



A history of wildlife translocations in the Marlborough Sounds

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Peter Gaze and Bill Cash

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1. Introduction

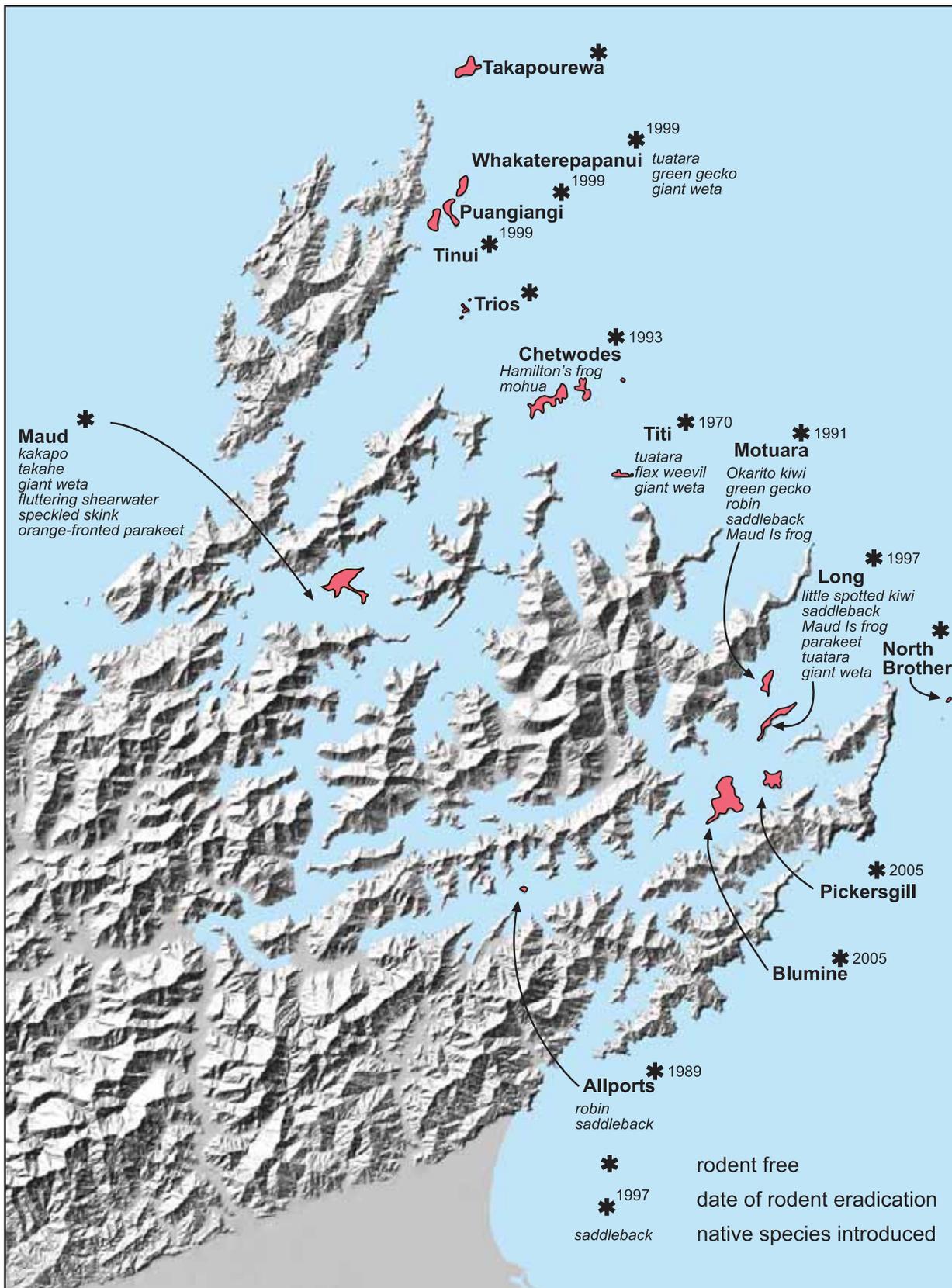
The translocation of wildlife to predator-free islands has become a key tool for conservation in New Zealand where predation is often the cause of declining populations. The Marlborough Sounds is an important area for this form of management because of the number of islands and because rats have now been eradicated from most of them (Fig. 1). The increasing number of predator-free islands has surpassed the need for survival of critically endangered species and there is now more focus on translocation of species for the restoration of island ecosystems.

