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The white line shows the boundary of the Okiwi Community Pest Project with over 200 traps currently deployed. Using the TrapNZ website, community members can enter their own data and see how the overall project is progressing.

The Great Barrier Island Environment Trust gratefully acknowledges the support of the Great Barrier Local Board for the printing of Environment News.

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ENVIRONMENTAL NEWS

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ENVIRONMENTAL NEWS

Editorial

EMMA J. WATERHOUSE

This issue of Environment News is late. While I could blame winter, life's usual craziness, work and a myriad of other things, the truth is that I have procrastinated on writing this editorial. And the reason is Rakitu.

In case you've missed it, the Department of Conservation (as this issue goes to print) is about to drop brodifacoum-laced baits on Rakitu Arid Island off Aotea's north eastern coast. And many people are unhappy about it. Many people also support it. The aim is to eradicate rats and in doing so provide further predator free habitat for our indigenous fauna and flora, including lots of birds. This approach works - on Burgess Island in the Mokahinau Islands just north of Aotea seven species of burrowing seabirds rapidly re-colonised the island following pest eradication, and with little active management.

The debate about 'the drop' appears to be becoming more acrimonious by the day. Are personal attacks really what this is about? Apparently in this debate you are a 'pro' or 'anti' poisoner. To cast this situation in such a black and white manner suits many. But like most things, it's not that straightforward. Nor are the very real trade-offs that are made if we flat out reject poison as a means of predator eradication. We don't, for example, have an alternative - yet - that will work at scale and at a cost New Zealand can afford, and on the kind of terrain found on Rakitu's coasts. So the question really is, if we don't use poison in some very limited instances, can our birds and other biodiversity wait?

Aotea Great Barrier isn't the first island or community to grapple with these issues. The local board on Lord Howe Island looked thoroughly at all methods available for their island, with a permanent population of about 400 people. The outcome - bait stations and hand broadcasting of bait in as many areas as they could (including in and around settlements) and aerial poison on coastal and inaccessible, cliff areas. An independent human health risk assessment was undertaken along with similar studies on non-target species, the marine environment and tourism, and they worked through community concerns.

That eradication is now scheduled for next winter and would be the biggest ever attempted on an inhabited island. If you are interested in some very good information on the Lord Howe Island project, the research and reports (including the history and approach to community involvement in the decision making and a very interesting study on what fish do when they encounter the baits) then head to the project website. It's both balanced and informative (*lhirodenteradicationproject.org*). Overall, their studies conclude that there is a very low risk to human health and the environment given the relatively small quantity of poison to be used, in a 'one-off' eradication.

The Lord Howe work and other researchers note that, 'one-off' use of brodifacoum in an eradication program is very different in terms of potential environmental effects when compared to ongoing sustained use.

Cover photo: Coppermine Bay in the north of Te Paparahi, looking towards Hauturu Little Barrier Island. Source: K Waterhouse

We spent the rest of the day (and most of the rest of the week) scouring Robin Bush for signs of rodents. Well, Milly was scouring, I was far more interested in investigating the remnants of the old aviary, the bird boxes and of course the descendants of the last two breeding black robins.

Photo: S. Sambell

Milly in Robin Bush—the small patch of forest on Mangere Island where the last black robins were translocated in a bid to save the species.

Unfortunately, it wasn't just a case of leaving the birds to it when they finally delivered the birds to this patch of healthy bush on Mangere. Once the translocation was complete, Merton and his team created and instigated a foster parent program for the fledglings, to encourage the last pair to produce enough offspring to create a viable population. The method worked and the descendants of Old Blue are doing well. I'm not sure what generation these birds were, but there are now plenty of them.

Old Blue

As the bush began to grow dark and our stamina was fading, we slid off a boulder into a flat clearing, a rare treat on such a steep island, and I threw my pack to ground to recuperate for a moment. Milly took this as a cue for a power-nap and instantly curled up on my pack while I pulled out the map to plan the quickest route back to base. I realised then that the area I was standing in was more than a clearing, it was more like a natural amphitheatre. Now, a very special few of you reading this would have been to Mangere Island and 'The Amphitheatre', so you will have to bear with me, but for those that haven't, read on.

This majestic little clearing, just large enough to very snuggly pitch two tents, is surrounded by large boulders that seem to stand sentry and bear witness to the very special thing that happened here 40 years ago. If you turn back towards the cliff above Robin Bush, you'll see one particularly prominent boulder. On that boulder, a human, has hung a plaque to let all those humans that came after them – myself included – know how special this place is.

I must have wandered too far from my pack because Milly took this as a cue to stand up and follow me and I looked back just as the great, great, great grandchild of Don's robins flew straight over her head and on landed on the rock above the plaque. As Milly came along side and obediently sat down I read it aloud to her….

In memory of 'Old Blue'
1971 – 1983
Last productive female 1979 – 1982
Ancestral mother of all black robins
Lived & bred here &
saved her species

Epilogue

It was indeed many days past the prearranged pick-up date when the boat finally made it back. It gave us time to properly search the island and quite a lot of time in the little hut finding ways to kill time between the squalls battering its thin walls. For anyone who has spent time in the Mangere hut, you will know, like I do now, every inch of its walls and the many messages and drawings that its inhabitants have left there. If you ever find yourself in the same position, be sure to examine the architrave on the northern wall where the many visitors, including the late great Don Merton, have scratched a line to mark their own height and written their name alongside. If you look down the bottom of the wall, you'll see a scratch on the timber not more than 30cm off the ground, and alongside, the name of a brave little dog that has given her entire life to conservation – and she's not done yet.

Next issue….Part 3 from…you'll just have to

I admit, at this stage I swore loud enough for Milly to stop her incessant sniffing. In fact, she even lifted her head and sat down in compliance, assuming I was telling her off. My words did explain very eloquently the courage needed to land a small boat on that point and free-climb the near vertical ridge above it. In 1976, this is precisely what Don Merton and his team did.

