving petrel colony. Habitat and resource creation for translocated companion species such as tuatara and sink is also advantageous. Adverse competition between oi/grey faced petrels and pakahā is not anticipated.

Translocated population dispersion - Inter-island/mainland mobility

Highly mobile – after fledging, northern diving petrels have a prolonged period of juvenile development and do not begin breeding until they are 3-6 years old. There is therefore a long delay between nestling transfer and adult return; colonies literally take years to establish. However, northern diving petrels are highly philopatric (site faithful) in that the great majority of birds return to their natal colonies to breed. A proportion of the 'transferred juveniles' never return because they die before reaching adulthood.

Translocation prerequisites

As a priority, the seabird restoration effort on Ipipiri should initially focus on encouraging seabirds to recolonise Ipipiri through habitat creation and social attractants. All the islands of Ipipiri contain sympathetic habitat for northern diving petrel. However, preliminary efforts to induce pakahā recolonisation should focus on sites less prone to pest incursion and human disturbance. Theoretically suitable colony sites should be selected and modified through appropriate revegetation to create favourable habitat incorporating social attractants. If after a number of years this method does not initiate colony reestablishment, then a programme to translocate appropriate northern diving petrel should be considered.

Habitat availability	Translocation composition	Recommend time frame for translocation
Okahu	200 to 250 chicks	From 2027 if unassisted recolonisation has not occurred
Waewaetorea	200 to 250 chicks	From 2027 if unassisted recolonisation has not occurred
Motuarohia	200 to 250 chicks	From 2027 if unassisted recolonisation has not occurred

Potential source populations	Tāngata whenua
Mauipae, Marotere (Coppermine, Hen and Chickens)	Ngātiwai

4. Land birds

A process to identify suitable land birds for translocation was implemented. Several endemic and native species are currently present. These include tūī (*Prosthemadera novaeseelandiae*), miromiro/tomtit (*Petroica macrocephala*), and mioweka/banded rail (*Gallirallus philippensis*). Since the eradication of mammalian pest the densities of these species have increased, and no supplementation is required. A number of other land bird species were considered for introduction, but were not included in the plan for various reasons. Kukupa (*Hemiphaga novaeseelandiae*) and mātātā/fernbird (*Bowdleria punctata*) were not recommended for introduction as they are expected to self-establish populations on Ipipiri in the long term. Twelve pāteke/brown teal (*Anas chlorotis*) were return to Urupukapuka in 2012, and the potential requirement to supplement the population has yet to be determined. In the long term kaka (*Nestor meridionalis*) may return naturally, but may to require a captive breeding programme to initiate formation, and should be considered separately to this plan. At this stage of ecological restoration, North Island weka (*Gallirallus australis greyi*) were not recommended because of the adverse impact this species can have on re-establishing invertebrates, reptiles and seabirds populations. As a result, ten species of land birds have been identified for translocation.

Toutouwai/North Island Robin

Scientific name: *Petroica longipes*
Conservation status: Not Threatened (2012)
Current recovery plan: None

Photos 6 & 7: Toutouwai/North Island Robin

The toutouwai occurs in forest and scrub habitats. It can be recognised by its erect stance and relatively long legs, and spends much time foraging on the ground. It is a territorial species, males in particular inhabiting the same patch of territory of 1-5 ha throughout their lives. Male are great songsters, particularly bachelors, singing loudly and often for many minutes at a time. Where toutouwai are regularly exposed to people, such as along public walking tracks, they become quite confident, often approaching to within a metre of a person sitting quietly.

The toutouwai is part of the local avifauna, and Ipipiri in the Eastern Bay of Islands is part of its range. There are no remnant toutouwai populations in Northland. Sixteen toutouwai were released on Moturua Island in February 1986 from the Mamaku Plateau, Bay of Plenty. Fourteen birds were found in June 1987 but only seven birds were found in 1989. On June 1994, a population of approximately 30 birds were estimated. Only 3 toutouwai were heard in 2008 and 2009, before the eradication of rats and stoats. Post eradication, 5 toutouwai were recorded in 2010, none in 2011 and 3 in 2012. A four day survey focused on toutouwai was also carried out in June-July 2012. The surveys indicated around 2-4 toutouwai. No birds were seen or heard on a one day survey was December 2013. The lack of population increase after pest eradication may be explained by the population being genetically unviable due to the effects of a bottleneck, genetic drift or inbreeding (Armstrong Doug, personal comment, 28 August 2013) or if predation or other sources of mortality led to a gender biased so that they cannot breed.

It is unlikely that toutouwai will disperse widely from the release islands (Wittern and Berggren, 2007). However, the establishment of a toutouwai population in the eastern Bay of Islands could provide a source population for future translocations to suitable sites within the region.

Potential interactions with other species

Possible dominance of miromiro/tomtit (*Petroica macrocephala*). Miromiro are present on Ipipiri, but this is not seen as an issue.

Translocated population dispersion - Inter-island/mainland mobility

Unlikely – Any new island population should be considered as potentially discrete. Toutouwai dispersal is highest amongst juveniles (Wittern and Berggren, 2007). Juvenile dispersal is highly dependent on habitat connectivity, with dispersal rates significantly reduced over distances greater than 60m between suitable habitat (Wittern and Berggren, 2007). With habitat connectivity between islands over 400m, it is believed the likelihood of dispersal is low.

Translocation prerequisites

Toutouwai can inhabit manuka/kanuka scrub through to deep forest. Suitable habitat exists on Ipipiri, and with revegetation and the natural restoration of large trees, toutouwai will benefit from the increase in nesting opportunities and resources. Toutouwai are territorial, and the size of their territories is dependent on ecosystem productivity. Toutouwai should only be translocated to sites that are large enough to form self-sustaining populations to minimise ongoing loss of genetic diversity.

Habitat availability	Translocation composition	Recommend time frame for translocation
Moturua	50 of even sex/age ratio	Completed June 2014 (43 transferred)
Urupukapuka	50 of even sex/age ratio	2018 – April/May
Rakaumangamanga	50 of even sex/age ratio	2024 - Once intensive/sustained pest management is in place

Potential source populations

Pureora - Hauhungaroa and Rangitoto Ranges
Mokoia Island – Rotorua
Tiritiri Matangi Island

Tāngata whenua

Rereahu Iwi
Te Arawa
Ngāti Manuhiri, Ngāti Maru, Ngāti Pāoa, Ngāti Tamaoho, Ngāti Tamaterā, Ngāti Te Ata, Ngātiwai, Ngāti Whanaunga, Te Kawerau a Maki, Te Marutūahu, Te Patukirikiri, Te Rūnanga o Ngāti Whātua, Ngāi Tai ki Tāmaki, Ngā Mana Whenua o Tāmaki Makaurau, Hauraki Collective

Tīeke/North Island Saddleback

Scientific name: *Philesturnus carunculatus rufusater*
Conservation status: At Risk - Recovering (2012)
Current recovery plan: None

Photo 8 & 9: Tīeke/North Island Saddleback

Tīeke are conspicuous and easily observed in regenerating scrub, forests and coastal forests. They call frequently, particularly in response to disturbance, and are very active, noisy foragers. They are about the size of a European blackbird. This species has weak powers of flight, and individuals are sedentary, carrying out all their activities of feeding, breeding and roosting in the same area of forest (Jenkins 1978). They need a range of cavities year round but will also use artificial roost and nest boxes if natural cavities are limited. They are primarily insectivorous but will also eat fruit, pollen and nectar. Although they hold their territories, or home areas, all year (Heather & Robertson 1996), they do not actively defend its boundaries by patrolling or skirmishing (Jenkins 1978). Rather, these territories appear to be the product of mutual avoidance behaviour mediated by very loud song. Tīeke were widespread at European contact, but rapidly declined on the mainland following the introduction of predatory mammals, especially ship rats and mustelids.

The tīeke was once part of the local avifauna, and Ipipiri is part of its former range. By the early 1900s, tīeke were confined to a single population on Taranga (Hen Island) off the northeast coast of the North Island. In the absence of rats and mustelids, tīeke can achieve high densities. A series of successful translocations was initiated by the New Zealand Wildlife Service in the 1960s, and there are now 15 island populations and several at predator-fenced mainland sites. Due to the small size of the single source population for these translocations, the genetic variability of the subsequent populations is limited.

In many translocations of birds (toutouwai, hihi) and other animals, the survival of individuals is typically higher following the first transfer than any subsequent transfers, and this is also true for tīeke (Powlesland & Parker 2013). To aid genetic diversity in the new population, it may be advantageous to source tīeke from two source population with different lineage back to the single natural population on Taranga (Hen Island). Birds from each source population could be mixed and released together, resulting in a broader genetic base to each new island founder population.

Tīeke are unlikely to disperse from the islands. The establishment of a tīeke population in the eastern Bay of Islands could provide a source population for future translocations to other suitable sites within the region.

Potential interactions with other species

Tīeke may have an impact on 'at risk' invertebrates and juvenile reptiles, and potentially other bird species that are still establishing, although direct evidence for this is currently lacking (K. Parker, pers. comm.). As a precaution, until introduced invertebrate and reptile populations are well established tīeke should not be transferred to the same sites.

Translocated population dispersion - Inter-island/mainland mobility

Limited – Dispersal is highly dependent on habitat connectivity as tīeke can only fly very short distances (approx. 200 metres). It may be possible for tīeke to transfer between some islands (Urupukapuka and Waewaetorea), but if required this could be mitigated for ecological conflicts.

Translocation prerequisites

Suitable habitat exists on Ipipiri, and with revegetation and the natural restoration of large trees, tīeke will benefit from the increase in nesting opportunities and resources. Self-sustaining populations require a minimum size of 100 hectares to minimise ongoing loss of genetic diversity (Parker. K pers. coms, 2014). Installation of pest-proof nest boxes and roost boxes will compensate for a shortage of natural cavities, and limit impacts from pest incursions.

Habitat availability	Translocation composition	Recommend time frame for translocation
Moturua	40 of even sex/age ratio	March/May 2015
Urupukapuka	40 of even sex/age ratio	March/May 2015
Rakaumangamanga	40 of even sex/age ratio	2028 - Once intensive/sustained pest management is in place

Potential source populations	Tāngata whenua
Mauimua (Lady Alice Island) - Whatupuke lineage birds	Ngātiwai
Tiritiri Matangi - Repanga (Cuvier Island) lineage birds	Ngāti Manuhiri, Ngāti Maru, Ngāti Pāoa, Ngāti Tamaoho, Ngāti Tamaterā, Ngāti Te Ata, Ngātiwai, Ngāti Whanaunga, Te Kawerau a Maki, Te Marutūahu, Te Patukirikiri, Te Rūnanga o Ngāti Whātua, Ngāi Tai ki Tāmaki, Ngā Mana Whenua o Tāmaki Makaurau, Hauraki Collective

Pōpokotea/Whitehead

Scientific name: *Mohoua albicilla*
Conservation status: Not Threatened (2012)
Current recovery plan: None

Photos 10 & 11: Pōpokotea/Whitehead

Pōpokotea are gregarious songbirds that live in noisy groups that are often heard before they are seen. They are insectivorous and widespread in a wide range of forest types throughout much of the North Island. They eat invertebrates, fruit, pollen and nectar. Pōpokotea are the only North Island hosts for the koekoea/long-tailed cuckoo (*Eudynamys taitensis*). Their numbers have been in decline, and there are no remnant populations found in Northland. They have been successfully translocated to several islands and discreet mainland sites. The outcome of translocations to large contiguous habitats is unclear.

Pōpokotea are part of the local avifauna, and Ipipiri is part of its former range. The introduction of pōpokotea will improve dispersal of local small fruiting flora. Small berries can be a significant part of the pōpokotea's diet and Ipipiri is missing several species of the small bush birds which previously would have performed this role e.g. hihi, kākāriki, korimako. As pōpokotea can inhabit a wide range of forest types a translocation to Ipipiri should be successful (K. Parker, pers. comm.). A translocation of pōpokotea from Tiritiri Matangi Island to Moturoa Island in the western side of the Bay of Island was carried out in 2011. It is improbable that a self-populating colony of pōpokotea will establish onto Ipipiri from Moturoa Island. It is also unlikely that the Moturoa population will establish quickly enough to allow a sustainably harvested for translocation to Ipipiri with in the timeframes of this plan. Therefore an alternative remnant or high genetic variance population is recommended for translocation to Ipipiri. The establishment of another population in the Bay of Islands would increase the range of the species, and provide another potential source population for the region.