While the need to maroon a critically endangered species on a predator-free island for its survival must take priority there are other considerations that become relevant when the focus is on restoration of the island ecosystem. For example, weka and saddleback were once key components of the avifauna of the Marlborough Sounds and while they could now, once again, survive well on many islands their feeding habits compromise options for the return of ground nesting birds, frogs, lizards, tuatara and some endangered invertebrates. For these and other reasons the translocation of wildlife is carefully planned. The Department of Conservation administers the Wildlife Act 1953 which makes it an offence to release wildlife without authority and any translocations planned within the department are subject to a rigorous approval system. Within the Marlborough Sounds an island management strategy (Millar and Gaze 1997) provides broad guidance on what might be appropriate. More prescriptive guidance is available for some islands (Whitaker 2002).

This paper attempts to summarise translocations that have occurred so far - either for survival of an endangered species or to restore the biodiversity of an island. Some of these translocations have sourced birds from outside the Sounds and, on other occasions, birds have been taken away from the Sounds. The distribution of species, particularly on islands, is of immense interest to biogeographers and is useful in determining the cause and effect of human disturbance on the landscape. This information may therefore be useful in the future in helping to distinguish the natural distribution of bird species in the Sounds from that which has been assisted in some way.

Information has been obtained from a variety of sources but relies largely on the memory of those who have worked in this field over the last 40 years. Wherever possible I have tried to substantiate this by reference to archived files from the New Zealand Wildlife Service, the Department of Lands and Survey. Current files from the Department of Conservation have also been useful as has its published summary of translocations (McHalick 1998). Unreferenced information on recent translocations was sourced from within the department via a database (DOCDM-33810). This account is a summary only and a guide as to where more detailed information can be found.

Fig 1 Pest-free islands in the Marlborough Sounds and species transferred to them



2. Species accounts

2.1 LITTLE SPOTTED KIWI

Apteryx owenii

This is the only species of kiwi known to have inhabited the Sounds. Despite some very promising leads none has been positively identified on the mainland of the Sounds for over 50 years. In the 1980s the NZ Wildlife Service made an attempt to save the last of the Sounds population from D'Urville Island, however, by that time only a few birds could be found.

Two males and one female were caught in 1980 and while one of the males died in captivity shortly afterwards, the remaining two birds were released on Maud Island. The female bird and an additional two males from Kapiti Island were translocated to Long Island in 1982 (Jolly and Colbourne 1991). Another male from D'Urville Island was released on Long Island in 1987.

The female from D'Urville Island bred successfully with at least one offspring, a male, found in 1986. After the last D'Urville male was transferred one of the two Kapiti Island males was removed to Otorohanga to give a better chance of the D'Urville male contributing and increasing the proportion of the D'Urville gene-pool. This bird settled in Camp Gully by 1995 and is thought to have bred successfully for several years. In March 1995 two new birds and the former D'Urville male were caught and with monitoring of other calls it was considered that a minimum of 10 birds was on the island giving an estimated population growth rate since 1982 of 6% per annum (Colbourne & Robertson 1997). In 2002 the population was conservatively estimated from calls to be at least 20 birds (Colbourne 2005). At that time birds were present in about half of what was thought to be suitable habitat. By April 2007 it was possible there were as many as 50 birds on the island although this was considered still short of the carrying capacity (Bill Cash pers. comm.).

2.2 OKARITO BROWN KIWI

Apteryx australis

Between 1997 and 2001 a total of 55 chicks were transferred to Motuara Island where they each spent a year in this predator-free environment before being returned to their natural habitat in South Okarito Forest on the South Island west coast. The intention of this exercise was that once the birds had safely reached an age of one year they could better withstand the risk of predation in the wild. These birds originated from mid-term eggs or freshly hatched chicks, collected in the wild and then raised in captivity for several weeks before translocation.

Of the 55 chicks that were released onto the island, 44 survived for release back into Okarito Forest. As at December 2002 only six of these birds are known to have died in the wild, the fate of a further three is uncertain due to failure of their transmitters (Chris Rickard pers.comm). This exercise ceased for several years as extensive stoat trapping through Okarito Forest reduced the loss of kiwi chicks, however, this option is still available when trapping does not provide sufficient protection. Two more chicks were put on the island in early 2003 and another 14 in 2004 (Colbourne 2005) and 16 in 2007 (Bill Cash pers. comm.).