The world's rarest bird

For four years prior, Merton and his team had been visiting the two Mangere Islands searching for species that had been lost on the mainland of New Zealand. And found them. Unfortunately, they found the last remaining black robins, just 18, in the world on top of a 100m high rock stock in a tiny patch of salt encrusted bush which was well on the way to becoming unsustainable habitat.

They studied the birds, recorded their dwindling numbers and by 1976 concluded that direct intervention would be the only way to save the species. In September of that year, the team, nosed a 12-foot-long dinghy up to the only part of the island even remotely accessible, and climbed up the ridge with bird boxes strapped to their backs to begin an audacious translocation.

When they got to the dying patch of bush, they found only five birds and just a single breeding pair.

As I looked across from the ridge on Mangere Island to the summit of Little Mangere, I tried to imagine what was going through their minds when they discovered that one last pair.

Photo: Sarah Matthew

All black robin alive today are descended from just one breeding pair—'Old Blue' and 'Old Yellow', named for the colour of their leg bands.

Here were the Adam and Eve of the species. All 30 grams of them. Their mission was to catch them, put them in boxes, climb down a sheer cliff into a tiny boat perilously colliding with the rocks below, transport the birds to a safe place and then, somehow, convince them to breed.

Of course, we all know how it ends, and indeed, where it ended – in Robin Bush where we were headed next. I whistled and Milly was immediately at my side. "Go ahead" I said, and motioned at the track down to Robin Bush. Milly shot off in front, nose to the ground. I followed behind.

Photo: S. Sambell

Black robins on the inside of the hut on Mangere Island—illustrated by some of the many scientists and legends of New Zealand conservation.

Robin Bush

If you could pick one word to describe 90% of Mangere Island you wouldn't go too wrong to choose 'windswept' or 'salt-blasted'. Just one tiny patch of bush, protected by a 200m high cliff on the eastern coast, looks like it could sustain forest life of some kind.

This is where Merton and his team decided to translocate their five birds (not that they had many other choices) and promptly built aviaries and bird boxes to give these tiny birds the best chance of clawing their way back from the brink of extinction.

Our main task was to search Robin Bush because, for reasons which should be too obvious for me to go into, rodents like to live where birds like to live which is precisely why it is so important that we don't allow them to.

From the information I could find, it appears about 4-6 kg of pure brodifacoum active ingredient are contained within all of the brodifacoum products sold in New Zealand each year. Of the brodifacoum sold, about 50% is used by private contractors. Other users are regional councils (30%), the Department of Conservation (15%) and private landowners (5%). Private contractors use brodifacoum as one of a variety of tools, mostly in bovine tuberculosis (Tb) vector (possum and ferret) control, regional councils at key biodiversity sites and the Department of Conservation now only use brodificaum on offshore islands, mostly in one-off rodent eradications.

So great is the loss of biodiversity in New Zealand that, when you get a glimpse of its true richness, it takes you a while to recognise it.

Researchers also say that the risk of secondary exposure to native non-target species is likely to be greater when brodifacoum is applied to the environment in a sustained manner. I am much more concerned about sustained ongoing use of brodifacoum in New Zealand than I am about one-off rodent eradications, such as that planned for Rakitu (that will deliver far more ecological benefit than cost) and those that have already successfully rid large offshore islands of rodents—and where no poisons are now needed.

The 'anti' poisoners seldom talk about the trade-offs of not using poison in such situations. If the early conservationists (visionaries) in New Zealand, and those that followed, had waited and not used poisons to rid offshore islands of rats and stoats, then there is no doubt that many of our iconic species would now be consigned to the museum. That's the very real trade-off.

For the record, I don't like poison. But I'm also a scientist and in some situations, I can accept a very low level of human and ecological risk, based on the evidence to hand. And full consideration of alternatives and consultation with affected communities. I also understand that no level of risk, however low, is acceptable to some people. We also all have a right, in this country, to express our opinions without fear.

I'll leave you with an extract from an article by Dave Hansford on predator free Fiordland in the New Zealand Geographic's latest issue that summed up for me, why we do what we do:

So great is the loss of biodiversity in New Zealand that, when you get a glimpse of its true richness, it takes you a while to recognise it. As we step ashore onto Chalky Island, we hear bird calls coming from the riotous rātā forest above that I can't immediately identify - tīeke, mohua, kākāriki. A falcon scuds overhead. And kererū; big flocks of them. Wilson and I start to wend our way -carefully, because there are seabird burrows everywhere - up through coastal scrub and into a bushy myriad: rimu, matai, rātā, kāmahi, hutu. The sun spangles in the putaputawētā.

Noho ora mai

Community members attend a bird monitoring workshop in Okiwi where the latest methods for undertaking bird counts as well as the practicalities of counts were presented and discussed.

Te Paparahi: the great land, the plentiful place, the foundation

KATE WATERHOUSE

If you are a visitor to Aotea Great Barrier Island, the chances are that no one you meet has ventured into Te Paparahi. The chances of you venturing there are also slight. Te Paparahi is the remote forested north of the island, rising to a height of 526 m at Tataweka, and falling steeply on all sides to a tortured basalt coastline exposed to the full force of the Pacific weather. It is very likely the first land that ocean-going waka sighted on the long sea voyages by early Māori from Hawaiki, but there is little shelter here.

In 1894, Miner's Head on the northwest tip of Te Paparahi was the site of New Zealand's third worst shipwreck, when the Wairarapa steamed into it at full speed in heavy fog with the loss of 121 lives. On the east side, Rangiwhakaea Bay (Wreck Bay) is an idyllic ring of sandy coves. To the west, Coppermine Bay is tucked in under Miner's Head and was the site of copper mining in the 19th Century. Little remains of this settlement today, nor of Te Paparahi's first inhabitants. Kumera pits dot the ridges above both bays, an indication of the Māori population the area once sustained. The forests appear intact and would have sustained large populations of kererū (*Hemiphaga novaeseelandiae*) and kākā (*Hemiphaga novaeseelandiae*), with ground nesting seabirds along the ridges and on adjoining islets.