In many translocations of birds (tīeke, toutouwai, hihi) and other animals, the survival of individuals is typically higher following the first transfer than any subsequent transfers, and this is also true for pōpokotea (Powlesland & Parker 2013). There may be several reasons for this, including the proportion and age of juveniles being transferred, the presence at the release site of conspecifics (i.e. other birds of the same species) from an earlier release, better survival and greater dispersal. However, this does suggest that there is probably merit in planning to carry out a single large translocation of pōpokotea, rather than transferring the same number of birds over two or more translocations to the same release site (Empson 2004). An exception to this would be where birds are being translocated to larger blocks of forest with greater habitat connectivity, and where dispersal beyond a managed area is likely to be a problem e.g. Rakaumangamanga.

Potential interactions with other species

No adverse effects. However, pōpokotea are the only North Island hosts for the koekoea/long-tailed cuckoo (*Eudynamys taitensis*). Long-tailed cuckoo are part of the local avifauna and visit the Bay of Islands. The establishment of a pōpokotea population in the Eastern Bay of Islands provides the opportunity for the brood-parasitic habit of the long-tailed cuckoo, or for a long-tailed cuckoo translocation (eggs/chicks) to Ipipiri in the future.

Translocated population dispersion - Inter-island/mainland mobility

Limited – Any new island population should be considered as potentially discrete (apart from Moturua and Motukiekie). Pōpokotea are good fliers, but dispersal is highly dependent on habitat connectivity and is likely to be limited over open water. There are no records of pōpokotea dispersing from Tiritiri Matangi to the adjacent mainland following release in 1990 and 1991, nor have there been any subsequent reports, despite a very dense population of pōpokotea on Tiritiri Matangi, and presumably high competition for habitat.

As natural inter-island dispersion is unlikely, pōpokotea will need assistance to form new island populations. This may be achieved by assisted island transfers, or translocations of new founder populations from alternative source to assist genetic diversity.

Translocation prerequisites

Suitable habitat exists on Ipipiri, and with revegetation and the natural restoration of large trees, pōpokotea will benefit from the increase in nesting opportunities and resources.

Habitat availability	Translocation composition	Recommend time frame translocation and origin
Motuarohia	40 to 50 of even sex/age ratio	March/April 2015 – subject to a Tiritiri Matangi assessment
Urupukapuka	40 to 50 of even sex/age ratio	March/April 2016
Moturua	40 to 50 of even sex/age ratio	March/April 2016
Rakaumangamanga	40 to 50 of even sex/age ratio	2019 – subject to intensive/sustained pest management

Potential source populations	Tāngata whenua
Tiritiri Matangi Island	Ngāti Manuhiri, Ngāti Maru, Ngāti Pāoa, Ngāti Tamaoho, Ngāti Tamaterā, Ngāti Te Ata, Ngātiwai, Ngāti Whanaunga, Te Kawerau a Maki, Te Marutūahu, Te Patukirikiri, Te Rūnanga o Ngāti Whātua, Ngāi Tai ki Tāmaki, Ngā Mana Whenua o Tāmaki Makaurau, Hauraki Collective
Te Hauturu-o-Toi (Little Barrier Island)	Ngāti Manuhiri, Ngātiwai, Ngāti Rehua
Pureora	Rereahu Iwi

Northland Brown Kiwi

Scientific name: *Apteryx mantelli*
Conservation status: Threatened - Nationally Vulnerable (2012)
Current recovery plan: Kiwi (*Apteryx spp.*) recovery plan, 2008–2018. S. Holzapfel; H.A. Robertson; J.A. McLennan; W.Sporle; K. Hackwell; M. Impey Threatened Species Recovery Plan 60.

Photos 12 & 13: Northland Brown Kiwi

North Island brown kiwi are the only kiwi in the wild in the North Island. They inhabit native forest and scrub, pine forests, rough farmland from sea level to 1400 m north of the Manawatu Gorge. Kiwi are flightless, with tiny vestigial wings and no tail. They have a long pale bill, short dark legs and toes, often with dark claws. Their feather tips feel spiky, and are dark brown, streaked lengthways with reddish brown and black. As they are nocturnal, therefore more often heard than seen. Male gives a repeated high-pitched ascending whistle, whilst the female gives a deeper throaty cry.

North Island Brown kiwi have been classified into four genetically and geographically isolated taxa: Northland, Coromandel, Eastern and Western North Island. Northland brown kiwi have their own genetic makeup, behaviour and ecology and are slightly larger and heavier than the three other brown kiwi taxa. The Northland taxa includes kiwi in both the Northland and Auckland regions. Further genetic differences are likely to occur within the Northland brown kiwi taxa.

Northland brown kiwi once lived all over Northland, probably from the Aupouri peninsula to the Auckland region. By the 1970s, kiwi range was limited to mostly forest and shrubland areas between Awanui and the Brynderwyns and a decade later, kiwi were locally extinct in many areas. This was largely caused by predation from introduced mammals. In 1996, it was estimated that North Island kiwi abundance had probably declined by at least 90% during the previous century. In 2008, their population was calculated at around 8000 birds, living in 25 broad clusters.

Northland brown kiwi eat mostly invertebrates such as insect larvae, weta, crickets, centipedes, moths, worms and spiders and may include occasional fruit, berries and leaves. The birds usually pair bond for life, with males generally preparing the nest and incubating eggs. Northland brown kiwi typically lay eggs in June and July, with a second clutch laid from October to December. They can breed successfully at just one year old, although three to five years is more

common. Adults are territorial and will stay in an area as long as the habitat is suitable. Their territory will usually overlap with that of their mate. Territories are maintained through calling and aggression. Territory location is important for kiwi as they lose condition without ready access to water.

Translocation of Northland brown kiwi to offshore islands started in the 1890s with birds translocated to Kawau Island. In recent years kiwi have been transferred onto a further nine islands in the Northland and Auckland regions. Translocations have generally occurred in an ad hoc manner which has given rise to a number of issues ranging from islands hosting mixed provenance kiwi, to unmanaged populations some with a lack of genetic diversity (Craig, Gardiner, Renwick, & Sporle, 2011).

Northland brown kiwi are part of the local avifauna, and Ipipiri is part of its range. A small remnant Northland brown kiwi population is found on Rakaumangamanga, and there are two translocated populations on the islands of Ipipiri. Moturua and Motuarohia kiwi population were founded in the 1970s and 1980s with kiwi rescued from mainland forest sites about to be cleared in the wider Bay of Islands area. Ad hoc translocations occurred by transferring very small numbers of kiwi to each island. It is believed there were only four founder individuals on Motuarohia, and fourteen on Moturua. A survey carried out in 2006 estimated about 30 pairs and a small number of chicks and juveniles on Moturua, and about 15 pairs and possibly four to eight juveniles/chicks on Motuarohia. Because of potential inbreeding as a result of very small founding populations and lack of bird dispersal, the islands populations could be affected by a loss of genetic diversity (bottlenecking).

The management of existing island populations and any potential new island populations need to be assessed separately. To support healthy self-sustaining kiwi populations on Moturua and Motuarohia, it is necessary to remove kiwi with high kinship (and therefore with limited genetic diversity) from the islands and replace them with new bloodlines from the mainland. A significant amount of stakeholders' involvement and liaison is required to effectively manage island kiwi. Any kiwi translocation cannot occur without obtaining advice from the Kiwi Recovery Group on complex issues such as island suitability and genetics.

The outcomes of suitable new island populations could include advocacy, Bay of Islands' species management, and support towards broader Northland population management. Northland kiwi restoration projects could be enhanced by actively managing kiwi populations on Ipipiri. Kōhanga kiwi and kiwi crèche sites can be useful tools to enhance mainland population recruitment. Kōhanga kiwi are sites where kiwi populations are allowed to grow in size to carrying capacity, which are then cropped to establish new or enhance existing populations. Kiwi crèche sites are only for captive-hatched or wild chicks held until they reach approx. 1200g at which they are considered to have a better chance of survival to stoat predation in the wild. Both kōhanga and crèche sites can be either intensively managed areas or predator free islands acting as a source of kiwi used to restore declining populations or to establish new populations in their historic range. They are differentiated by the fact that kōhanga have a permanent, self-sustaining kiwi population. Crèche sites are transitory 'safe havens' for chicks which are often used to support mainland projects by supplementing recruitment in years when conventional predator control is failing or to start new populations. The suitability of kōhanga and crèche have to be assessed against the potential species management outcomes, stakeholder engagement, and the long term management resourcing requirements.

Potential interactions with other species
Kiwi may compete or harm endangered invertebrates or reptiles present or likely to be translocated to the same sites.

Translocated population dispersion - Inter-island/mainland mobility
None – Flightless. Any new island population should be considered as discrete.

Translocation prerequisites
Islands over 100ha have a greater carrying capacity and they can hold more founding individuals which would decrease the risk of inbreeding and bottlenecking. Smaller islands cannot support permanent kiwi populations but they could

be valuable as crèche sites. Suitable habitat providing sufficient food, nesting and burrow sites as well as streams or swamps with damp soil available to kiwi in drought conditions.

Habitat availability	Translocation composition	Recommend time frame for translocation
Urupukapuka	Min 40 birds of even sex ratio	2016 – subject to assessment
Moturua	To be determined	To be determined
Motuarohia	To be determined	To be determined

Potential source populations
To be determined

Tāngata whenua
To be determined

Kākāriki/Red Crowned Parakeet

Scientific name: *Cyanoramphus n novaezelandiae*
Conservation status: At Risk – Relict (2012)
Current recovery plan: None

Photos 14 & 15: Kākāriki/Red Crowned Parakeet

The three species of kākāriki or New Zealand parakeets are the most common species of parakeet in the genus *Cyanoramphus*, family *Psittacida*e. The three species on mainland New Zealand are the Yellow-crowned Parakeet, *Cyanoramphus auriceps*, the Red-crowned Parakeet or Red-fronted Parakeet, *C. novaezelandiae*, and the critically endangered Malherbe's Parakeet (or Orange-fronted Parakeet), *C. malherbi*.

Red crowned parakeets, *Cyanoramphus novaezelandiae* (hereafter kākāriki), are scarce on mainland New Zealand, but they continue to survive in good numbers on various offshore islands. Kākāriki target flax, beech, grass, and tussock seed, but will also eat fruits, leaves, flower buds, young shoots, nectar, and exotic seed. They spend considerable time feeding on the ground and are especially vulnerable to cats and stoats.

Kākāriki are part of the local avifauna, and Ipipiri is part of its range. The grassland/coastal habitats of Ipipiri are ideal for red-crowned parakeet, and the birds could potentially thrive. Kākāriki are frequent visitors to the forests of the Whangaruru Ecological District including, Tutukaka to Ngunguru, Mount Tiger, and Russell Forest (Booth 2005). However, it is unlikely in the near future that kākāriki will make their own way back to Ipipiri in large enough numbers to form a sustainable breeding population.

Kākāriki have been translocated to new sites by wild to wild translocation, or a combination of wild to wild and captive to wild translocation (R Collen et al 2013). Direct translocation of kākāriki from source to release site and immediate release is the most commonly used technique to establish new populations (wild to wild hard release). Typically one or two transfers of a large number of birds have been carried out to establish a population at a suitable release site. At this stage it is unknown how many birds should be transferred to ensure the population will have sufficient genetic

diversity to persist long term; something that must be considered when planning a translocation (R Collen et al 2013). Translocation projects can involve captive breeding of kākāriki and release of offspring (captive soft release). This type of translocation is more likely to have benefits for a mainland release site where dispersal into adjacent habitat might be an issue. The limitations of the captive to wild translocation technique make it more likely to be used in conjunction with a wild to wild translocation (i.e. it is just one of the tools that can be used to achieve a specific goal).

As a result of the adjacent mainland habitat, the high mobility and the philopatric tendencies of kākāriki, it is probable that a combination of wild to wild and captive to wild translocation techniques will be required to re-establish birds back on Ipipiri. The initial founders (about 30) will be held in an aviary, and their offspring will be released until a robust population establishes in the wild. Kākāriki breed very well in captivity and their offspring can then be transferred to temporary island aviaries before their release.

The source birds must be of known wild origin and genetic provenance, as hybridisation of red- and yellow-crowned kākāriki has occurred in captivity in the past (R Collen et al 2013). The existing large, widespread captive population of red-crowned and yellow-crowned kākāriki is not suitable for translocations into the wild and cannot be considered for wild releases. Kākāriki on Tiritiri Matangi, Moutuhora (Whale) and Repanga (Cuvier) Islands are not considered suitable as a source for translocation. This is because they were established from captive-bred stock that were hybridised with yellow-crowned parakeets (Cromarty & Hitchmough 2005).

Potential interactions with other species

No adverse effects – possible limitation for future translocations of orange-fronted Parakeet (*C. malherbi*) due to potential hybridisation. The introduced Eastern rosella (*Platycercus eximius*) found on Ipipiri are known to compete for resources with kākāriki.