2.3 FAIRY PRION

Pachyptila turtur

In January 2002, 40 nestling fairy prions were taken from their burrows on Stephens Island and translocated to artificial burrows on Mana Island. The operation was organised by The Friends of Mana Island Society and the Department of Conservation in Wellington. These nestlings were placed in artificial burrows on Mana where a 'gate' prevented premature fledging. The birds were fed on either a krill or sardine diet for between two and 14 days. All 40 birds appeared to fledge safely (Miskelly and Williams 2002). One hundred additional chicks were transferred in each of 2003 and 2004 with all fledging successfully. In the latter two years the chicks were fed sardines only (Miskelly and Gummer 2004).

2.4 DIVING PETREL

Pelecanoides urinatrix

Diving petrel were taken from North Brother in November of 1997, 98 and 99 for release on Mana Island on the Wellington west coast. In the first year 39 nestlings and 80 non-breeding adults were taken, 40 nestlings in 1998 and 49 in the final year. In the first two years birds were also taken from Motumahanga, one of the sugarloaf islands near New Plymouth. The technique used for this translocation involved finding suitable sized nestlings during inspections of the burrows and returning to collect the birds on the morning of departure from the island. Nestling age was calculated from wing length and used to select those that were 11-25 days short of fledging at an age of 45-5 days (Graeme Taylor pers. comm.). The nestlings were placed in compartments within cardboard boxes and flown by helicopter directly to Mana. On Mana all birds were contained within artificial burrows and fed twice daily. A total of 62 chicks sourced from North Brother Island are believed to have fledged from Mana Island and by 2003 at least 15 of these had subsequently returned to Mana Island to breed (Miskelly and Taylor 2004).

2.5 FLUTTERING SHEARWATER

Puffinus gavia

Fluttering shearwater chicks were translocated from Long Island to Maud Island in January of the five years 1991 to 1996 in a project organised by Brian Bell and the Ornithological Society of New Zealand. A total of 334 chicks were moved during this period and each was placed in an artificial burrow on Maud Island and fed for two-five weeks before fledging (Bell, Bell and Bell 2005). Fledging success was 82%. The first birds returned to breed after five years with 15 pairs breeding in 2003/04. This return was encouraged by cutting or spraying of the long grass around the burrows and an automatic audio system which played amplified calls at the colony during the hours of darkness. Those birds that returned to Maud Island as their natal colony have frequently had unbanded mates.

A total of 131 fluttering shearwater chicks were transferred from Long Island to Mana Island off the Wellington coast, in 2006 and 2007 (Gummer and Adams 2007), and a final complement in January 2008.

2.6 WEKA

Gallirallus australis

It is likely that weka have come and gone from numerous islands in the Marlborough Sounds but it is not possible to always determine when this has been a natural process. Most of the information on these changes relates to the removal of weka from islands. These operations have on occasions been attempts to eradicate the birds from an island where they were seen as a risk to other conservation values because of their predatory nature. All known attempts to manipulate weka on islands are described.

Weka were introduced to the Chetwode Islands by fishermen in the 1920s to control kiore (*Rattus exulans*) and rabbits (Stead, 1928). Various efforts from 1970 were made to eradicate these birds by the Wildlife Service (Veitch and Bell, 1990) but this was not achieved until after the eradication of kiore on Nukuwaiata (Inner Chetwode Island) in 1993. Prior to the rat eradication 24 birds were caught on Nukuwaiata and translocated to mainland aviaries (Brown, 1997). 112 birds were captured from the rat-free Te Kakaho (Outer Chetwode Island) and relocated to The Glen near Nelson (Preece and Shaw, 1998). These birds were held for 4-6 weeks before release but no new population was established. After the rat eradication on Nukuwaiata the remaining birds on both islands were destroyed.

Campbell (1967) records that weka were probably introduced to the Middle Trio and that eradication efforts by Wildlife Service since 1951 were in response to the threat posed to tuatara, seabird and invertebrate populations. A single bird that was killed in 1964 is the last record of weka on the Trios.