The northern part of Aotea, Te Paparahi forest, covers about 3,310 ha[1]. As Sonia Williams wrote in 2012[2], *Te Paparahi is of significant importance to Ngati Rehua, it holds taonga and spiritual values that pertain to mauri (life force) and wairua (spiritual nature/forces/essences) of people, flora, fauna, land and water*.

Aotea's northern biodiversity hotspot

Te Paparahi is not volcanic, unlike much of the rest of the island. Instead greywacke rock (about 150 million years old) forms the northern part. Kanuka forest (*Kunzea ericoides)* dominate in areas that have been burned or cleared. Large areas of coastal broadleaf forest cover the eastern slopes.

Te Paparahi is also rich in wildlife, and home to black petrel (*Procellaria parkinsoni*), Cook's petrel (*Pterodroma cookie*), kākāriki (*Cyanoramphus novaezelandiae)*[3], pāteke (*Anas chlorotis)*, kākā, long-tailed bat (*Chalinolobus tuberculatus*), chevron skink (*Oligosoma homalonotum*) and one of two island populations of Hochstetter's frog (*Leiopelma hochstetteri*). From 31 December 1982 to 9 January 1983, a 20 strong group from the renowned Offshore Island Research Group camped at Rangiwhakaea Bay, and surveyed the northeast of Aotea Great Barrier Island. Many of the resulting publications documented the area's natural history for the first time, including the geology[4], botany[5], avifauna[6] and herpetofauna[7].

Te Paparahi is the largest tract of possum and mustelid free forest in New Zealand and was the last refuge for kōkako on Aotea.

This tiny wind-battered relic of history would be our home the next four days, or as long as it took for the next break in weather to allow the boat to pick us up. It didn't fill me with a lot of confidence that we had at least a week's worth of food in the barrels and then to discover another two weeks' worth of food in the hut… and fishing gear.

"This", announced one of the staffers, "is nothing", upon hearing my concerns – apparently two 44-gallon drums of food and supplies were buried on the hill above us – just in case the entire hut was somehow swept away. I looked down at my offsider who was wagging her tail obliviously and informed her, "We are really remote this time buddy".

Milly the conservation dog

For those that have only just joined us or weren't interested enough in rats to read our Part 1 of this series, Milly and I, at this stage were half way through a tour of duty on the Chatham Islands archipelago, doing, what we have been doing all her life – looking for rats on pest free islands.

For Milly is a conservation dog - and good one at that. She was bred, raised and trained to do only two things – obey my every command and find rodents.

Photo: Sarah Matthew

Milly the conservation dog

Let's be clear, it's not just any, off-the-shelf Jack Russel terrier that can go to the most sensitive ecosystems in the word and sniff around in the undergrowth. There are some very, very precious species on these islands that she must completely and utterly ignore on our adventures, and none is more precious and rare, than the infamous Chatham Island black robin/kakaruia (*Petroica traversi*). The very thing that we had been sent to this island to help protect.

Black robin history

I found the four buckets with 'Scott' and 'Milly' written on them and lugged them into the bunkroom as I checked out the inside of the hut. It was just as I imagined it would be, but real. On the walls, illustrated by some of the many scientists and legends of New Zealand conservation that proceeded us, were murals of the special birds they had been protecting. We were in the place where the staging of the saving of the black robin had taken place... or at least I was.

Milly was quietly whimpering outside as she is not allowed inside Department of Conservation huts. It wasn't long though before I'd fished out her muzzle and coat and my oilskin coat and was out the door with my super-enthusiastic rat hunter bounding in leaps, several times her height along beside me. We were off to Robin Bush!

As with Rangatira Island, which we had left that morning, Mangere Island is home to tens of thousands of seabids, the burrows of which we carefully avoided as we picked our way up the path to the island's main ridge. The prions and storm petrels weren't at home – and wouldn't be until dusk – returning *en-masse* in a what can only be described as an extraordinary spectacle (unless you are the type of person that comes to remote sub-Antarctic islands expecting to get any kind of sleep!).

Once on the ridge, we turned south at the emergency supply depot and camp site and headed down to the bluff at the end of the island. Milly, with her head ever-pinned to the ground constantly scouring the undergrowth for the slightest hint of rat, didn't notice when the monolith of Little Mangere Island came into view. She was still sniffing exhaustively when we had gone another 100m and I saw for the first time with my own eyes the infamous 'landing beach' on the north end of Little Mangere.

Beyond Barrier - conservation dogs and the war on rats (aka the adventures of Milly) - *Part 2*

JOURNEYS TO OUR VERY SPECIAL OFFSHORE ISLANDS

In his multi-part series, ***Scott Sambell*** *recounts his recent journeys with Milly to some of our very special offshore islands, and we see a glimpse of past (and future?) New Zealand ...*

PART 2: Mangere Island

Mountaineers have Mt Everest, musicians have Abbey Road, and rugby fans have… well Rugby (the town), I guess. Conservationists, such as myself and my mobile olfactory companion, Milly, have Mangere Island. The staging place of the greatest story in the history of conservation – ever.

The tale of Mangere Island, its avian inhabitants, and the people that saved them – literally – from the brink of extinction – is legend. Like all conservationists, I have seen many images of the imposing rocks of these two islands taken from all angles as I have pawed through the many iterations of 'the story of Mangere'. I had assumed, that had I ever been within leaping distance of those rocks, I would be filled with awe and excited anticipation. In fact, as I stood holding on the rapidly ascending bow of the crayfish boat, my feeling was more akin to dread, fear, and a wickedly strong shot of motion sickness.

Getting ashore

No matter how many times you practice throwing your best friend over two metres of icy water onto a slippery rock shelf, it never gets boring. But, true to form, Milly the rodent detection dog landed perfectly on all fours and, as rehearsed, trotted confidently five steps forward to avoid being crushed as I landed closely behind.

We were on Mangere Island to check for rats, to continue the protection of what was... the most endangered species in the world.