Translocated population dispersion - Inter-island/mainland mobility

High mobility – Once released, translocated kākāriki appear to quickly establish a breeding population with minimal management needed after release (Ortiz-Catedral et al 2010). However, there is potential for kākāriki to disperse at sites that have suitable habitat nearby. A number of techniques have been trialled in an effort to try to anchor the birds to the release site, including supplementary feeding, installation of nest boxes, sound anchoring. However, the success of these techniques to anchor birds to release sites has not been adequately assessed (R Collen et al 2013).

Translocation prerequisites

Suitable habitat exists on Ipipiri, and with revegetation and the natural restoration of large trees, kākāriki will benefit from the increase in nesting opportunities and resources. Due to the high mobility and the philopatric tendencies of kākāriki, it is likely that the birds will be re-established back on Ipipiri using a combination of wild to wild and captive to wild release techniques. There will be a requirement to gain captive breeding skills, develop adequate aviaries, and source suitable birds for captive breeding. Predator-proof nest boxes for kākāriki will be scattered throughout Project Island Song to aid release site anchoring and limit the implications of a pest incursion. The requirement to use other anchoring techniques (supplementary feeding, sound anchoring) to limit bird dispersal from the release sites will need to be assessed before each translocation.

Habitat availability	**Translocation composition**	**Recommend time frame for translocation**
Urupukapuka	40 of even sex ratio	2017 - captive population - sourced and housed
Moturua	40 of even sex ratio	Dependent on success of previous release
Motuarohia		
Motukiekie		
Rakaumangamanga		Once intensive/sustained pest management is in place

Potential source populations	**Tāngata whenua**
Te Hauturu-o-Toi (Little Barrier Island)	Ngāti Manuhiri, Ngātiwai, Ngāti Rehua
Taranga Island, Marotere (Hen, Hen and Chickens)	Ngātiwai

Takahē/South Island Takahē

Scientific name: *Porphyrio [Notornis] hochstetteri*
Conservation status: Threatened Nationally - Critical (2012)
Current recovery plan: Takahe (*Porphyrio hochstetteri*) recovery plan. C. Wickes; D. Crouchley; J. Maxwell (Plan 61)

Photos 16 & 17: Takahē/South Island Takahē

The extinct North Island takahē was likely once part of the local avifauna. The South Island takahē is an analogue species for the North Island takahē, meaning it is the best fit to fill the same ecological niche. The South Island takahē (hereafter takahē) is a rare relict of the flightless, vegetarian bird fauna which once ranged the South Island. Four specimens were collected from Fiordland between 1849 and 1898, after which takahē were considered to be extinct until famously rediscovered in the Murchison Mountains, west of Lake Te Anau, in 1948. Until the 1980s, takahē were confined in the wild to the Murchison Mountains. Mustelids are major predators of takahē. Takahē are also susceptible to chance events, disease outbreaks, low population size, low productivity, and fire. The takahē has the most critical conservation status, and is covered by a recovery plan (Wickes et al 2009). Conservation work by the Department of Conservation and community groups aims to prevent extinction and restore takahē to sites throughout their original range. The takahē population in 2011-12 was approximately 276 birds, with 110 in Fiordland, 107 at restoration sites, 11 at captive display sites, and 48 at the captive breeding site.

Takahē live in pairs or small family groups. Young stay with parents until just before the next breeding season, or stay for second year. Unusual cases of breeding trios or greater (two females laying) have been observed. Pairs defend their breeding territory by calling, or fighting if necessary, returning to the same areas each year. Where pasture is available all year round takahē will feed on grasses. The grasses are grazed from the tips down. When available, grass seeds are stripped from the stem while still attached. Takahē opportunistically take protein in the form of large invertebrates (moths, beetles, weta), or very rarely will take ducklings or reptiles.

Initial discussion with the Takahē Recovery Group would suggest that the introduction of takahē to Ipipiri is in line with the criteria set out in the recovery plan. Takahē numbers on island/mainland reserves are managed by the removal of surplus young. This method both limits population density to a suitable level and avoids inbreeding by mixing genetic lines between different sites. At the takahē captive breeding facility, puppet rearing is now redundant and artificial incubation is minimised. Instead, the enlarged breeding group is intensively managed through egg and chick fostering, ensuring each pair is laying, incubating good eggs or raising chicks. Genetic lines are managed to ensure none is over-represented. The numerous islands in close proximity with suitable takahē habitat is sighted as a potential benefit to aid species management and viability (Genet M pers. coms. 2013). The source and timing of the introduction of takahē to Ipipiri will be dependent on the availability of suitable birds and requirements set out by the Takahē Recovery Group.

Potential interactions with other species

Takahē have shown aggressive intraspecific competition for territories. Aggressive interactions with other species is limited and not seen as a concern. The implications of takahē predation on rare invertebrates or reptiles is also

negligible. Potential nest disturbance and chick predation by pukeko (*Porphyrio porphyrio melanotus*) has required pukeko populations to be managed at restoration sites (Speed H pers. coms. 2014)

Translocated population dispersion - Inter-island/mainland mobility
None – Flightless. Any new island population should be considered as discrete.

Translocation prerequisites
Suitable pasture habitat exists at a number of sites across Ipipiri. As takahē are vulnerable to mustelids, until the long term viability to restrict pest incursions can be proven, the placement of takahē may be initially limited to sites further offshore less prone to incursion (e.g. Waewaetorea). Although dog access to Crown Reserves on Ipipiri is restricted, there are currently no restrictions to dog access below the mean high-water mark. Due to the potential for takahē predation by dogs, there may be a requirement to amend relevant bylaw legislation to restrict dog access. To aid protect and limit overland dispersal, infrastructure may be required to contain takahē within restoration sites.

Habitat availability	**Translocation composition**	**Recommend time frame for translocation**
Waewaetorea	To be determined	2018 subject to Recovery Group
Urupukapuka	To be determined	2022 subject to Recovery Group

Potential source populations
Takahē Recovery Group

Tāngata whenua
Ngāi Tahu

Tītipounamu/North Island Rifleman

Scientific name: *Acanthisitta chloris granti*
Conservation status: At Risk - Declining (2012)
Current recovery plan: None

Photos 18 & 19: Tītipounamu/North Island Rifleman

The tītipounamu is generally considered to be New Zealand's smallest bird (the equally light-weight riroriro/grey warbler has a longer tail). It is one of only two surviving species within the ancient endemic New Zealand wren family. Tītipounamu are small forest-dwelling insectivores, and are constantly on the move, producing a characteristic 'wing-flicking' while moving through the canopy and foraging up and down tree trunks. In the North Island tītipounamu survives as geographically isolated populations on North Island mountain ranges, with only three populations north of Pureora Forest (Warawara Forest in Northland, and on Te Hauturu-o-Toi and Tiritiri Matangi Islands).

Tītipounamu was once part of the local avifauna, and Ipipiri is part of its former range. Finding an appropriate source population for Ipipiri may be problematic. Research indicates that the large populations across the North Island can have highly divergent lineages, and may have been separated for millions of years (S. Withers pers. comm.). The most relevant source population for Ipipiri is a low density population of Warawara Forest, which is the only remnant population in Northland. It is probable the Warawara population has a highly distinct lineage from other North Island

populations, and could potentially be a separate sub-species. Research into the lineage population density and comparison release site suitability (e.g. Puketi Forest) is required before a translocation could be considered. If a translocation from Warawara is considered both culturally and scientifically appropriate, the new population on Ipipiri could be a useful back up for this remnant Northland population.

A population found on Te Hauturu-o-Toi (Little Barrier Island) is fragile and low in density. In addition, this tītipounamu population is very different from the rest of the mainland and has extremely low genetic diversity, resulting in it not being an ideal source site for any further translocations. The establishing Tiritiri Matangi population could be a potential source site in the long term (once the population has established and increased in density), however it has almost no genetic diversity limiting its suitably (S. Withers pers. comm.).

Potential interactions with other species

Observations of korimako (*Anthornis melanura*) aggression toward tītipounamu (*Acanthisitta chloris granti*) in a translocated population have been recorded (S. J. Withers, 2009). This may only be a problem in an establishing population of tītipounamu. Therefore translocating tītipounamu into an established korimako population should be avoided.

Translocation prerequisites

Suitable habitat exists on Ipipiri, and with revegetation and the natural restoration of large trees, tītipounamu will benefit from the increase in nesting opportunities and resources. Research is required to determine the suitability of the Warawara tītipounamu as a good genetic source for Ipipiri. It is anticipated that under current circumstances this will be achieved by 2019. It will also be necessary to survey the Warawara birds to make sure there are adequate birds that can be harvested, without making the remaining population unsustainable. The habitat suitability of Ipipiri for translocation in comparison to other relevant Northland sites (e.g. Puketi Forest) also has to be evaluated.

If a translocation was to be carried out, 30-50 predator-proof nest boxes will be erected for tītipounamu in the release site forest. The nest boxes will limit predation by an incursion of rats, compensate for the shortage of natural crevices and holes in what is currently a structurally simple forest, and make it easy for observers to monitor the population trends of tītipounamu on Ipipiri over coming years.

Translocated population dispersion - Inter-island/mainland mobility

None – Any new island population should be considered as discrete. Tītipounamu will not disperse between islands (S. Fordham pers. comm.). Although tītipounamu are average-to-good fliers they do not disperse from release sites rapidly, and will not traverse open spaces between suitable vegetation. Observations after translocation to Tiritiri Matangi show that the original birds remained close to the release site (less than 300m), and dispersal was generationally driven (S. Fordham pers. comm.).

Habitat availability	**Translocation composition**	**Recommend time frame for translocation**
Moturua	40/50 of even sex/age ratio	2019 once required genetic/population assessed
Urupukapuka	40/50 of even sex/age ratio	Subject to availability of source population
Rakaumangamanga	40/50 of even sex/age ratio	As above, and intensive/sustained pest management

Potential source populations	**Tāngata whenua**
Warawara (preferred source if viable)	Te Iwi o Te Rarawa
Tiritiri Matangi	Ngāti Manuhiri, Ngāti Maru, Ngāti Pāoa, Ngāti Tamaoho, Ngāti Tamaterā, Ngāti Te Ata, Ngātiwai, Ngāti Whanaunga, Te Kawerau a Maki, Te Marutūahu, Te Patukirikiri, Te Rūnanga o Ngāti Whātua, Ngāi Tai ki Tāmaki, Ngā Mana Whenua o Tāmaki Makaurau, Hauraki Collective
Hauturu-o-Toi (Little Barrier Island)	Ngāti Manuhiri, Ngātiwai, Ngāti Rehua

Korimako/Bellbird

Scientific name: *Anthornis melanura*
Conservation status: Not Threatened (2012)
Current recovery plan: None

Photos 20 & 21: Korimako/Bellbird

Korimako are the most widespread and familiar honeyeater in the South Island, and is also found in parts of the North Island. Korimako disappeared from the Northland and Auckland mainland regions in the 1860s for unknown reasons. It has been suggested that an unknown disease may have caused this decline. Populations have persisted in many other areas on the mainland, despite habitat modification and introduced mammalian predators (Heather and Robertson, 1996). Their numbers recovered somewhat from about 1940 onwards, but they are almost completely absent on the mainland north of Hamilton, and are still rare in parts of Wellington, Wairarapa and much of inland Canterbury and Otago. Korimako tend to nest in trees, and prefer trees with dense foliage for cover. They are known to mate with the same partner year after year, and the pair maintains the same breeding territory each year. Although they have a brush-like tongue which is used to reach deeply into flowers to reach nectar bellbirds also feed on fruits and insects. In feeding on nectar they play an important ecological role in pollinating the flowers of many native trees and shrubs. Subsequently, when feeding on the fruits that result from this pollination they have a role in dispersing the seeds, and so they assist in the regeneration of the forest in at least two ways.

Very few korimako translocations have been attempted, and to date these translocation have resulted in limited success. Korimako are also highly mobile. Banded birds have moved up to 10 km, but they are likely to move greater distances when searching for concentrated food source during winter. Due to their mobility, once suitable habitat becomes available korimako have been recorded to re-establish without assistance (Gardner-Gee, R. et al 2007). Birds that naturally recolonised Tawharanui (North Auckland) are believed to have flown from Little Barrier Island 23 km away (Parker K, pers. coms. 2014).

The korimako is part of the local avifauna, and Ipipiri is part of its former range. Potentially there is at least one subspecies of korimako that could have once been found in the ecological district (Booth 2005). Infrequent sightings might suggest that a transient or a very low density population may be present on Rakaumangamanga (Cape Brett). Over time as suitable habitat becomes available, korimako may re-establish on Ipipiri without assistance. Natural recolonisation would likely result in the closest resemblance to any previous subspecies that could have once been found on Ipipiri. However, if by a set date korimako have not naturally re-established a translocation should be implemented, as the species will improve the ecology function by returning a key pollinator and seed disperser to the islands. Postponing a korimako translocation may also let other translocated species to establish unhindered (tītipounamu), and potentially allow for improvements in translocation methodologies to be tested and implemented.