Weka have been recorded on Maud Island since the 1950s (Veitch and Bell, 1990) and these have been regularly captured alive and released on the adjacent mainland in Pelorus Sound. During the 1970s some of these birds were banded before release and were found to return to the island. The apparent ability of weka to swim the 600-900m to the island caused future releases to be at a greater distance from the island. Weka are still found on the island from time to time and it is probable that these are new birds swimming to the island rather than from a resident population.

Weka were eradicated from Tawhitinui and Awaiti Islands in 1983 as a consequence of using brodifacoum to eradicate ship rats (*Rattus rattus*) and were still absent 19 months later (Taylor, 1984). Both islands had been re-colonised by weka when visited in 2000 (pers. obs.) Weka were eradicated from the Allports Islands in 1989 (Derek Brown pers. comm.) and have never re-colonised the island (pers. obs). It is unknown whether this population was naturally occurring or had been translocated.

Single weka have been observed and eradicated from other islands when their presence was regarded as incompatible with other conservation values, eg. Duffers Reef, Motuara and Titi Island (pers. obs.). The latter occurrence would involve a swim of several kilometres in open ocean and is therefore likely to have been 'human assisted'.

Weka are present on Blumine. It is not known whether these were introduced or have swum from time to time from Arapawa. There were efforts by the Wildlife Service during the 1980s to eradicate this population for the benefit of a population of giant land snail *Powelliphanta hochstetteri bicolor* but they persisted and, more recently, survived the 2005 aerial drop of brodifacoum that was intended to eradicate mice and stoats. Weka had been present on Long Island since 1983 but have recently been removed so as to allow establishment of other species.

2.7 TAKAHE

Porphyrio mantelli

Takahe were first introduced to Maud Island in 1984 when six hand-reared juveniles were translocated from Te Anau (Clearwater, 1993). Along with a further three birds taken to the island the following year this established a breeding population that has raised young in most years since the 1986/87 season (Steve Ward pers. comm.). After the initial translocation birds have been moved to and from Maud Island and other captive colonies — the National Wildlife Centre at Mt Bruce, Te Anau and island populations at Kapiti, Mana and Tiritiri Matangi. These subsequent moves have been on the advice of the Takahe Recovery Group, aimed at managing takahe in these locations as a single population and maximizing out-breeding (Crouchley, 1994a).

2.8 KAKAPO

Strigops habroptilus

The first kakapo on Maud Island were two male birds (Jonathan and Jill) that were transferred from Fiordland in 1974. A single male, named Richard Henry, was moved in 1975 and in 1981 two more males (Hugo and Mirkwood) were also shifted. None of these birds were initially fitted with transmitters but Richard Henry continues to survive (as the only bird from the Fiordland population) and it is known that one bird died and presumed that the other two also died on the island. In 1980/81 a male bird (Arab) and three females (Maggie, Jean, Dianna) were transferred to Maud from the recently discovered population on Stewart Island. One of the female birds (Dianna) was found dead within months.

In 1982 stoats became established on Maud Island (Crouchley 1984) and the four surviving birds were moved to the safety of Hauturu (Little Barrier Island) in the hope that they would breed with other kakapo shifted to that island.

With stoats eradicated from Maud and preventative trapping in place more birds were brought from Stewart Island. A juvenile female (Tara) brought in 1985 did not survive but two females (Ruth and Fuchsia) and four males (Jimmy, Piripiri, Jerry and Smoko) were successfully transferred between 1989 and 1991. In 1996 Richard Henry was brought back to Maud as he was not interacting well with the others on Hauturu and in 1998 one of the females was brought back for the same reason.

From 1998 to 2001 one of the Stewart I males (Jimmy) was released on Nukuwaiata (Inner Chetwode) to determine if the island provided suitable habitat in case of the need for emergency evacuation from Maud.

Two more birds were brought to Maud. Hoki was a juvenile male that was hatched on Whenua Hou (Codfish Island) and hand-raised at Auckland Zoo before coming to the island in 1992 where he was raised in captivity until transferred back to Whenua Hou in 1997. An adult female was brought from Hauturu to Maud in 1996 in the hope of maximizing her breeding potential. In fact these two birds successfully raised three young on the island in 1998. Following this event three more females were brought to Maud; one from Whenua Hou (Nora) and two from Hauturu (Heather and Wendy). As kakapo management ended on Hauturu three of the male birds (Stumpy, Luke, Merty) were taken to Nukuwaiata and a female (Lisa) was taken to Maud. In addition, three juveniles (Trevor, Boomer, Morehu) that had been raised in captivity at Burwood Bush were brought to Maud in 1999.