The two of us, in our own little way, were now continuing the legacy of Mangere Island. We were shortly joined by two Department of Conservation staff. Once the many buckets and barrels of supplies were safely ashore, we began the arduous process of lugging them across the rock shelf and up to the hut, somewhere amongst the towering cliffs above us.

Photo: Sarah Matthew

Mangere Island (right) and Little Mangere Island (to its left) —the setting for the planet's greatest ever conservation story.

The Offshore Island Research Group survey revealed most of the Te Paparahi forests had been eaten out and severely degraded by the presence of goats and pigs over 124 years.

Goats were eradicated from Te Paparahi by 1992, but pigs remain. Hunting requires a permit and Aotea Great Barrier Island is a significant pig hunting destination

Needles Point at the northern tip of Te Paparahi on Aotea Great Barrier.

Value of Te Paparahi to the nation

Te Paparahi is New Zealand's largest tract of possum and mustelid free forest and is close to our largest population centre. So why has it not attracted more attention from the Department of Conservation for protection? Its taonga are well known to mana whenua and include:

Intact forest ecosystem: Forest scientists[8] have highlighted the quality of the 'Northern Bush'. While the area was affected by fire and forest clearance, contiguous tracts of the main forest types on the island are still found in there – montane, upper montane and lowland.

Seabird breeding habitat: The ridges of Te Paparahi would once have been riddled with seabirds. Today, a few species (black petrel, Cook's petrel and possibly little shearwater and grey-faced petrels) are likely to be nesting on islets and cliffs where predation by feral pigs, cats and rats is reduced.

Kāuri forest free of dieback: Difficult access meant that kāuri was not completely logged out of Te Paparahi. Stands can be seen on ridgelines to the east of Tataweka - no tracks lead to these trees and few venture there, making them an important population in the Auckland region.

Biodiversity site of significance: In a memo titled *Ecological Review of the Aotea Great Barrier Island Ecological Vision* to the Great Barrier Local Board in 2017, Auckland Council Ecologist Eru Nathan highlighted Te Paparahi as a biodiversity focus area for Auckland.

Expert route finding required

The Department of Conservation's advice to visitors makes it clear that the track to Tataweka is an 'Expert route' giving time estimates of eight to nine hours return. The Burrill Route is named for Max Burrill who gifted the land to the crown in 1984. The track starts from Mabey Road and climbs steeply through the regenerating forest of Te Paparahi to the central ridge and follows through to Tataweka. The Department of Conservation states that the track is not regularly managed and is indistinct in some places.

In January 1978, I undertook the first of many trips into what was known locally as the 'Northern Block'. My father had shot goats there in the 1950s with the Cooper boys of Glenfern. He led us up the old mining track through head high ti-tree (as we called it then), into the open bush and stands of massively buttressed pukatea (*Laurelia novae-zelandiae*), down into Coppermine Bay. From there it was up and out along the sea cliffs of Miner's Head on tracks lined with spiky goat-browsed coprosma, before circling back over Tataweka. At that time, the summit was grassy and open and home to a herd of about 30 goats.

The next trip saw us make the full traverse, dropping down from Tataweka through huge stands of kanuka to a scrap of sand he had seen on an aerial photo at the base of the 'Needles' – in a single day. This was a remote and magical place where we caught fish, ate paua and wild pork and camped on the one tiny flat spot above the beach. The trip back via the east coast through the maze of gullies and waterfalls was epic. We lost daylight one night and had to camp on a ridge, followed by many steep sidles and descents through kōkako country to Wreck Bay (Rangiwhakaea Bay).

Te Paparahi: Conservation milestones

1972	Consolidated Silver Mining Company bulldozes a track from Mabey Road to Tataweka .
1980	Hochstetter's frog discovered in Te Paparahi – one of only two island populations. Ogle identifies Te Paparahi as an area of outstanding forest habitat.
1983	Control measures begin for feral goats which are devastating the forest understory.
1984	'Northern Block' is gifted to the Department of Lands and Survey for a reserve.
1985	Several researchers[5,6,7] note the particularly diverse fauna of native lizards, frogs, kokako and plants.
1986	Goat culling begins in Te Paparahi by Forest Service cullers and continues until 1992.
1989	First interest in marine protection for the northeast cost of Aotea Great Barrier.
1993	Chevron Skink Threatened Species Recovery Plan[9] identifies west-facing streams of Te Paparahi as strongholds for the species.
1994	Last two surviving kōkako caught and transferred by boat to Hauturu Little Barrier.
2005	Goats eradicated from Aotea Great Barrier, shot out of Te Paparahi in the early 1990s.
2009	Between 2008 and 2009, 18 feral cattle shot out of Te Paparahi, some remain.
2010	Great Barrier Island State of the Environment Report: profiles Te Paparahi.
2011	*Bring Back Kōkako* hui at Motairehe Marae hosted by Ngati Rehua Ngatiwai Ki Aotea.
2014	Return of North Island kōkako to Te Paparahi included as a milestone in Department of Conservation's Auckland Region Conservation Management Strategy.
2015	Te Paparahi included in the newly created Aotea Conservation Park.
2016	*Bring Back Kōkako* feasibility study completed by ecologist Ian Flux for Ngati Rehua, funded by the Department of Conservation, as input into planning for return of kōkako.
2017	Te Paparahi identified as a biodiversity focus area by Auckland Council.
	Planning begins to establish monitoring lines and assess methods for pest eradication.

Photo: E Cameron

Rangiwhakaea Bay and the northeast coastline. Forest types on Te Paparahi vary greatly: from the conifer/ hardwood (kauri, kanuka, ponga); to broadleaf assemblages of kohekohe, tawa, tarairi and nikau; and disturbed forest types with kanuka, manuka, ponga as well as pohutakawa, kohekohe and fernland.

New Zealand seabird relocation

Nearly 100 mottled petrel chick have been moved over 1,000km from their home on Codfish Island to mainland New Zealand - inland on the Maungaharuru Range in Hawke's Bay. Like so many of New Zealand's hill country, the Maungaharuru Range once was home to millions of seabirds.