Potential interactions with other species

Korimako are dominated by tui at some seasonally important food sources such as nectar. This is when the dominance hierarchy, with male tui are at the top followed by female tui, then male and female korimako, is most obvious. While

dominance at some food sources may be seasonally important, the two species occupy different niches (Angehr 1986) and both species have a long history of coexistence on the mainland and many islands.

Observations of korimako aggression toward tītipounamu (*Acanthisitta chloris granti*) in a translocated population have been recorded (S. J. Withers, 2009). This may only be a problem in an establishing population of tītipounamu. Therefore translocating tītipounamu into an established korimako population should be avoided.

Translocated population dispersion - Inter-island/mainland mobility
Mobile - once established, as korimako are good flyers it is likely they will spread to other islands and the mainland. Korimako can be difficult to translocate successfully due to a high dispersal rate. Subsequent transfers may be required to successfully establish a population. However, by adopting methodology and learnings from past translocations of this species, the threat of dispersal can be minimised.

Habitat availability	**Translocation composition**	**Recommend time frame for translocation**
Urupukapuka	40 to 60 of even sex/age ratio	March/April 2025 if not naturally recolonised

Potential source populations	**Tāngata whenua**
Tawhiti Rahi (Poor Knights Islands)	Ngātiwai
Taranga Island, Marotere (Hen Island, Hen and Chickens)	Ngātiwai
Te Hauturu-o-Toi (Little Barrier Island)	Ngāti Manuhiri, Ngātiwai, Ngāti Rehua
Tawharanui	Ngāti Manuhiri
Tiritiri Matangi Island	Ngāti Manuhiri, Ngāti Maru, Ngāti Pāoa, Ngāti Tamaoho, Ngāti Tamaterā, Ngāti Te Ata, Ngātiwai, Ngāti Whanaunga, Te Kawerau a Maki, Te Marutūahu, Te Patukirikiri, Te Rūnanga o Ngāti Whātua, Ngāi Tai ki Tāmaki, Ngā Mana Whenua o Tāmaki Makaurau, Hauraki Collective

Kōkako/North Island Kōkako

Scientific name: *Callaeas cinerea wilsoni*
Conservation status: At Risk - Recovering (2012)
Current recovery plan: North Island kokako recovery plan. J. Innes; I. Flux 1999. Threatened Species Recovery Plan 30

Photos 22 & 23: Kōkako/North Island Kōkako

With their extraordinary haunting song, and obscure evolutionary relationships to other birds, North Island kōkako (hereafter kōkako) evoke the forests of ancient New Zealand perhaps more than any other species. More likely to be heard than seen, North Island kōkako have persisted in small populations particularly in the central North Island from the King Country through to Te Urewera National Park. They characteristically reside in tall, diverse native forest, usually with a canopy of tawa or taraire with emergent podocarps or kauri. Kōkako have successfully bred in planted diverse shrub- and tree- hardwoods on Tiritiri Matangi Island.

As omnivorous feeders, Kōkako consume fruits, foliage, nectar and insects (Rasch 1992), and can spread the seeds and fruits of native trees. Kōkako are a forest inclined-bird, and their behaviour makes this species less adaptable to a changing environment. Adult birds are known to defend large and exclusive territories as individuals or as pairs. This means that kōkako often require large non-fragmented areas of forest to maintain population stability (Rasch 1992). Predation at nests by ship rats and possums is the primary cause of current declines of kōkako. Food reduction mainly by possums and predation by stoats are unhelpful secondary factors. All current populations must be continually managed against introduced mammal pests, either by repeated pest control on the mainland, or by vigilance against pest invasion on islands. Ship rats and possums are routinely targeted by trapping and poisoning so that their numbers are low for the duration of the breeding season (November to February). Food supply influences the number of breeding attempts that kōkako make, but nest predators determine the outcomes of these attempts. In addition kōkako are threatened by the destruction of continuous forest, small population size (genetic bottlenecks), inbreeding, fire, chance events, and disease (e.g. *aspergillosis*).

Several key populations are being restored primarily by community groups. Maintenance of genetic health also influences management; e.g. new populations are established with individuals from two different source populations. The conservation status of this species was moved from nationally vulnerable to 'at risk - recovering' in 2012.

Kōkako was once part of the local avifauna, and Ipipiri is part of its former range. Few remnant Northland kōkako populations remain (e.g. Mataraua Forest). Recent translocations to reinstate kōkako have been carried out at Puketi Forest. Ipipiri island release sites were considered in this assessment, but rejected because the amount of available habitat on the islands is considered insufficient to allow sustainable populations of these species to be achieved. Even if a kōkako population was able to establish on one of the islands, intensive management would be required to ensure genetic variability was maintained. Potential suitable habitat could be available on Rakaumangamanga once sufficient pest management is in place. As a release site Pukehuia would likely have more to offer in the range of food to sustain kōkako throughout the year (Mcmanus S. pers. coms. 2014).

Potential interactions with other species
No adverse effects

Translocated population dispersion - Inter-island/mainland mobility
Although kōkako cannot fly very far, they are experts at flying through the bush by bouncing and fluttering between trees. They can travel long distances in areas of unbroken bush, and travel outside of pest control areas. Kōkako would have to be encouraged to stay within pest managed areas using call playback systems, and having suitable trees to feed on.

Translocation prerequisites
Suitable habitat could be provided at Pukehuia on the Cape Brett Peninsular, and with revegetation and the natural restoration of large trees, kōkako will benefit from the increase in nesting opportunities and resources. Extensive habitat regeneration may also aid release site anchoring. However, large areas of forest have to be under intensive pest management before a translocation of kōkako could be considered.

Habitat availability	**Translocation composition**	**Recommend time frame for translocation**
Rakaumangamanga	20 pairs	2029 – subject to intensive/sustained pest management

Potential source populations	**Tāngata whenua**
Mataraua Forest	Ngai Tawake ki te Waoku
Mauimua, Marotere (Lady Alice, Hen and Chickens)	Ngātiwai

Hihi/Stitchbird

Scientific name: *Notiomystis cincta*
Conservation status: Threatened - Nationally Vulnerable (2012)
Current recovery plan: Hihi/stitchbird (*Notiomystis cincta*) recovery plan 2004–09. 2005. Plan 54

Photos 24 & 25: Hihi/Stitchbird

The hihi was both rare and poorly known until the 1990s, as few people had an opportunity to visit the single remnant population on Te Hauturu-o-Toi (Little Barrier Island). However, thanks to successful conservation management and research, the hihi is now one of the better studied New Zealand bird species, and can be seen at several accessible translocation sites. Hihi are often curious, approaching people for close examination whilst emitting warning calls; yet the calls' high pitch, and the bird's rapid movements and colouration can make them hard to detect. Until 2006 the hihi was considered to be a honeyeater (Family *Meliphagidae*), which includes tui and bellbird and c.100 other Australasian and Pacific species. However, genetic studies showed that the hihi belongs to a family of its own (*Notiomystidae*), closest to the New Zealand wattlebirds (*Callaeidae*, comprising huia, kokako and saddlebacks). The hihi has a complex and unusual breeding system that includes pair and group nesting as well as promiscuity. They use a variety of mating positions and strategies that, when considered together, are unique to the bird world.

Hihi was once part of the local avifauna, and Ipipiri is part of its former range. Hihi eat mainly nectar, but will also eat fruits and invertebrates if needed. Without significant and prolonged artificial feeding, the islands of Ipipiri alone do not currently have the required vegetation to produce the nectar, and are too small to hold a hihi population large enough to form a self-sustaining breeding group. Rakaumangamanga could provide a more suitable environment for hihi once the level of pest animals is low enough to allow the birds to establish a sustainable population. Whilst establishing a separate population on Rakaumangamanga would provide another source for future harvesting, such a release would probably mainly be conducted for conservation advocacy reasons.

Potential interactions with other species
No adverse effects - The translocation of hihi would not restrict options for the introduction of other species. Although now known to be not closely related to korimako, the hihi overlaps with korimako in some aspects of its feeding ecology (Angehr 1986).

Translocation prerequisites
Suitable habitat could be provided on Rakaumangamanga, and with revegetation and the natural restoration of large trees, hihi will benefit from the increase in nesting opportunities and resources. Extensive habitat regeneration may also aid release site anchoring. However, as with other release sites hihi may need to be maintained on Rakaumangamanga by supplementary feeding. In addition, large areas of forest have to be under intensive pest management before a translocation of hihi could be considered.

Translocated population dispersion - Inter-island/mainland mobility
Hihi will travel can long distance each day in search for their preferred food source, so they can disperse easily to outside of pest controlled areas.

Habitat availability	Translocation composition	Recommend time frame for translocation
Rakaumangamanga	40 to 50 of even sex/age ratio	2030 - suitable habitat/intensive pest management is in place

Potential source populations
Te Hauturu-o-Toi (Little Barrier Island)
Tiritiri Matangi Island

Tāngata whenua
Ngāti Manuhiri, Ngātiwai, Ngāti Rehua
Ngāti Manuhiri, Ngāti Maru, Ngāti Pāoa, Ngāti Tamaoho, Ngāti Tamaterā, Ngāti Te Ata, Ngātiwai, Ngāti Whanaunga, Te Kawerau a Maki, Te Marutūahu, Te Patukirikiri, Te Rūnanga o Ngāti Whātua, Ngāi Tai ki Tāmaki, Ngā Mana Whenua o Tāmaki Makaurau, Hauraki Collective

5. Reptiles

Herpetofauna is the animal grouping that includes reptiles and amphibians. New Zealand has approximately 60 species of amphibians and reptiles. Lizards including geckos and skink (39 species) are the largest single group, but the animal grouping also includes includes tuatara, and four species of native frog (pepeketua). The lizard fauna is remarkable for its diversity in view of New Zealand's isolation, relatively small land mass and temperate climate. The distinctiveness of the herpetofauna has long been underestimated, with scientific emphasis being devoted largely to the endemic frogs (*Leiopelmatidae*) and the tuatara (*Sphenodontidae*) (Bell et al. 1985). Recent genetic studies of lizards show that they too represent a high level of endemism (Towns et al. 1985).

The islands of Ipipiri are likely to have once supported a number of reptiles given its connections to the mainland during the last ice age. All New Zealand reptiles are vulnerable to introduced mammalian predation, and their impact on reptile populations on Ipipiri would have been significant. Since the removal of mammalian predators from Ipipiri in 2009, any residual remnant reptile population will take time to recover and be observed. Surveying is required to determine the presence and range of any remnant species. Motukōkako/Piercy Island is the closest unmodified reference site (Ben Barr pers. comm.). Information on the flora and fauna of Motukokako can be found in Cameron & Taylor (1991).

The appropriate reintroduction of reptiles will improve the ecological integrity and conservation value of Ipipiri and increase opportunities for New Zealanders and visitors to experience and learn about New Zealand's native reptiles. Three reptile species have been initially identified for reintroduction. The identification of these three species does not limit the possibility of other translocations of other suitable reptile species.

Northland Green Gecko

Scientific name: *Naultinus grayii*
Conservation status: At Risk - Declining (2012)
Current recovery plan: None

Photos 26 & 27: Northland Green Gecko

The Northland green gecko, is an endemic lizard found only in Northland, north of Whangaroa. Its total length is up to 200 mm, snout to vent up to 95 mm. The Northland green gecko is vivid green with grey or gold coloured markings on either side along the dorsal edges. The green leaf-like colour provides some protection from hunting birds. Males have a blue band along the sides just below the limbs. Underneath, the surface of both sexes is pale green, sometimes with a yellow tinge. The inside of the mouth is deep blue with a bright red tongue. They communicate by squeaking and barking. These lizards give birth to live young and can live for 30-40 years. However, their reproductive rate is low. These geckos are vulnerable to habitat removal, mammalian predation, and poaching.

The Northland green gecko is diurnal, sometimes witnessed sun-basking. It has an arboreal lifestyle, especially favouring stands of manuka, kanuka, and mingimingi. This gecko can be found crawling amongst vegetation looking for insects or eating berries and nectar. Geckos fill an important role in the forest by helping pollinate plants including pōhutukawa. They hold the pollen in their throats and carry it to another plant, cross pollinating the flowers on the second plant, another example of the independence between species. They will also access fruit on trees and shrubs which is inaccessible to birds and spread that seed.