Finally, Maud was used for the recuperation of two injured birds; a male bird (Ken) brought to the island in 1998 subsequently died but a female (Jane) with leg injuries survived well.

By 2001 Whenua Hou was regarded as the island most likely to maximise breeding potential and nine females (Jean, Fuchsia, Ruth, Flossie, Nora, Heather, Wendy, Lisa and Jane) and four males (Jimmy, Sinbad, Luke and Merty) were sent south. The following year four of the remaining

birds (RH, Piripiri, Smoko, and Kuia) were transferred to Te Kakahu (Chalky Island) to expose the birds to a beech (*Nothofagus*) forest on a predator-free island.

Since that time Maud has only been used occasionally and then only for kakapo outside of the breeding programme.

2.9 YELLOW-CROWNED PARAKEET



Fig. 2: A parakeet being removed from a mist net for translocation.

Cyanoramphus auriceps

The first transfer of yellow-crowned parakeet was in 1970 when the Wildlife Service took six pairs from the Chetwode Islands to Stephens Island (Brown, 2000). While at least one pair bred successfully, the species did not persist on Stephens Island for more than a few years.

The next translocation of yellow-crowned parakeet within the Marlborough Sounds was in February 2001 when 27 birds were shifted from the Te Kakaho (Outer Chetwode Island) to Long Island. All birds survived the transfer and fledged young were seen on Long Island the following summer. Since then the population has continued to flourish

In 2004 parakeet were again taken from the Chetwode Islands, this time destined for Mana Island. In January 2007 the new population on Long Island was cropped with 45 birds being translocated to Motuara.

2.10 ORANGE-FRONTED PARAKEET

Cyanoramphus malberbi

In March 2007 11 orange-fronted parakeet were released on Maud. Another three birds were released in May. These birds had all been raised from captive stock at Peacock Springs, Christchurch. Breeding occurred during the winter and additional birds were translocated from captivity.

2.11 ANTIPODES ISLAND PARAKEET

Cyanoramphus unicolor

In 1986 the Wildlife Service released 15 captive-raised Antipodes Island parakeet on Stephens Island. In January 11 birds were taken from captive facilities in Nelson and in April a further four birds were translocated from Wellington Zoo (McHalick, 1998). While some of the birds bred successfully on the island numbers declined due to predation by tuatara and the remaining four birds were returned to captivity on the mainland in 1988 (Brown, 2000).

2.12 SOUTH ISLAND ROBIN

Petroica australis australis

In 1973 the NZ Wildlife Service shifted five robins from Nukuwaiata to Motuara and another five were shifted from Kowhai Bush at Kaikoura to Allports Island (McHalick, 1998). These translocations involved only five birds in each instance yet were successful with robins continuing to survive well on both islands (Byrne 1999). Some of these banded birds were later found on Long Island where a population had become well established by the 1980s (Bill Cash pers. comm.).

In winter 1983 an attempt was made to establish robins on Maud Island with the translocation of 11 birds from Te Kakaho (McHalick 1998). The majority of the birds shifted were males although at least one pair was observed attempting to breed on Maud (Bill Cash pers.comm). If this translocation was in August it would coincide with the last stoat capture on Maud until 1990 (Crouchley 1994b) and these predators may not necessarily have been the cause of this translocation failing.

2.13 SOUTH ISLAND TIT

Petroica macrocephala macrocephala

While tits have occasionally been seen on Maud they have not established. In 2004 three males and three females were transferred from Blumine and released directly into the main forest. While one bird was seen six months later and another (unbanded) in early 2007 there is little reason to think this attempt has been successful.



Fig. 3: South Island tits being taken from Blumine Island for release on Maud.

2.14 SOUTH ISLAND SADDLEBACK

Philesturnus carunculatus carunculatus

One of the first saddleback translocations occurred in 1965 when 30 of the surviving birds on Big South Cape were moved to Nukuwaiata. An additional 17 were moved in 1970 (Hooson 2002). These birds never established due probably to the combined impact of kiore and weka (Lovegrove 1995) and all had disappeared from the island by 1973 (Merton 1975). In 1980 and 1982 a total of 72 saddleback were moved from Big (Stage) Island to Maud. Birds from the first transfer successfully raised young but the second transfer unfortunately coincided with the first record of a stoat on the island (Crouchley 1994b) and the loss of all birds after that was apparently quite rapid.