The relocation in March was the biggest ever attempted and is part of a broader plan to help seabirds repopulate the region.

The mottled petrel (kōrure) will spend four to six weeks at the site where they will be monitored and fed to bring them into optimal condition for fledging.

Kōrure, like many seabirds, were ecologically important as natural recyclers of nutrients from the sea into native bush.

Seabirds usually return to their natal nesting site—where they were born—to breed, often several years after emerging from their burrows and fledging.

Photo: Department of Conservation

Korure or mottled petrel is endemic to New Zealand and currently only breeds at a few sites in the south of the country.

Kōrure will spend three to four years at sea before (hopefully) returning to Maungaharuru to nest. Running since 2014, the relocation programme has seen the first kōrure returning to the site.

Kōrure, like many seabirds, were ecologically important as natural recyclers of nutrients from the sea into native bush.

Update from Lord Howe Island

The Lord Howe Island Rodent Eradication Project aims to eradicate ship rats (*Rattus rattus*) and mice (*Mus musculus*). If successful, Lord Howe Island would be the largest inhabited island in the world where rodents have been eradicated.

Delay to 2019

In March 2018, the Lord Howe Island Board decided to delay the baiting implementation phase of the project to winter 2019. The decision to delay related to delays with receiving permits and a change in the proposed method to increase bait stations in the settlement area in response to community consultation. The change needed more time and resources during the eradication and more time invested in planning.

The overall baiting approach includes aerial broadcasting over uninhabited parts of the island and a combination of hand broadcasting and bait stations in the settlement area. The actual treatment method over individual properties is to be discussed and negotiated with individual leaseholders and residents through property management plans.

Fish behaviour towards placebo bait pellets

Professor David Booth, Professor of Marine Ecology at the University of Technology Sydney, has been studying the potential effects of baits entering the ocean adjacent to Lord Howe Island during the eradication. The study looked at the response of fish to bait pellets.

Placebo pellets (no toxin) were dropped into the water and fish behaviour towards the pellets observed i.e., whether they ignored, approached, mouthed or swallowed the baits. About 400 fish were observed where pallets were dropped. About 37% totally ignored the pellets, 36% approached but deflected the pellet, and 25% mouthed the bait and then rejected it. Less than 2% of fish swallowed the bait, all of which were at sites where people hand feed fish (and where no aerial baiting would occur). The study concluded that aerial application of bait would have little or no effect on fish in areas adjacent to aerial baiting operations.

http://lhirodenteradicationproject.org/reef-fish-behaviour-towards-placebo-bait-pellets-on-lord-howe-island/

Beyond Barrier

ENVIRONMENTAL NEWS FROM NEW ZEALAND & AROUND THE WORLD

Milestones for island eradications

In the last month, two significant rodent eradications have been declared a success - one on South Georgia and the other closer to home, on the sub Antarctic Antipodes Islands.

South Georgia was declared rodent-free in early May with the island now clear of rats and mice. The project is the world's biggest to eradicate an invasive species - the island is about 160-km-long, covering about 350,000 ha, with about 100,000 ha ice and snow free.

Rats and mice were inadvertently introduced to the island 250 years ago by passing ships that called in. The effect on native bird populations was dramatic, as unused to predators, they laid their eggs on the ground or in burrows, easily accessible to the rodents.

Two species of birds endemic to the island, the South Georgia pipit and pintail, were largely confined to a few tiny islands off the coast, which the rodents could not reach, and penguins and other seabird populations were also threatened.

Aerial and ground based poison was laid over three seasons, ending in 2016. Thousands of peanut butter-coated chew sticks, camera traps and tracking tunnels were checked and New Zealand dog handlers and three rodent detection dogs spent months on South Georgia walking over hundreds of kilometres across the island looking for any signs of rats and mice - and finding none.

The project has been heralded as an inspiration for eradications on other large islands around the world.

Photo: Oliver Prince/South Georgia Heritage Trust

New Zealand conservation dogs checked South Georgia for signs of rats and mice.

Meanwhile on the **Antipodes Islands**, 750 km southeast of New Zealand, the Department of Conservation officially declared the island free of mice in March this year. The 'Million Dollar Mouse' project aimed to eradicate mice , the only mammalian predator, from the islands and set about aerial baiting in the winter of 2016. Two seasons of breeding in were then needed to determine if the islands were mice free. Like on South Georgia, the team used a variety of monitoring methods as well as dogs to check for signs of mice.

The Antipodes Islands are the only home of the Antipodes Island snipe and the Antipodes Island parakeet, both of which nest on the ground and are set to benefit greatly from the eradication.

What lies ahead: post-settlement co-governance and bringing back kōkako

Te Paparahi is likely to be included in the Treaty settlement currently being finalised by the Maori Trustee. Te Paparahi, like all of Aotea Great Barrier, contains sites of cultural significance for Ngati Rehua Ngatiwai Ki Aotea. These may be wahi tapu or sacred sites, or areas used traditionally for mahinga kai such as titi (muttonbird) gathering.

As the hapu management plan[1] states: *As kaitiaki we expect to be involved in all decision making that affects indigenous biodiversity, and in particular… in those areas affected by Treaty settlements.* Appendix 11 lays out the biodiversity protection requirements the iwi is likely to apply to management of Te Paparahi – which seek to maintain the mauri of an area through sustainable cultural practices and protecting indigenous biodiversity from harm.

There is strong support for the return of kōkako to Te Paparahi. At a hui at Motairehe in 2012, Hazel Speed of the Kokako Recovery Group confirmed that Te Paparahi was large enough to sustain an unmanaged kōkako population.

Since that time, Ngati Rehua has been working to bring about the return of kōkako - a goal specified in the 2014-2024 Conservation Management Strategy for the island.

Surveys have confirmed the recovery of the forest understory. However, with high densities of ship rats and feral cats, not only can kōkako not return, but other species such as Chevron skink, Hochstetter's frog, kākāriki, kākā and kererū are also under pressure.