Green gecko observed in the Bay of Islands have shown characteristics of both Northland Green Gecko (*Naultinus grayii*) and Auckland green geckos (*Naultinus elegans*) (Ben Barr pers. comm.). Ipipiri may fall into an ecological introgression zone where the ranges of the two diverged intraspecific lineages meet and cross-fertilize. Before a translocation of Northland green gecko can occur, surveying is required to determine the presence or absence of a remnant green gecko population at a release site. Additional mainland surveying maybe required to determine local green gecko characteristics and the suitability of translocation.

The source population of any translocation will be determined by the outcome of surveying. The suitability of existing captive Northland green gecko populations is limited due to unknown provenance issues. If appropriate to translocate, as wild populations of Northland green gecko are sparse it is probable that multiple day captures over several months from different source sites will be required. The development of a captive breeding programme could assist in the effective reintroduction of Northland green gecko to Ipipiri. Female-biased sex ratios are common in reptiles. To maximise the productivity of a founder population, the translocation composition should contain a female-biased sex ratio.

Potential interactions with other species
No adverse interspecific effects. Potential hybridisation with remnant Auckland green geckos (*Naultinus elegans*) if present.

Translocation prerequisites
Surveying is required to determine potential remnant green gecko populations and characteristics, and the suitability of translocating Northland green gecko.

Translocated population dispersion - Inter-island/mainland mobility
None - Any new island population should be considered as discrete.

Habitat availability	Translocation composition	Recommend time frame for translocation
Waewaetorea	50 Sex ratio: 2:1 (Females: Males)	2016 Once required surveying has been completed
Motukiekie	50 Sex ratio: 2:1 (Females: Males)	Once required surveying has been completed
Motuarohia	50 Sex ratio: 2:1 (Females: Males)	Once required surveying has been completed

Potential source populations
To be determined

Tāngata whenua
To be determined

Robust Skink

Scientific name: *Oligosoma Alani*
Conservation status: At Risk – Recovering (2012)
Current recovery plan: *Cyclodina spp*. skink recovery plan. D.R. Towns 1999. Threatened Species Recovery Plan 27.

Photos 28 & 29: Robust Skink

Ipipiri may have been home to one of New Zealand's largest skinks, the robust skink. Robust skinks are nocturnal and forest dwelling and often occupy seabird burrows. Evidence of their widespread distribution on the North Island is provided by scattered remains as sub-fossils from Northland to Wellington. The nearest local population is on Matapia Island, Aupouri, but there are sub-fossil remains from caves and sand dunes in Northland (Worthy, 1987). Three other large skinks may also have been present. These species are the marbled skink (*C. oliveri*), Whitaker's skink (*C. whitakeri*) and McGregor's skinks (*C. macgregori*). Like robust skinks, there are few living populations of these species, but sub-fossil deposits indicate they were formerly widespread. Comparisons between the relict distribution of many species in this genus and the present distribution of introduced mammalian predators, coupled with experimental manipulations of predator populations, indicate that most (if not all) species in this genus are sensitive to predation (Towns 1999)

The robust skink is strongly nocturnal and lives under rocks or inhabits seabird burrows, tree stumps and fallen logs, generally in well-vegetated areas (Robb 1986, Southey 1985, Towns et al. 1985). They can also occupy coastal areas as long as there is a dense cover of vegetation. Studies on cutaneous water loss by robust skinks (A. Cree, C.H. Daugherty and D.R. Towns unpublished) indicated an unusually high propensity to lose water through the skin. Robust skinks may use damp environments such as crevices, bird burrows, rotting logs and closely matted vegetation as retreats in order to minimise this evaporative loss.

Despite evidence that this species was once widely distributed through the North Island and on offshore islands, the present distribution is highly fragmentary with natural populations confined to six small islands around the northern North Island, the largest of which (Middle Island) is just 13 ha in area. Populations are present on Matapia Island (2 ha), Moturoa Island (9.5 ha), Tatapihi (Groper) Island (3 ha) in the Mokohinau Group, Middle Island and Green Island (4 ha) in the Mercury Group, and Castle Island (3 ha) (Towns 1992a, de Lange et al. 1995). In addition to these, populations have been translocated to Korapuki Island (18 ha), Stanley Island (100 ha) and Red Mercury Island (225 ha) in the Mercury Group (Towns 1992a, 1994, Towns and Stephens 1997) and Motuopao Island (30 ha). Establishing a new population on Ipipiri could assist with species viability.

Potential interactions with other species

Subfossil deposits indicate that robust skinks once co-existed with up to six other species of *Cyclodina* in the northern North Island (Towns and Daugherty 1994) and with copper and McGregor's skinks on Mana Island (Towns 1992a). Robust skinks still co-exist with ornate skinks on Matapia Island (Forester and Anderson 1995), with Mokohinau skinks and ornate skinks on Groper Island (de Lange et al. 1995) and with copper, marbled and Whitaker's skinks in the Mercury Islands (Towns 1991).

Translocation prerequisites
All main islands of Ipipiri could potentially support a diverse skink population. Furthermore, these islands have, or are capable of having given time, the habitat requirements set out by the recovery plan. Adequate surveying is required to assess remnant skink species distribution across the island group. To maximise the productivity of a founder population, the translocation composition should contain a female-biased sex ratio.

Translocated population dispersion - Inter-island/mainland mobility
None - Any new island population should be considered as discrete.

Habitat availability	Translocation composition	Recommend time frame for translocation
Waewaetorea	100 Sex ratio: 2:1 (Females: Males)	2020 Once required surveying has been completed
Motuarohia	100 Sex ratio: 2:1 (Females: Males)	2023 Once required surveying has been completed
Motukiekie	100 Sex ratio: 2:1 (Females: Males)	Once required surveying has been completed
Poroporo	100 Sex ratio: 2:1 (Females: Males)	Once pest incursion patterns have been determined

Potential source populations	Tāngata whenua
Robust skink - Moturoa Island, Rangaunu Bay	Patu Kōraha te Hapū, Ngāti Kahu
Robust skink - Matapia Island, Aupouri	Ngai Takoto

Tuatara/Northern Tuatara

Scientific name: *Sphenodon punctatus punctatus*
Conservation status: At Risk – Relict (2012)
Current recovery plan: Tuatara Recovery Plan. P. Gaze 2001. (Plan 47)

Photos 30 & 31: Tuatara/Northern Tuatara

Tuatara are rare, medium-sized reptiles found only in New Zealand. Adult tuatara range from about 300g to 1kg. They are the only surviving members of the order *Sphenodontia*, which was well represented by many species during the age of the dinosaurs, some 200 million years ago. All species except for the tuatara declined and eventually became extinct about 60 million years ago. Tuatara are therefore of huge international interest to biologists. They are recognised internationally and within New Zealand as species in need of active conservation management.

Until quite recently two species of tuatara were recognised and one of these was considered to comprise two subspecies. The northern tuatara (*Sphenodon punctatus punctatus*) present on islands from the Bay of Plenty north, and the Cook Strait tuatara (*S. punctatus*) an unnamed subspecies present on Takapourewa (Stephens Island) and the Trio Islands in Marlborough Sounds. The other species was the Brothers Island tuatara (*S. guntheri*) known naturally from one small island in Marlborough Sounds. In 2009 research examined DNA and allozyme data for all populations and concluded that tuatara is best described as a single species that contains distinctive and important geographic variants.

Tuatara once lived throughout the mainland of New Zealand but have survived in the wild only on 32 offshore islands. These islands are characteristically free of rodents and other introduced mammalian predators which are known to prey on eggs and young as well as compete for invertebrate food. The islands are usually occupied by colonies of breeding seabirds. These seabirds contribute to the fertility and the richness of invertebrate and lizard fauna which tuatara need to survive. Tuatara inhabit burrows on coastal forest and shrubland, and reproduce very slowly. They are most active at night but can also be seen basking in the sun. In established populations, tuatara are considered as a top level predator and part of a functioning natural ecosystem.

The Tuatara Recovery Plan (Gaze, 2001) lists habitat features on p11 that are considered favourable for long term survival of a population:

- Coastal forest or scrub with a relatively open understorey and little ground cover.
- Friable soil for digging burrows.
- Ambient air temperatures varying seasonally between 5°C and 28°C.
- Generally high relative humidity with regular heavy rain (although standing water is not necessary).
- A lack of introduced mammals.
- A diverse invertebrate fauna (preferably including tree weta and Mimopeus beetles), small lizards and small nesting seabirds (particularly fairy prions and diving petrels).
- Areas suitable for nesting that are open and sunny. Preferably with a northern aspect and with moist soil to a depth of c. 0.5m.

Tuatara have previously been successfully translocated to numerous sites including Moutohora; Titi; Karori Wildlife Sanctuary; Matiu/Somes; Red Mercury; Cuvier; Tiritiri Matangi; and Whakaterepapanui. Techniques used have been steadily improved over this time, culminating in a draft Best Practise Manual for the Translocation of Tuatara (Blanchard, 2008). Late November is the best time of the year for tuatara transfers as supplies of invertebrates food species in the wild are at their best and tuatara are about to enter their most active phase (December) which should allow them to 'settle in' well after release (Blanchard, 2008).

Potentially translocation to the same release site should be staggered, were additional transfers of tuatara should be considered in the future to build up numbers and range as able, focusing on the other sub-populations. Monitoring of tuatara may identify a management issue which would need resolving.

Potential interactions with other species

As tuatara are long lived, slow growing, and slow maturing with slow reproduction rates, it will take many decades for them to increase to levels where impacts on local lizard and invertebrate faunas might become apparent. This reintroduction will not restrict options for introducing other species to Ipipiri in the future because of the expected very slow rate of population increase and due to the size of the release islands there is sufficient room to release other species such as the suggested Robust skink without negative impact.

Translocation prerequisites

All main islands in Ipipiri (except Poroporo) are over 10 ha and therefore comply with size conditions set by Gaze (2001). Furthermore, these islands have, or are capable of having given time, the habitat requirements set out by the recovery plan. However Okahu may be the best for tuatara as it's farthest from the mainland and therefore expected to be least likely to be reinvaded by mammalian pests. Seabird colonies would have previously been present, but most likely disappeared due to human modification and pest mammal predations. A colony is not seen as an essential component of successful tuatara establishment, but can assist (Gaze, 2001). Most remnant tuatara island populations survive in the presence of seabird colonies. Preferably the release of tuatara should be scheduled to give adequate time allow for seabird colonies to be reinstated, and the required invertebrate and reptile populations to re-establish.

Founder animals must be able to find each other to breed. Release sites with natural barriers should be chosen to limit dispersal. In the absence of seabird burrowing colonies, there may be a requirement to form burrows to encourage release site anchoring.

Translocated population dispersion - Inter-island/mainland mobility
None - Any new island population should be considered as discrete.

Habitat availability	Translocation composition	Recommend time frame for translocation
Okahu	40-60 with slight female sex ratio bias	2026 - November
Motuarohia	40-60 with slight female sex ratio bias	2028 - November

Potential source populations	Tāngata whenua
Taranga Island, Marotere (Hen Island, Hen and Chickens)	Ngātiwai
Hauturu (Little Barrier Island)	Ngāti Manuhiri, Ngātiwai, Ngāti Rehua
Atiu (Middle Island, Mercury Islands)	Ngāti Hei
Moutohora (Whale Island)	Ngāti Awa
Moutoki Island	Ngāti Awa

6. Invertebrates

Many species of invertebrate still survive on Ipipiri, and are likely to have increased in abundance with pest predator controls in place. Comprehensive sampling of the native invertebrate populations on Ipipiri is required to be carried out to determine the extent of invertebrate recovery post pest eradication. Due to limited data, and given the absence of any information about the original invertebrate fauna, only three groups of invertebrates have been considered for possible introduction to Ipipiri: large flightless species (unable to geographically re-establish), ecologically significant species (i.e. species likely to have important roles in the restored island ecosystem) and regionally threatened species.

Offshore islands are (or were) characterised by high invertebrate abundance and by the presence of large bodied invertebrates (Daugherty, Towns, Atkinson & Gibbs, 1990). The invertebrate fauna of unmodified northern offshore islands typically includes the following large bodied taxa: giant centipedes, weta, large flightless beetles and giant land snails (Towns, Parrish & NWTBRMU, 2003). As these invertebrate taxa are flightless they are unlikely to re-establish unaided if they have been lost from Ipipiri. All three species that have been identified for translocation are threatened or at risk. Some have important ecological roles, and others are “icons” of invertebrate conservation. In conjunction with these proposed species, as a consequence of the required surveying other invertebrate species can be identified and transferred to aid the broader ecological restoration.