In 1994 eight male, 11 female and seven juvenile saddleback were translocated to Motuara Island (Pierre 1995, Hooson 2002). These birds came from the Titi Islands near Stewart Island, 21 birds from North Island and five from Jacky Lee. In autumn 1999 the population had exceeded 100 birds (Cash and Gaze 2000) allowing for a transfer in May of seven birds to Allports Island, closer to Picton. This small population succumbed during the drought of 2002. While the birds are now well established on Motuara the breeding success of this population is less than elsewhere and may be attributable to a combination of environmental and genetic factors (Hooson 2002). The impact of disease was apparent in March 2002 when a proposed translocation from Motuara to Long Island was cancelled because of an outbreak of systemic coccidiosis (Alley and Twentyman 2003). This example has been studied further by Hale (2007) in her PhD study.

During the spring of 2005 health screening of the Motuara population tested negative for coccidiosis and 45 saddleback were translocated to Long Island. It is likely these birds bred in the first season and breeding was certainly confirmed in their second season as was dispersal over much of the island. In late summer of 2007 some individuals around the release site were visibly unwell and Katrina Hale was contracted to research this occurrence. Avian pox and avian malaria were detected in some individuals (Hale 2007a).



Fig. 4: The portable aviary and transfer boxes used for several bird species. (Photo: Dave Hansford)

2.15 MOHUA

Moboua ochrocephala

Since the early 1990s the Department of Conservation managed mohua on Mt Stokes through an intensive programme of stoat trapping and nest protection. Over a period of ten years this population, the only one north of Arthurs Pass, increased from less than 10 birds to close on 100. A translocation to the Inner Chetwode Island (Nukuwaiata) was planned for November 1999 to pre-empt the likely effect of increased predator numbers but only four birds were able to be translocated before the population became extinct (Gaze 2001). The four birds included only one female and it wasn't until her third breeding season on the island that young were raised. In February 2003 only two of the original four birds were remaining, along with three of their progeny (King 2004).

In October 2001 an additional 27 birds were translocated to Nukuwaiata from the Dart Valley. These birds were closely monitored for their first two summers on the island during which numbers dropped to only four survivors by February 2003. The only known breeding of these birds was in 2003-04 when a male bird from the Dart was observed to breed with the Mt Stokes female (King 2004). In December 2005 a maximum of eight individuals were located - as described by Karen Mayhew in a file report DOCDM-133978. Further monitoring by Leigh Joyce (DOCDM-254630) in 2006 and 2007 showed the Mt Stokes female was still the only breeding female on the island.

2.16 MAUD ISLAND FROG

Leiopelma pakeka

In 1984 43 frogs were moved from the Main Bush site to a new site at Boat Bay 0.5km away. A further 57 frogs were moved to the new site a year later. Intensive monitoring over the following 20 years has shown an initial settlement period followed by high annual survival and good recruitment (Bell et al. 2004).

In May 1997 300 adult frogs were translocated from Maud Island to Motuara (Gaze 1999) in what was likely to have been the first frog translocation ever done for conservation reasons. This new population was regularly monitored and during the August visit in 2002 155 individuals were recaptured as well as 42 new recruits (Tocher and Shirley 2005).

A third island population was initiated in 2005 when 101 frogs were translocated to a prepared site on Long Island. Germano (2006) closely followed their adaptation to the new site showing that there was a tendency to disperse downhill and that those shifted with near neighbours were just as likely to disperse.

Some frogs from Maud Island had been taken into captivity at University of Canterbury and when this was no longer necessary they were taken to the Karori Sanctuary, Wellington in 2005. The initial success of this translocation allowed for a further 30 frogs to be collected from the

wild on Maud Island the following year. This population is being closely studied by students at Victoria University.

2.17 HAMILTON'S FROG

Leiopelma hamiltoni

In 1991 frog habitat was created on Stephens Island c.70m from the only known site for this species. The new site was seeded with invertebrates, fenced to keep tuatara out and had a boardwalk erected for ease of monitoring. Twelve frogs were transferred (Brown 1994). In the next year seven of those individuals were recaptured but by 2000 only three individuals were known to have survived at this site. Two of the 12 individuals were recaptured back at the source, within a metre of where they were originally captured. Between 1996 and 2000 four juveniles were found providing evidence of at least three breeding events (Tocher and Brown 2005).