In the early 1980s, kōkako was still being reported in Te Paparahi. I will never forget hearing the call of a kōkako floating across a valley in the early evening behind Rangiwhakaea Bay. Sonia Williams wrote in 2012, *"I remember my aunty telling me she had heard the kōkako that morning on her way to her favourite fishing spot, only 30 years ago!"*

By 1982, a survey found just 12 to14 kōkako concentrated in the valleys on the eastern side of the ridge to Tataweka. By the early 1990s, the decision was taken to remove any remaining birds to Hauturu Little Barrier to preserve the genetic diversity they represented. Only two were found.

Photo: Adrain Lambrechts

North Island kōkako on Aotea were the only known natural offshore island population and was lost in 1994 when the last two birds were transferred from Te Paparahi to Hauturu Little Barrier

Notes:

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Ecological function in an age of extinction

GEORGE PERRY (School of Environment, University of Auckland)

Ecologists consider ecosystems as having three components - composition, structure and function. Structure and composition refer to what the components of an ecosystem are and how they are arranged, whereas function refers to the flow of energy and matter.

Most discussion of biodiversity tends to focus on composition i.e. the species present. This perspective is reinforced by the myriad of ways natural selection has come up with to deal with the challenges organisms face (such as lizards that shoot blood from their eyes) as well as the list of threatened and extinct species.

Seeing biodiversity as simply a catalogue of species provides only a partial view as it fails to consider function, and the process that bind ecosystem components together. So, in an age of biodiversity loss should we be at least as concerned about the 'extinction of function' as we are about the 'extinction of composition'?

New Zealand is famously a land of birds but as Jared Diamond described it, all that remains is the 'wreckage of an avifauna'. Given that birds in New Zealand are involved in seed dispersal, pollination, soil formation processes and nutrient transfer surely their decline has had functional implications for our ecosystems?

The function of seabirds as nutrient recyclers

Oceanic and terrestrial ecosystems are separate from each other; after all, it is obvious when you move from one to the other (not least that you get wet). In New Zealand's offshore islands, however, a constant movement of material occurs from oceanic ecosystems to the land driven by seabirds in the form of defecated and vomited nutrients.

The elements so-moved include phosphorus, nitrogen, and bioavailable iron. In other ecosystems, these fluxes would also have been driven by animals such as andromadous fish which spend most of their adult lives at sea, and return to fresh water to spawn.

In a recent study, Doughty and colleagues[1] tried to quantify the effects of the loss of marine animals (and especially megafauna) on these ocean-to-land fluxes. They came to two interesting conclusions: (i) globally the loss of marine animals has led to an up to 95% reduction in the movement of phosphorus from the ocean to the land, and (ii) although the flows are much reduced, northern New Zealand's offshore islands are a global hotspot for ocean-land nutrient transfer by seabirds. This nutrient transfer, coupled with seabirds' soil burrowing, was likely to have been a key shaper of forest communities in New Zealand's pre-human island and coastal ecosystems.

...the loss of a function in an ecosystem does not require the complete loss of the species that provide it...

Modern studies[2] have shown that on New Zealand's offshore islands invaded by rats (with negative effects on seabirds), foliar (leaf) nutrients and soil fertility are reduced, and belowground ecological processes altered.

Photo: E. Cronin

Seabirds off Aotea Great Barrier Island. The mainland of New Zealand was once home to millions of seabirds.

A final question about seabird-driven nutrient movement is how far from the coast these fluxes extended? In coastal plant communities where seabird fluxes are intact, plants show high levels of nitrogen and phosphorus in their leaves. Research from the west coast of the South Island[3] showed that the signal of these marine nutrients could be detected in kererū feathers, but that these nutrients were unlikely to be moved far beyond the colony itself.

Okiwi Community Pest Project

Jo O'Reilly

Okiwi School children and staff have looked after Okiwi Reserve for many years. Their work has included pest control, native plantings, making weta homes and more. The children have pride and a sense of kaitiaki for the park and its surrounds.

People in Okiwi take pride in the bird life of our valley. Flocks of up to 12 kākāriki have been counted, kākā are plentiful and raucous, banded rails are everywhere, pāteke are secretive but they're here and we go to sleep to the calls of morepork and kaka.

The Great Barrier Local Board are supporting the Okiwi Community Pest Project, which aims to protect and enhance biodiversity values in Okiwi, support existing initiatives, and raise awareness and understanding of biodiversity values, threats, and their management.

Surveying community opinions

An initial survey found that many landowners and residents control pests on their properties targeting rats and mice with some also controlling rabbits, minor birds or/and cats. Rats were the biggest concern for people followed by rabbits. Several methods were used to control rats, including kill trapping, live capture, and poison baits. Absentee landowners who undertake control tended to favour poisons (often inside a house).

The project is focussed on non toxic means of control as pest control in a small area like Okiwi, surrounded by unmanaged rat habitat, will require ongoing and regular control of rats. Persistent use of toxins is not best practice and not all community members support the use of toxins. Residents are still able to use toxins on their own properties and are encouraged to contribute their results to the project. The option to consider a toxin to knock down rat numbers in targeted areas, periodically, if required, is acceptable to most.

Trapping rats and cats

Two hundred kill rat traps in wooden boxes have been placed throughout about 50 ha in Okiwi. Ten multi kill traps have been supplied by the Department of Conservation and will be trialled in areas with more difficult access. The department manages cat traps on public land around Okiwi and the project is augmenting this effort with a few strategically placed traps as well as a cage trap available to individuals to respond to sightings.

The project area has been divided into sections, with individuals, or groups taking responsibility for specific areas. Some people are undertaking work on their own properties and others look after traps on adjoining properties or public land as well.

The school has a big role to play and two Department of Conservation staff are volunteering their time to service traps on public reserve land.