Flax Weevil

Scientific name: *Anagotus fairburni*
Conservation status: At Risk – Relict (2010)
Current recovery plan: None

Photos 32 & 33: Flax Weevil

Flax weevils are large flightless beetles. Unable to fly, all species in the genus *Anagotus* are predated by rodents. Fossil evidence shows that flax weevils were once widespread in the North Island. Weevils can be recognized by the shape of their head, which is drawn out to form a long snout. The small mandibles sit at the tip of the snout. The flax weevil has a wide distribution, occurring on many offshore islands from Poor Knights Islands to Stewart Island (McGuinness, 2001). These nocturnal weevils feed only on harakeke/flax (*Phormium tenax* and *P. cookianum*) and hide amongst dead leaves at the base of the flax plant during the day (McGuinness, 2001).

The flax weevil was once part of the local invertebrate fauna, and Ipipiri is part of its former range. As a consequence of the former rodent population, It is assumed the flax weevil is absent from all the islands of Ipipiri. Ipipiri has a several stands of flax that would provide adequate habitat for the flax weevil. The flightless beetle is unable to re-establish on Ipipiri unassisted. At least three new populations of the weevil have been established on other islands around New Zealand through translocation. In February 2001, 82 animals from Maud Island were released at two sites on Titi Island (32 ha, Marlborough Sounds). Norway rats, which had a clear impact on invertebrate fauna, were eradicated from Titi 1970-75. Animals were captured from coastal flaxes (*Phormium cookianum*) and harakeke (*P. tenax*) by hand at night, held overnight in sealed plastic containers, then released into coastal vegetation (comprising grasses, low scrub, herbs and clumps of flax) on Titi the next day. Each animal was individually marked with a numbered 'bee tag' for monitoring requirements.

Selecting a suitable flax weevil source population that is located in near proximity to Ipipiri may help re-establish a population that is most closely related to the flax weevil that would have once inhabited Ipipiri. The flax weevil has been recorded at Te Hauturu-o-Toi (Little Barrier) and the Marotere Group (Hen and Chickens) but current population numbers are unknown (Gardner-Gee et al. 2007). It is envisaged the translocated weevils will establish on Ipipiri and provide a source for future relocations to the mainland.

Potential interactions with other species

The restoration of flax weevil would help restore a component of the large-bodied beetle fauna of Ipipiri. As an herbivore the presence of the flax weevil provides a primary heterotrophic organism with in the island ecosystem.

Translocation prerequisites

It may be necessary to enhance release sites by planting additional harakeke/flax before the flax weevil is released.

Translocated population dispersion - Inter-island/mainland mobility

None - Any new island population should be considered as discrete.

Habitat availability	Translocation composition	Recommend time frame for translocation
Okahu	50 to 150 individuals	2017 - As soon as source populations available
Waewaetorea	50 to 150 individuals	2020 – subject to source population and habitat availability
Motukiekie	50 to 150 individuals	2022 – subject to source population and habitat availability
Poroporo	50 to 150 individuals	Once pest incursion patterns have been determined
Rakaumangamanga	50 to 150 individuals	2023 - suitable habitat/intensive pest management is in place

Potential source populations	Tāngata whenua
Marotere (Hen and Chickens)	Ngātiwai
Tawhiti Rahi (Poor Knights Islands)	Ngātiwai

Pupuharakeke/Flax Snail

Scientific name: *Placostylus hongii*

Conservation status: Threatened - Nationally Vulnerable (2010)

Current recovery plan: Giant land snail recovery plan (Placostylus spp., paryphanta sp.). R. Parrish; G. Sherley; M. Aviss 1995. Threatened Species Recovery Plan 13.

Photos 34 & 35: Pupuharakeke/Flax Snail

These giants may live to 20 years or more, and were once widespread in Northland before human settlement. Many of them are now endangered or threatened, and inhabit a more restricted area of Northland and the islands offshore. Pupuharakeke usually live in broadleaf forest (rātā, pōhutukawa, nīkau, karaka, pūriri) and scrub. They inhabit pockets of broadleaf litter, or under ground cover vegetation. It is thought mahoe, karaka, wharangi, and hangehange are key food sources for these snails. Mating appears to be triggered by climatic conditions, such as rainfall, and can last for 10 hours or more. Snail hatchlings spend an unknown period living in trees and shrubs up to 6 metres above the ground. There are three species of Pupuharakeke (*Placostylus spp.*):

Placostylus bollonsi - up to 115 mm long (shell length), distribution: Three Kings Islands
Placostylus ambagiosus - up to 94 mm long (shell length), distribution: Te Paki
Placostylus hongii - up to 85 mm long (shell length), distribution: eastern Northland

Parrish et al. (1995) state that the causes of decline for pupuharakeke include habitat destruction, habitat modification by domestic or feral browsers and grazers (sheep, cattle, horse, goat, pigs and possum) and/or predation, either by a variety of introduced mammals – including rodents, pigs, probably hedgehogs and possum - or by thrushes. Collection of live animals for their shells by humans may also once have had an effect.

Pupuharakeke is part of the local invertebrate fauna, and Ipipiri is part of its former range. Limited sampling on Ipipiri to date has not detected any pupuharakeke, and hence introductions should be considered to restore this portion of the invertebrate fauna. The eastern Northland distribution of *Placostylus hongii* (Parrish et al. 1995), probably makes it the most relevant pupuharakeke to prioritise for reintroduction to Ipipiri.

Previous translocations of large land snails such as pupuharakeke have variable success (Parrish et al. 1995). The New Zealand Wildlife Service did several translocations onto islands in the Cavalli and Simmonds island groups. Only one was successful and is located at Motutakapu Island (Parrish et al. 1995). Captive rearing and release programmes of pupuharakeke have had limited success. Stringer & Parrish (2009) state the failure of captive bred pupuharakeke (*Placostylus hongii*) to establish was possibly due to a long dry period with high temperatures during the summer of 2003/04, together with soil that dried hard, thus preventing the snails from burrowing. Further research is needed to determine the causes of mortality in translocated snails and how these can be mitigated before further captive-rearing followed by translocation is considered.

Potential interactions with other species
No adverse effects

Translocated population dispersion - Inter-island/mainland mobility
None - Any new island population should be considered as discrete.

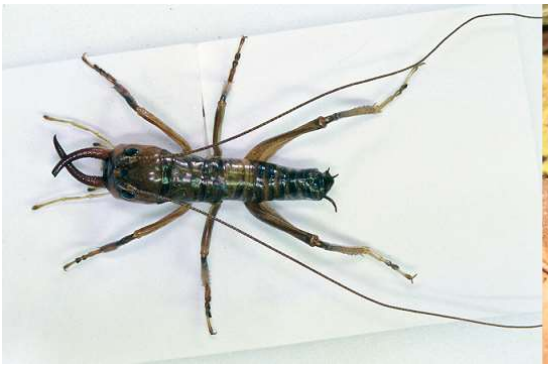
Translocation prerequisites
Restoration and revegetation of the forest on the islands to coastal broadleaf forest will help to provide greater accessibility to forest and leaf litter habitat.

Habitat availability	Translocation composition	Recommend time frame for translocation
Urupukapuka	20 to 30 individuals	2020 - As soon as source populations available
Motukiekie	20 to 30 individuals	2020 – Subject to source populations availability
Motuarohia	20 to 30 individuals	
Waewaetorea	20 to 30 individuals	
Poroporo Island	20 to 30 individuals	Once pest incursion patterns have been determined

Potential source populations	Tāngata whenua
Orokawa Bay, Ipipiri	Nga Hapu o Te Rawhiti
Peach Cove, Te Whara/Bream Head	Ngātiwai
Aorangi (Poor Knights Islands)	Ngātiwai

Northland Tusked Weta

Scientific name: *Anisoura nicobarica*
Conservation status: At Risk - Relict (2010)
Current recovery plan: Threatened Weta Recovery Plan (Plan no. 25) - Sherley, 1998




Photos 36 & 37: Northland tusked weta

These are very rare weta found only in a few Northland locations. It is a small bodied weta, 25 to 32 mm in length. Adult males have protruding tusks at the base of their mandibles which extend forward and cross each other, which they use in territorial fights. They are reddish brown in colour, with yellow dorsal stripes. There are small spines on the hind tibia. Northland tusked weta will live inside holes in kanuka and manuka trees, as well as under logs, and inside vines growing on tress. Most of the islands would be suitable to reintroduce Northland tusked weta. These weta are poorly studied, but it is known that they prefer an animal diet, feeding on live and dead insects and spiders. Very little is known about their ecological dynamics, but as with other invertebrates they probably have an important role in feeding native bird populations, and are needed for ecosystem recovery and processes.

This species is only known from north of a line between Waipoua and Whananaki. The first specimen was found at Orokawa Bay in the Bay of Islands in 1948, and the species was described from one individual found at Cape Reinga in 1950. Most subsequent sightings have come from the Hokianga region. Most records are of single animals which has

given little indication of their abundance. Several sightings are reported from Pakanae Valley, Opononi and Kohukohu. Since 1990, single animals have been found at Maungapika (Te Paki), Whareana (Te Paki), Whananaki, Kaitaia and Puketi Forest (Sherley, 1998). Very little is known about the ecology of this species. There is no evidence of a decline and little information on past or present abundance and distribution. Loss of habitat through forest clearance and the introduction of exotic predators has probably reduced both the distribution and abundance of the species. Attempts at captive breeding have been unsuccessful (Sherley, 1998).

Potential interactions with other species
Prey species - As Northland tusked weta can be eaten by other native species, ideally translocations should be timed so that a new population of weta have time to establish before predatory species (e.g. tīeke) are released into the same area.

Translocation prerequisites
Surveying required - No single large population of Northland tusked has ever been recorded. Surveying of known small populations of Northland tusked weta may be needed to make sure that taking translocation weta will not have a long lasting impact.

Translocated population dispersion - Inter-island/mainland mobility
None - Any new island population should be considered as discrete.

Habitat availability	Translocation composition	Recommend time frame for translocation
Waewaetorea	20 to 30 individuals	2025 - When surveying and source populations available
Motuarohia	20 to 30 individuals	Subject to source populations available
Urupukapuka	20 to 30 individuals	Subject to source populations available
Poroporo	20 to 30 individuals	Once pest incursion patterns have been determined

Potential source populations	Tāngata whenua
Orokawa Bay, Ipipiri	Nga Hapu o Te Rawhiti
Puketi Forest	Ngāti Toro, Te Runanga O Whaingaroa

7. Plants

Within New Zealand, Northland is one of three regional “hotspots” for local endemism and species diversity amongst plants (Forester & Townsend, 2004). The Northland Peninsula itself is primarily subtropical, coastal or lowland in character and supports an ecological diverse range of coastal and marine environments. Forester and Townsend (2004) state 179 plant species are listed as threatened that occur or have occurred in the Northland region. Coastal areas contain a higher number of threatened plants than other habitats such as forests (Booth 2005). The Whangaruru Ecological District in which Ipipiri sits contains a high proportion of coastal fringe and islands; therefore it has a high number of threatened plants. Coastal areas are extremely influenced by natural disturbance, and are also affected by other pressures such as development, weeds, pests, vehicles, and stock. As a result, the numbers of threatened and significant plants that have disappeared. The islands of Ipipiri are likely to have once supported a wide variety of plant species. Within the limits of this plan two threatened plant species have been proposed for introduced to Ipipiri to aid species management. The identification of these two species does not limit the possibility of other translocations of other suitable flora. In addition, the flora restoration that provides ideal habitat and food resources for native species should be considered in broader restoration planning.

Kōwhai ngutukākā/Kakabeak

Scientific name: *Clianthus puniceus*

Conservation status: Threatened - Nationally Critical (2012)

Current recovery plan: Kowhai ngutukaka recovery plan (Clianthus puniceus). W.B. Shaw 1993. (Plan 8)

Photos 38 & 39: Kōwhai ngutukākā /Kakabeak

Clianthus, commonly known as kakabeak or kōwhai ngutukākā, is a genus of flowering plants in the legume family *Fabaceae*, comprising two species of shrubs endemic to New Zealand (*Clianthus puniceus* and *Clianthus maximus*). *Clianthus puniceus* is endemic to the northern North Island. A remnant population is currently only found in the Kaipara Harbour, and is presumed extinct in Northland. Forester & Townsend (2004) state historic records for Northland from the late 19th century suggest the plant was present in the Bay of Islands and Maungatapere.

The plant grows in open, sunny, steep sites, often on rocky outcrops, slips, the bases of cliffs or edges of lakes and streams. Being a member of the pea family kōwhai ngutukākā can fix nitrogen, enabling it to grow in infertile sites. The kōwhai ngutukākā is a sprawling, soft woody shrub up to 2m tall. Leaves are alternately arranged, dull, grey-green coloured and are made up of many small, round or oblong leaves. Flowers are salmon-red scarlet or white, 50-80mm long, arranged in clusters of up to ten. Reproduction of kowhai ngutukaka is both sexual (hermaphrodite, flowers are functionally male and female) and asexual. Seed pods are black, up to 80mm long and contain many greenish-black seeds. Flowering occurs from July to December and pods develop in January.