Given that the only population of Hamilton's frog amounted to c.300 individuals living in 300m² of a rock on Stephens Island there was much to be gained by establishing a population on another island. Past experience provided some confidence that this could be done but the risks were greater because of the low numbers. A long history of monitoring this population provided the data for Tocher et al. (2006) to predict which of nine hypothetical translocation scenarios was likely to produce the best result for the species. They concluded that translocation of 20 adult and 20 sub-adult female frogs along with 40 males provided a balance between risk of extinction in the donor population and probability of success in the translocated population.

In May 2004 the first 40 frogs were moved to a site on Nukuwaiata. Dataloggers had been previously installed at the site to confirm what was assumed to be a suitable climate and boardwalks had been fitted so the animals could be monitored without disturbing the habitat. By May 2006 Hayley Cooper from University of Otago had spent 15 nights monitoring the fate of these animals and had encountered 25 of them over that period. She also found that sub-adults were growing at a normal rate. With these promising results the final cohort of 31 frogs were captured on Stephens Island and shifted to Nukuwaiata during the winter of 2006.

2.18 MARLBOROUGH GREEN GECKO

Naultinus manukanus

The first known translocation of this species was in 1998 when 14 animals were moved from Arapawa Island to the northern tip of Motuara. Attempts to find survivors or progeny since then have been unsuccessful (OLDDM-454368).

In March 2003 Kelly Hare took 30 green gecko from Takapourewa to Victoria University for her PhD research into the paradox of nocturnality in lizards. In October the 27 survivors and their 17 progeny were released on Wakaterepapanui (DOCDM-63162).

Since then one adult was seen in May 2004 and a juvenile in November 2006.

2.19 SPECKLED SKINK

Oligosoma infrapunctatum

Eighty animals were translocated from Takapourewa in February 2004. Forty to Mana Island and forty to Maud Island. Those transferred to Maud Island were released in second-growth below the main forest. One of these animals was seen six months after the release and two more (including one that was not toe-clipped) in late 2007.

2.20 BROWN SKINK

Oligosoma zelandicum

In November 2000 15 brown skinks were captured on Maud and taken into captivity in Nelson for a behavioural study. The following summer these 15 and 15 progeny were transferred to Awaiti. Searches were made for any survivors, using pitfall traps and G minnow traps, during the following two summers. No survivors were found, possibly due to the re-establishment of weka on this small island.

2.21 GUNTHER'S TUATARA

Sphenodon guntheri

The first translocation of tuatara for conservation purposes occurred in 1995 when 68 animals (18 adults and 50 captive raised juveniles) were moved from North Brother to Titi Island. This was central to research by Nicky Nelson. Nelson (1998) documents the survival of these animals and the fascinating way that all increased in weight and length - even those adults that had previously shown no growth over several years on North Brother. In November 2006 a team from Victoria University spent a total of 185 hours searching for these animals. Twenty two individuals were captured of which 14 had originally been released as juveniles and one which was not toe-clipped and therefore must have been recruited on the island (DOCDM-136236). Buccal swabs were used to take DNA samples were taken from these animals and this will be used to detect genetic bottlenecks in this population that may warrant a supplementary translocation.

In October 1998 30 eight yr old tuatara and 20 adults were released on Matiu Island in Wellington Harbour. The young animals came from eggs that had been incubated in captivity by Nicky Nelson (1998) and then raised at Nga Manu reserve in Waikanae.

In November 2000 13 gravid females were induced to lay a total of 71 eggs which were taken back to Victoria University for research into temperature-dependent sex determination (Nicki Mitchell pers. comm.). In November 2002 a further 17 eggs were taken from full-term natural nests on the island. All young arising from these eggs were raised by Barbara Blanchard at Wellington Zoo and were released on Long Island in 2007 after all weka had been removed from the island.