Results are recorded in the TrapNZ database (*see map on back page*) where they can be viewed on maps, in graphs or tables, by anyone signed up to the project. Some residents are entering their data, others are supplying data to the coordinator for entry. Trap results have shown an initial high number of rat captures (in most areas where poison isn't also being used), dropping and being replaced with high mouse occurrence. Mice create problems by consuming the peanut butter in traps but often not springing them.

Rat monitoring with tracking cards provides the opportunity to identify other fauna in the area, e.g., skinks. Training workshops on bird identification and monitoring have been held in with the first bird monitoring scheduled for early July. The monitoring aims to align as much as possible with work undertaken 10 years ago by John Ogden and the Environmental Trust.

Working with the community

Several community meetings have been held to update residents on methods, provide supplies, share experiences and answer questions. Further workshops and community activities/ gatherings are planned for the coming year.

The support by Auckland Council, Local Board, DOC, Okiwi School, and members of our community is much appreciated, and makes the project possible.

Kākāriki are vulnerable to rats

The results show that there are kākāriki using the Okiwi Valley area as a nesting site. While only one active nest was found, it can be assumed that there are more nests in the area. Considerable bird activity occurs in this area, such as perching around potential trees, calling and flying through.

Rats present the biggest threat to this species, as rats can enter the cavity and destroy eggs and chicks on the nest, while also attacking chicks that have recently fledged.

Some of the potential nests that were found contained rat droppings which confirm that rats are entering nests. One nest was found with feathers and a skeleton of a kākāriki inside, suggesting that a bird had been killed on the nest. The stage of the feathers indicate that it was either a pre-fledged juvenile or an adult, and so likely cause of death was either that it starved or was killed by a predator, most likely a rat.

Conclusions and recommendations

The results of the research to date are important as they show that there is a need for nest protection in the Okiwi Valley. After talking with residents of the area, it is clear that this population of kākāriki are an important part of the environment, both culturally and scientifically. Nest protection for this species should be provided, as well as nest monitoring, around identified active and potential nests. It is essential that the community continue to feel a sense of ownership and engagement with this species and to be involved with any protection initiatives. Traps placed near active nests will reduce rat presence around the tree and importantly allow juveniles to fledge and have a chance at survival.

Nests could also be monitored with night vision cameras to provide insights into chick development while allowing predators entering the nest to be identified - particularly useful for nests that are difficult to reach.

Kākāriki can produce clutches of eggs throughout their breeding season and may not have established a nest at the time of this study. Further nest searching at different times of the breeding season will add to our knowledge of this species in Okiwi.

This population of kākāriki are an important part of the story that involves the translocation of kākāriki around the North Island, to areas such as Tiri Tiri Matangi Island, Tawharanui Regional Park, Motuihe Island and nearby Little Barrier Island (Te Hauturu-o-Toi)[4,5]. The population could also be important for future translocations and the mixing of genetic material in this species. Without nest protection, this species may reduce so much in numbers that they become functionally extinct, which would be a great loss.

Photo: DOC

Red crowned parakeet at nest hole. In Okiwi, mature puriri trees are likely to be the only trees with suitable nesting sites.

Notes

[1]Director of National Parks. 2010. Norfolk Island Region Threatened Species Recovery Plan. Dept. of the Environment, Water, Heritage and the Arts.
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However, extinct birds may have once transferred marine nutrients much further. In short, conservation of seabird populations by activities such as predator removal has the potential for flow-on effects through the ecosystem, and at locations well beyond seabird colonies.

Pollination and seed dispersal

A second example of the loss of ecological function following avifaunal decline in New Zealand is through pollination and seed dispersal. Many New Zealand's plant species are either pollinated by, or have their seeds dispersed by birds, and a few even rely on the same bird species for both. These are crucial processes in the plant life-cycle - fewer birds should have significant implications for the plant species involved.

Photo: W. Bennett

*Taurepo (*Rhabdothamnus solandri*) is pollinated by native birds that are absent or rare from the mainland.*

A study published in Science in 2014 demonstrated the effects of pollinator loss on the plants that rely on them. The study looked at the plant taurepo (*Rhabdothamnus solandri*) which is pollinated by native birds such as hihi/stitchbird (*Notiomystis cincta*) and korimako/bellbird (*Anthornis melanura*) that are either now absent from or rare across mainland northern New Zealand.

The silvereye (*Zosterops lateralis*) which naturalised from Australia in the 1850s, may play a pollination role, but is much more important as a nectar robber (i.e. steals the reward without providing the pollination service). The presence of taurepo populations on the mainland where pollinators are either absent or very scarce, and on offshore islands where pollinators are present, provides an opportunity to assess how taurepo responds to pollinator decline/loss. The study showed that where the pollinators are absent, fruit set and the number of seed per fruit are lower than where the pollinators are present. The result is much lower densities of juvenile taurepo where the pollinators are absent. When taurepo seeds were sown at sites without the pollinators, a dramatic increase was seen in seedling abundance – this result is crucial as it suggests that a lack of seeds rather than some other environmental factor is responsible for the recruitment failure (i.e., seed germination, seedling survivorship, and seedling growth).

Similar 'pollination limitation' effects have been demonstrated in other New Zealand species such as toropapa (*Alseuosmia macrophylla*), kotukutuku (*Fuchsia exorticata*), and in forest ecosystems globally.

Extinction of ecosystem function

The key message is that the decline or extinction of a single species can reverberate throughout an ecosystem. Another important message is that the loss of a function in an ecosystem does not require the complete loss of the species that provide it and in fact, functional extinction is likely to precede complete loss of a species.

Notes

[1] Doughty, C. E., Roman, J., Faurby, S., Wolf, A., Haque, A., Bakker, E. S., Svenning, J.-C. (2016). Global nutrient transport in a world of giants. Proceedings of the National Academy of Sciences, 113(4), 868–873.

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The kākāriki of Okiwi

SERENA SIMMONDS (Massey University)

The Great Barrier Island Environment Trust, working with Okiwi School and other community members has initiated a project to find out more about the remnant kākāriki population of Okiwi.