Kōwhai ngutukākā was formerly cultivated by Maori. Plants are easily propagated from seed and cuttings, but are relatively short lived (Forester & Townsend, 2004). The species is a very nutritious plant and has no defences against introduced browsing mammals or garden snails, kōwhai ngutukākā has become nationally critical. Introduced plants, such as Mexican daisy, gorse and buddleia, also threaten its survival as they like to live in similar sites.

Kōwhai ngutukākā was part of the local flora, and Ipipiri is part of its former range. As part of a restoration programme run on private property, several kōwhai ngutukākā have been reintroduced onto Motuarohia/Roberton Island. Additional kōwhai ngutukākā could be translocated to Ipipiri once a suitable seed stock has been propagated, and suitable planting sites have been identified and protected from predators.

Potential interactions with other species

Hybridisation between clianthus species is possible, and should be avoided. It will be essential to protect kōwhai ngutukākā from introduced snails, slugs, and livestock. Kōwhai ngutukākā flower holds copious nectar at the base of the flower attracting tui and other nectar loving birds.

Translocated population dispersion - Inter-island/mainland mobility

Limited - Any new island population should be considered as discrete.

Translocation prerequisites
Kōwhai ngutukākā could be translocated to Ipipiri once a suitable seed stock has been propagated, and appropriate planting sites have been identified and protected from predators.

Habitat availability	Translocation composition	Recommend time frame for translocation
Motuarohia	Supplementation	2015
Urupukapuka	Dependent on propagation	2015
Motukiekie	Dependent on propagation	2015

Potential source populations	Tāngata whenua
Moturemu Island - Kaipara Harbour (seed banked)	Ngā Maunga Whakahii
Auckland Botanic Gardens (seed bank)	Ngā Maunga Whakahii

Cook's Scurvy Grass

Scientific name: *Lepidium oleraceum*
Conservation status: Threatened - Nationally Endangered (2012)
Current recovery plan: None

Photos 40 & 41: Cook's Scurvy Grass

Lepidium oleraceum is a herb in the *Brassicaceae* family, endemic to New Zealand. Its English common name is Cook's scurvy grass; Māori names include nau, ngau, naunau and heketara. During his voyages of exploration James Cook collected a number of plant species at various locations which were used to help ward off scurvy amongst his crew.

Cook's scurvy grass is a spreading, upright hairless herb that reaches to 0.5m tall. Foliage and stems have a strong cress-like flavour and if crushed, smell like cabbage. Leaves are fleshy, green, and oblong to elliptic with rounded tips. Margins are evenly toothed towards the tip, and taper to a broad, flat base. Flowers are 2-3mm diameter, white and arranged in clusters. Fruit are flattened, broadly egg-shaped silicles with a sharply pointed apex. Each fruit contains two brown seeds. Flowers appear year-round, but mainly in September to March. Fruiting occurs from December to April. Seed production is rapid so flowers, immature and ripe seed are all typically found on the same plant.

Cook's scurvy grass was part of the local flora, and Ipipiri is part of its former range. This species prefers fertile soils in coastal areas, and are frequently associated with seabird activity, and rocky shorelines (Forester & Townsend 2004). Once common on the coast and islands throughout New Zealand, but now largely restricted to off-shore islands. The plant is browsed by a large range of predator, including domestic stock, rats, snails, aphids, leaf miner, diamond backed moth and cabbage white butterfly. Fungal disease (white rust fungus) is also a problem and the plan has been and continues to be over-collected by humans. The small remnant populations are highly threatened, potentially as a result of reduced populations of seabirds which the plant is dependent on to provide highly fertile and disturbed soils associated with nesting grounds.

Potential interactions with other species
Cook's scurvy grass is frequently associated with seabird activity (Forester & Townsend 2004). The plant is dependent on highly fertile and disturbed soils associated with seabird nesting grounds. It will be essential to protect new populations of Cook's scurvy grass from predation and disease.

Translocated population dispersion - Inter-island/mainland mobility
Limited - Any new island population should be considered as discrete.

Translocation prerequisites
Cook's scurvy grass could be translocated to Ipipiri once a suitable seed stock has been propagated, and appropriate planting sites (potential seabird nesting grounds) have been identified/established and protected from predators. The species grows well from seed but strict quarantine measures for pest and diseases are required to prevent their establishment when visiting offshore islands (Forester & Townsend 2004).

Habitat availability	Translocation composition	Recommend time frame for translocation
Okahu	Dependent on propagation	2021 – In conjunction with seabird habitat restoration
Waewaetorea	Dependent on propagation	2023 – In conjunction with seabird habitat restoration
Motuarohia	Dependent on propagation	2024 – In conjunction with seabird habitat restoration

Potential source populations	Tāngata whenua
Matapia Island, Aupouri	Ngai Takoto
Marotere (Hen and Chickens)	Ngātiwai
Tawhiti Rahi (Poor Knights Islands)	Ngātiwai
Motuharakeke Island (Cavalli Island)	Ngāti Kura

8. Schedule of translocations – 2015 to 2030

Proposed schedule of bird, reptile, invertebrate, and threatened plant species recommended for introduction to Ipipiri between 2015 and 2030:

2015
Tīeke/saddleback to Urupukapuka and Moturua
Pōpokotea/whitehead to Motuarohia
North Island Brown kiwi management on Moturua and Motuarohia
Kōwhai ngutukākā/kakabeak supplementation to Motuarohia

2016
North Island Brown kiwi to Urupukapuka
Pōpokotea/whitehead to Urupukapuka and Moturua
Habitat creation and installation of social attractants for seabirds on Okahu, Waewaetorea, and Motuarohia
Northland Green gecko to Waewaetorea

2017
Kākāriki/Red Crowned Parakeet for captive breeding and Urupukapuka
Flax Weevil to Okahu

2018
Toutouwai/North Island robin to Urupukapuka
Takahē to Waewaetorea subject to Recovery Group

2019
Pōpokotea/whitehead to Rakaumangamanga (subject to pest levels) – Ipipiri sourced founder population
Tītipounamu/North Island Rifleman to Moturua – once required source genetic/population density assessed
Kōwhai ngutukākā/kakabeak to Urupukapuka

2020
Flax Weevil to Waewaetorea
Pupuharakeke/flax snail to Urupukapuka
Robust skink to Waewaetorea

2021
Cook's scurvy grass to Okahu
Kōwhai ngutukākā/kakabeak to Motukiekie

2022
Flax Weevil to Motukiekie
Takahē/South Island Takahē to Urupukapuka – subject to Recovery Group
Pupuharakeke/Flax Snail to Motukiekie

2023
Robust skink to Motuarohia
Flax Weevil to Rakaumangamanga – subject to intensive pest management and habitat availability
Cock's scurvy grass to Waewaetorea

2024
Cook's Scurvy Grass to Motuarohia
Toutouwai/North Island robin to Rakaumangamanga subject to intensive pest management – Ipipiri sourced

2025
Northland tusked weta to Waewaetorea
Korimako/bellbird to Urupukapuka – if do not self-establish

2026
Pakahā/Fluttering Shearwater to Waewaetorea, Okahu and Motuarohia – as required if do not self-establish
Tuatara to Okahu

2027
Northern Diving Petrel to Waewaetorea, Okahu and Motuarohia – as required if do not self-establish
Tuatara/North Tuatara to Motuarohia

2028
Tīeke to Rakaumangamanga - subject to intensive pest management – Ipipiri Sourced
Tuatara to Motuarohia

2029
North Island Kōkako to Rakaumangamanga - subject to intensive pest management

2030
Hihi/Stitchbird to Rakaumangamanga - subject to intensive pest management

9. References

Angehr, G.R. 1986. Ecology of honeyeaters on Little Barrier Island: a preliminary survey. Pp 1-11 in Wright, A.E.;

Beever, R.E. (Eds), 1986. The offshore islands of northern New Zealand. New Zealand Department of Lands and Survey Information Series No. 16.

Blanchard, B. 2006. Best Practice Manual for the Translocation of Tuatara (*Sphenodon sp.*), draft. (DOCDM-73797)

Bell, B.D. 1994. Translocation of fluttering shearwaters: developing a method to re-establish seabird populations. In: Serena, M. (Ed). Reintroduction biology of Australian and New Zealand fauna. Surrey Beatty, Chipping Norton, New South Wales. Pp 143–148.

Bell, M.; Bell, B.D.; Bell, E.A. 2005. Translocation of fluttering shearwater (*Puffinus gavia*) chicks to create a new colony. Notornis 52: 11–15.

Booth, A. 2005. Natural areas of Whangaruru Ecological District Reconnaissance Survey Report for the Protected Natural Areas Programme. Department of Conservation, Whangarei.

Bostock, H.; Maas, E.; Mountjoy, J.; Nodder, S. 2010. Bay of Islands OS20/20 survey report: Chapter 3: Seafloor and subsurface sediment characteristics. National Institute of Water and Atmospheric Research. Wellington.

Butler, D. McLennan, J. 1991. Kiwi recovery plan. Threatened Species Recovery Plan 2.

Cameron, E. K.; Taylor, G. A. 1991. Flora and fauna of Motukokako (Piercy Island), Cape Brett, northern New Zealand. Tane 33.

Collen, R.; Cash, B.; Adams, L.; Ortiz-Catedral, L.; Booth, M.; Gray, R.; Fastier, D.; Nakagawa, K.; Ward-Smith, T. 2013. Best practice techniques for translocations of red-crowned parakeet (käkäriki, *Cyanoramphus novaezelandiae novaezelandiae*) and yellow-crowned parakeet (käkäriki, *Cyanoramphus auriceps*) (Version 1.1). Department of Conservation, Wellington, New Zealand (unpublished, Department of Conservation internal document DOCDM-1194242)

Cromarty, P.; Hitchmough, R. 2005. Recommended best practice relating to future translocations of hybrid red-crowned parakeets from Tiritiri Matangi, Cuvier Islands & Moutohora (Whale Island). NZ Department of Conservation internal document (unpublished) DOCDM-1110129

Daugherty, C. H.; Towns, D. R.; Atkinson, I. A. E.; Gibbs, G. W. 1990. The significance of the biological resources of New Zealand islands for ecological restoration. Pp. 9-21 in Towns, D. R., Daugherty, C. H., Atkinson, I. A. E. (eds) Ecological restoration of New Zealand islands. Conservation Science Publication No. 2. Department of Conservation, Wellington.

Empson, R. 2004. Transfer of bellbirds, whiteheads, robins and tomtits from Kapiti Island to Karori Wildlife Sanctuary 2002. Report to Karori Wildlife Sanctuary, Wellington and Department of Conservation, Wellington (unpublished). 28 p. (DOCDM-621119)

Forester, L. Townsend, A. 2004. Threatened plants of Northland Conservancy. Department of Conservation, Wellington.

Gardner-Gee, R. Graham, S. Griffiths, R. Habgood, M. Heiss Dunlop, S. Lindsay, H. 2007. Motuora Native Species Restoration Plan. Motuora Restoration Society, Department of Conservation, Wellington.

Gaskin, C. & Rayner, M. 2013. Seabirds of the Hauraki Gulf: Natural History, Research and Conservation. Hauraki Gulf Forum

Gaze, P. 2001. Tuatara Recovery Plan. Threatened Species Recovery Plan 47

Gummer, H. 2003. Chick translocation as a method of establishing new surface-nesting seabird colonies: a review; DOC SCIENCE INTERNAL SERIES 150

Gummer, H.; Graham, S.; Gardner-Gee, R. 2008; Second transfer of common diving petrel chicks (*Pelecanoides urinatrix urinatrix*) from Wooded Island to Motuora in the Hauraki Gulf: For Motuora Restoration Society and the Department of Conservation

Gummer, H.; Adams, L.; 2010. Translocation techniques for fluttering shearwaters (*Puffinus gavia*): establishing a colony on Mana Island, New Zealand. Department of Conservation, Wellington. 52 p.

Imber, M.J.; 1985. Origins phylogeny and taxonomy of the gadfly petrels *Pterodroma-spp*. Ibis 127: 197-229

Innes. J; Flux. I; 1999; North Island kokako recovery plan. Threatened Species Recovery Plan 30

Holzapfel, S.; Robertson, H.A; McLennan, J.A.; Sporle, Hackwell, K; Impey, M. 2008. Kiwi (*Apteryx spp.*) recovery plan, 2008–2018. Threatened Species Recovery Plan 60.

Jenkins, P.F.; 1978. Cultural transmission of song patterns and dialect development in a free-living bird population. Animal Behaviour 26: 50–78.