2.2.2 COOK STRAIT TUATARA

Sphenodon punctatus

In October 1998 eggs were taken from Takapourewa for artificial incubation and research into how incubation temperature affects the sex of hatchlings (Nelson 2001). These were obtained from natural nests and by induction of gravid female tuatara. During the following years the

university obtained funding from the South Pacific Conservation and Development Fund (ex Rainbow Warrior) for the eradication of rats on all three of the Rangitoto Islands. This operation was successfully carried out by the Sounds Office of the department. A report on restoration options for Wakaterepapanui (the northernmost of the Rangitoto Islands) was prepared Whitaker (2002). Meanwhile all hatchlings were raised at the Nga Manu Reserve in Waikanae with funding assistance from the Zoological Society of San Diego. In October 2004 343 young tuatara were flown to Wakaterepapanui and released at a site near the summit. All had been individually



Fig. 5: A tuatara ready for transfer. (Photo: Lee Pagni)

marked by toe-clips and at the time of transfer 112 were large enough to have transponders (PIT tags) inserted. These records are held by the university

A return visit to Wakaterepapanui in November 2006 found 20 of these animals, all of which had increased in size and condition since their release. There was sign of tuatara in adjacent areas suggesting that some animals had dispersed quite widely.

During 2003 a tuatara proof fence was erected around the two frog habitats on Takapourewa and in October 89 tuatara were removed from within. These animals were all individually marked with PIT tags and translocated to a site on Wakaterepapanui. This site was several hundred metres from where the juveniles were released the following year. The monitoring trip in 2006 re-captured 17 of these animals and again, all had increased in length, mass and condition - even those that were adults.

During 2003 and 2004 frogs were taken into captivity for research at University of Canterbury. As this work concluded arrangements were made for these 30 animals to be translocated to the Karori Wildlife Sanctuary. This occurred in January and March 2006 and were complemented by a further 30 frogs taken directly from Maud Island in September 2006.

2.23 FLAX WEEVIL

Anagotus fairburni

Fifty flax weevils were translocated from Maud Island to Mana in March 2004 (80) and 2006 (70).

In January 2001 82 flax weevils were translocated to Titi. Good feeding sign from these insects has since been found on the island.

2.24 GIANT WETA

Deinacrida rugosa

The first translocation of this species occurred in 1977 when 43 giant weta from Mana were released on Maud (Meads and Moller 1978). These animals were released into tauhinu vegetation above the sandy bay on the peninsula. The population appeared relatively static until the mid 1990s when it spread widely along the east of the island (Meads and Norman 1992) with animals now encountered frequently and abundantly.

In February 2001 92 giant weta were moved from Maud to Titi. A small amount of old faecal matter found in February 2007 was attributed to weta.

In October 2003, 42 giant weta were moved from Takapourewa to Wakaterepapanui. Thirteen captive bred weta were transferred to the island in May 2004. More details are available on DOCDM-63162. and DOCDM-33695 A search in early 2006 failed to find any giant weta (Gruber 2007 - DOCDM-136250).

More detail on invertebrate transfers in the conservancy are provided by Ian Millar on DOCDM-33695.



Fig. 6: Cook Strait giant weta
(Photo: Mike Aviss)

3. Future translocations

With the recent eradication of rodents from Blumine and Pickersgill, all islands in the Marlborough Sounds that are entirely within public ownership and beyond easy swimming range are now free of mammalian predators. These predator-free islands remain available for the conservation of nationally threatened bird species and these may include species such as stitchbird (*Notiomystis cincta*) that would be outside of their previously known natural range. The re-introduction of seabirds to some islands such as Wakaterepapanui will be an important step in restoring the fertility and associated biodiversity. With techniques for this work being continually refined (Miskelly and Williams 2002) the establishment of fairy prion on more islands should become possible within the short-term. Other translocations will focus more on restoring the biodiversity of islands with bird species that might once have been present but are unlikely to re-colonise without assistance. Suitable species include: yellow crowned parakeet, red crowned parakeet (*Cyanoramphus novaezelandiae novaezelandiae*), South Island saddleback, South Island robin, South Island tit and South Island fernbird (*Bowdleria punctata punctata*).

Invertebrates include giant weta, flax weevil, ngaio weevil and click beetle, all of which may have been present in the past but have disappeared in the presence of rodents.

Further translocations will involve greater attention in ensuring heterogeneity of founder stock to avoid possible repercussions (Hale 2007, Jamieson et al. 2006) and consideration must be given to providing a broader genetic base for some existing island populations.

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