The research is being funded by the Trust, and initially includes two aspects—nest searching and population counts. Nest searches in the study area were carried out in December 2017 and February 2018. Locating potential and active nests of kākāriki / red-crowned parakeet (*Cyanoramphus novaezelandiae novaezelandiae*) was identified as a key component of the research, as nest protection is an important requirement for the management of a species, particularly in areas where predators are present. This strategy has been used successfully on Norfolk Island for the Tasman parakeet (*Cyanoramphus cookii*)[1].

Why kakariki remain in Okiwi

The population of kākāriki persist in the Okiwi Valley despite the presence of ship rats and feral cats. These birds are sociable and vocal, especially when in small groups and are well known to local residents.

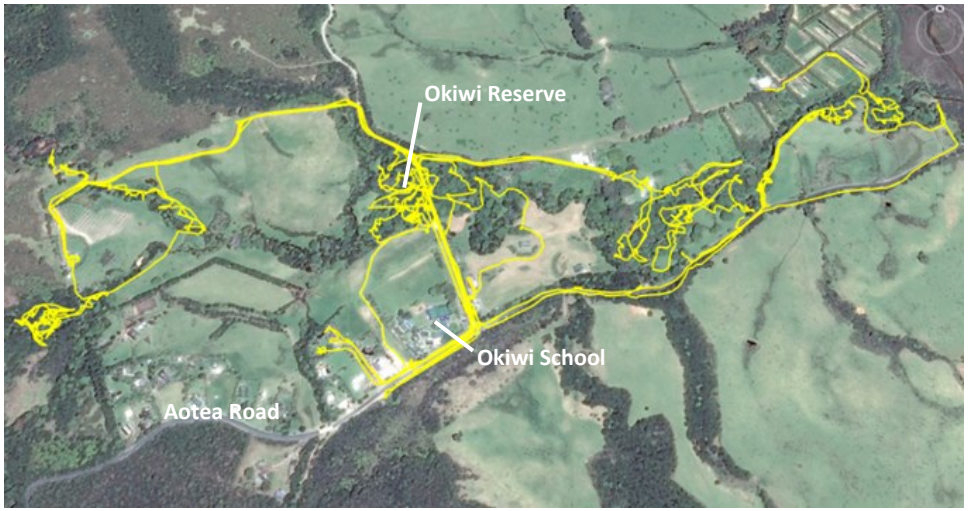
The number of kākāriki resident in Okiwi is unknown, with no formal count or monitoring known to have been undertaken. Single birds and birds in groups of up to a dozen have been sighted in the Okiwi River and adjacent forested areas.

The species is believed to nest in mature puriri trees along the Okiwi River, most likely in the Okiwi Reserve – where Okiwi School has carried out rat control for many years.

Nest search methods

On predator free islands kākāriki can be found nesting in flax, logs, burrows on the ground, and in pōhutukawa (*Metrosideros excelsa*) and puriri (*Vitex lucens*) trees.

The presence of rats and cats in the Okiwi Valley mean that the Aotea Great Barrier Island kākāriki are highly unlikely to be successfully using ground level nest sites.



The yellow track shows areas of the Okiwi Valley where searching was carried out for kākāriki nests in December 2017. A subsequent search in February 2018, covered further areas with mature puriri trees. Further searches are planned for later in 2018.

Kākāriki prefer mature trees with access to water. Sections of bush in the study area were identified as potential nest sites where they had mature puriri trees and were close to watercourses. Permission was sought from owners of each property prior to the undertaking the searches.

Literature on this species informed the identification of potential nest trees. The literature notes that natural nests in puriri trees were found in alive and healthy trees that were greater than 300 mm diameter at breast height, indicating mature trees[2,3].

Photo: S. Simmonds

Unoccupied nest in mature puriri tree, Okiwi Valley.

Puriri tree search and cavity check

Each section of identified bush was searched and suitable puriri trees were identified. Cavities in puriri trees are formed when a tree limb drops off and the scar left behind rots away and becomes hollow. For this reason, young trees were not searched as they most often have all of their limbs attached. Every tree that fits the criteria was searched for cavities, and if a cavity was found, it was examined for bird activity if accessible.

Bird activity included droppings, feathers, complete eggs or shell fragments, chicks or adult birds. If adults, chicks, or eggs were seen it was recorded as an active nest. If only presence indicators (droppings and feathers) were noted, it was recorded as unoccupied.

Any cavities with no bird activity, but otherwise suitable (for example a dry hollow with a large enough cavity), were recorded as potential nest sites. All active nest sites, unoccupied or potential sites had their location recorded.

Nest search results

Four nests were found with signs of bird activity: one active, two unoccupied, and one considered a possible nest. The active nest was found in the Okiwi Reserve. The entrance to the nest was formed by a fallen limb and is approximately 5 m from the ground and is roughly 40 mm long and 20 mm wide. Two birds were observed near this nest and one was seen entering the entrance.

The first unoccupied nest was found in a medium size puriri tree near Mabey Road and was about 1.6 m from the ground with a small entrance. This nest had a few feathers found inside it but no sign of current bird activity.

The second unoccupied nest was found on the short scenic walking track that crosses through the Whangapoua Reserve off Aotea Road. This nest was in the base of a large puriri tree, approximately 0.5 m from the ground. This nest had a skeleton and feathers present but no signs of current activity. A possible nest was also found on private property close to the estuary in a large puriri by the stream. A bird was perched, calling, approximately 6-7m from the ground in this tree, near a hollow. The bird was gripping on to the tree and proceeded to go upside down and stick its head into the roots of a widow maker (*Collospermum hastatum*), near the hollow.

Photo: J. Scarlett

Interior of a potential nest site with rat droppings present, Okiwi.

A total of 49 potential [kākāriki] nests were identified in puriri trees around the Okiwi Valley area.

Some of these (n=4) were found in the bush area adjacent to the Department of Conservation offices, while the majority were found in the Okiwi Reserve beside the school and private properties bordering the Okiwi Stream. Some of the trees had multiple hollows at varying heights. Some of the potential nests had rat droppings present.