Kress, S.W. 1990. Egg Rock Update 1990. Newsletter of the Fratercula Fund of the National Audubon Society, USA

Kress, S.W. 1997.Using animal behaviour for conservation: case studies in seabird restoration from the Maine coast, USA. Journal of the Yamashina Institute for Ornithology 29(1): 1–26.

Marchant, S.; Higgins, P.J. (Eds) 1990. Handbook of Australian, New Zealand and Antarctic birds. Vol. 1. Ratites to ducks. Oxford University Press, Melbourne.

Miskelly, C. M.; Taylor, G. A. 2004. Establishment of a colony of common diving petrels (*Pelecanoides urinatrix*) by chick transfers and acoustic attraction. Emu 104: 205-211.

Miskelly, C.M.; Taylor, G.A.; Gummer, H.; Williams, R. 2009. Translocations of eight species of burrow-nesting seabirds (genera *Pterodroma, Pelecanoides, Pachyptila* and *Puffinus*: Family *Procellariidae*). Biological Conservation 142: 1965–1980.

Numata, M. 1996. Effects of philopatry on the outcome of translocating endangered seabirds. Unpublished report for Postgraduate Diploma in Wildlife Management, University of Otago, Dunedin, New Zealand. 42 p.

McGuinness, C. A. 2001. The conservation requirements of New Zealand's nationally threatened invertebrates. Wellington: Department of Conservation.

Ortiz-Catedral, L.; Adams, L.; Hauber, M.E.; Brunton, D.H. 2010. Conservation translocations of red-fronted parakeet on Matiu/Somes Island and Motuihe Island, New Zealand. In: Soorae, P. S. (ed.) 2010: Global re-introduction perspectives: Additional case-studies from around the globe. IUCN/SSC Re-introduction Specialist Group, Abu Dhabi, UAE, xii + 352 pp. www.data.iucn.org/dbtw-wpd/edocs/2010-076.pdf

Parrish. R; Sherley. G; Aviss. M; 1995. Giant land snail recovery plan (*Placostylus spp., paryphanta sp.*). Threatened Species Recovery Plan 13.

Podolsky, R.H. 1990. Effectiveness of social stimuli in attracting Laysan Albatross to new potential nesting sites. Auk 107(1): 119–125.

Powlesland, R: Parker, K. 2013. Best practice techniques for the translocation of whiteheads Department of Conservation, Wellington, New Zealand (unpublished, Department of Conservation internal document)

Rasch, G. (Ed.) 1991. Recovery plan for North Island Kokako. Threatened Species Recovery Plan 1

Rasch, G. 1992. Recovery plan for North Island kokako. Threatened Species Recovery Plan 1. Department of Conservation, Wellington.

Schreiber, E.A.; Burger, J. 2002. Seabirds in the marine environment. In: Sulzycki J (ed) The biology of marine birds, New York

Serventy, D.L.; Gunn, B.M.; Skira, I.J.; Bradley, J.S.; Wooller, R.D. 1989. Fledgling translocation and philopatry in a seabird. Oecologia 81: 428–429.

Shaw, W.B. 1993. Kowhai ngutukaka recovery plan (*Clianthus puniceus*). Threatened Species Recovery Plan 8

Sherley, G.H. 1998. Threatened weta recovery plan - Threatened Species Recovery Plan 25. Wellington: Department of Conservation.

Taylor, S.; Castro, I.; Griffiths, R.; 2005. Hihi/stitchbird (*Notiomystis cincta*) recovery plan 2004–09 Threatened Species Recovery Plan 54

Towns, D.R.; 1999. Cyclodina spp. skink recovery plan. Threatened Species Recovery Plan 27.

Towns, D. R., Parrish, R. 2003. Restoration of the principal Marotere Islands. Ngati Wai Trust Board Resource Management Unit (NWTBRMU). Wellington: Department of Conservation.

Warham, J. 1990. The petrels their ecology and breeding systems. Academic Press, London

Wickes, C.; Crouchley, D.; Maxwell, J. 2009. Takahe (*Porphyrio hochstetteri*) recovery plan. Threatened Species Recovery Plan 61 2009

Worthy, T.H. 1987. Osteological observations on the larger species of the skink *Cyclodina* and the subfossil occurrence of these and the gecko *Hoplodactylus duvaucelii* in the North Island, New Zealand. New Zealand Journal of Zoology, 14, 219-229.

10. Appendix

Appendix 1: Descriptions of the islands of Ipipiri

Tenure and status of the islands of Ipipiri

Ipipiri has seven larger islands and a number of rock stacks. Land tenure of these include: Crown land, private land, Maori land and some small islets of unknown status (7.968ha in total) which is un-investigated Crown or Maori Land.

Table 1: Tenure and status

Island	Total area (ha)	Private land (ha)	Maori land (ha)	Scenic reserve (ha)	Recreation reserve (ha)	Crown lease (ha)
Urupukapuka	228.931				224.131	4.8
Moturua	166.027	15.7143	0.1378	150.1749		
Motuarohia	63.402	43.914			15.3274	
Waewaetorea	55.121				55.121	
Motukiekie	34.216	34.216				
Okahu	27.265				27.265	
Poroporo	7.739			7.739		

Urupukapuka Island (228.93 ha)

Urupukapuka Island is predominately public conservation land currently managed by DOC. The island is the focal host island for visitors who generally arrive via commercial tourism operators. A significant proportion of the visitors arriving into the facilities at Otehei Bay will be day excursions that will utilise walking tracks on the islands.

Topography:
The island's topography is the most varied of the islands in Ipipiri and ranges from flat areas behind the major bays (Indico, Otehei, Urupukapuka) and rises to moderately steep slopes and coastal cliffs on the island's eastern side.

Vegetation:
The main vegetation type is manuka/kanuka shrubland and extensive kikuyu grasslands are features of northern and southern areas of Urupukapuka. A spectacular pohutukawa forest occupies the coastal fringe and pohutukawa are a highlight of the island's vegetation. Grazing occurs on approximately a third of the island in order to maintain open space and vegetation on archaeological sites. There is a significant wetland habitat created in the 1980s as a wildlife habitat with *baumea sp.* and raupo reed land. Ecologically the island is in the early stages of natural revegetation (and succession) from windblown seed and dispersal via avian seed carriers.

Conservation:
Urupukapuka has significant restoration potential with its range of habitats and current natural regeneration and it is a breeding area for pateke - brown teal and NZ dotterel.

Habitation:
Through the commercial operations at Otehei Bay there is permanent habitation on Urupukapuka. There are a number of other non permanent occupant dwellings and ancillary buildings at Otehei Bay. There are two main campgrounds on Urupukapuka that are utilised for holidaying during the summer.

Photo 1: Viewed from mainland, Urupukapuka Island centre right of photo
Photo 2: Urupukapuka Island

Moturua Island (166.03 ha)

A large proportion of Moturua Island is a scenic reserve administered by DOC.

Vegetation:
The botanical composition of Moturua Island is dominated by manuka/kanuka shrubland with pohutukawa frequently dotting the coast. Moturua is less pastured than other occupied/farmed islands in the area. Ecologically, Moturua is more advanced than other islands in Ipipiri and is developing a more diverse understory of coastal broadleaf forest.

Conservation:
16 North Island robins (petroica australis longipes/Toutouwai) were released here in 1986, from the Mamaku Plateau. A number of Northland Island brown kiwi are also on Moturua Island. These kiwi were salvaged when their habitat was destroyed by forest clearance on the mainland.

Habitation:
An area of private property is situated in the south east of the island at Hahangarua Bay.


Photos 3 & 4: Moturua Island

Motuarohia/Roberton Island (63.40 ha)

Approximately 29% of Motuarohia Island is public conservation land administered by DOC.

Topography:
The topography of Motuarohia ranges from steep coastal cliffs which face the open sea to the north and west, with headlands dissected by moderately steep gullies on its southern side. Flat lat surrounds a lagoon area on the southern side of Motuarohia.

Vegetation:
Vegetation consists of kikuyu grass flats, kanuka/native shrub hardwood forest and extensive stands of maritime pine (Pinus pinaster) with a regenerating understorey of native shrub hardwoods which are mainly hangehange and coprosoma spp. Coastal cliff communities are extensive with pohutukawa and the coastal tussock (Chionachloa

bromoides). Stands of maritime pine were originally grown for the extraction of turpentine. Extensive planting of native coastal species has resulted in native forest regeneration in areas of felled to waste pine forest on the western end of the island. There is a small remnant of coastal forest on Te Kuru Point.

Conservation:
North Island brown kiwi number approximately 40 birds estimated post a survey in April 2006 (R. Colbourne 2006). Dotterel nest protection is undertaken during the breeding season.

Habitation:
Public conservation land 19.488 ha. Private land 43.914 ha
There is permanent habitation in at least one of the 9 dwellings on private land and there are multiple ancillary buildings.

Photo 5: Motuarohia Island in foreground – Moturua Island behind
Photo 6: Motuarohia Island

Waewaetorea Island (55.12 ha)

Waewaetorea is an uninhabited island managed by DOC as a Scenic Reserve. Of significance the island has eleven recorded archaeological sites, of pre-historic Maori origin.

Vegetation:
Dominance of grasslands is the key feature of the flora of Waewaetorea Island, with the noxious introduced weed kikuyu as well as native grasses. The remaining habitat is composed of stands of regenerating manuka/kanuka forest situated mainly on the south western face, and a small stand confined to the eastern point.

Photo 7: From left to right – Urupukapuka Island, Waewaetorea Island, and Okahu Island
Photo 8: Waewaetorea Island looking towards Urupukapuka Island

Motukiekie Island (34.22 ha)

Motukiekie Island is a privately owned and resided on. On Motukiekie coastal pohutukawa have survived, grasslands are extensive, and the dominant canopy is manuka/kanuka forest with native shrub hardwood forest associated.


Photo 9: From right to left – Motukiekie Island, Moturua Island, and Motuarohia Island
Photo 10: Motukiekie Island

Okahu Island (27.26 ha)

The uninhabited Okahu Island is characterised by extensive pastures, regenerating manuka/kanuka, and coastal pohutukawa. Between the cliffs and the island's single southern beach is a grassland dominated valley. Amongst the grasses are flax, developing manuka/kanuka, and pohutukawa. Canopy cover, is dominated by manuka.


Photo 11: Foreground back – Okahu Island, Waewaetorea Island, and Urupukapuka Island
Photo 12: Okahu Island

Poroporo Island (7.74 ha)

The island is public conservation land administered by DOC. Poroporo Island has a small forest of regenerating manuka/kanuka, and large coastal pohutukawa. Smaller pohutukawa are evident on some of the inner ridges (possibly planted). The island is uninhabited.


Photos 13 & 14: Poroporo Island

Appendix 2: Island Translocation Table

Species	Also know as	*Scientific Name*	Urupukapuka (228.9ha)	Moturua (166.1ha)	Motuarohia (63.4ha)	Waewaetorea (55.1ha)	Motukiekie (34.2ha)	Okahu (27.3ha)	Poroporo (7.7ha)	Rakaumanga-man Cape Brett
Seabirds										
Pakahā	Fluttering shearwater	*Puffinus gavia*			X	X		X		
Northern diving petrel		*Pelecanoides urinatrix urinatrix*			X	X		X		
Land birds										
Toutouwai	North Island robin	*Petroica longipes*	X	X						X
Tīeke	North Island saddleback	*Philesturnus carunculatus rufusater*	X	X						X
Pōpokotea	Whitehead	*Mohoua albicilla*	X	X	X					X
Northland brown kiwi		*Apteryx mantelli*	X	X	X					
Kakariki	Red crowned Parakeet	*Cyanoramphus n novaezelandiae*	X	X	X		X			X
Takahē	South Island Takahe	*Porphyrio [Notornis] hochstetteri*	X			X				
Tītipounamu	North Island Rifleman	*Acanthisitta chloris granti*	X	X						X
Korimako	Bellbird	*Anthornis melanura*	X							
Kōkako	North Island Kōkako	*Callaeas cinerea wilsoni*								X
Hihi	Stitchbird	*Notiomystis cincta*								X
Reptiles										
Northland green gecko	Northland green gecko	*Naultinus grayii*			X	X	X			
Robust skink		*Oligosoma Alani*			X	X	X		X	
Tuatara	Northern Tuatara	*Sphenodon punctatus*			X			X		
Invertebrates										

Flax Weevil		*Anagotus fairburni*				X	X	X	X	X
Pupuharakeke	Flax snail	*Placostylus hongii*	X		X	X	X		X	
Northland tusked weta		*Anisoura nicobarica*	X		X	X			X	
Plants										
Kowhai ngutukaka	Kakabeak	*Clianthus puniceus*	X		X		X			
Cooks scurvy grass		*Lepidium oleraceum*			X	X		X		