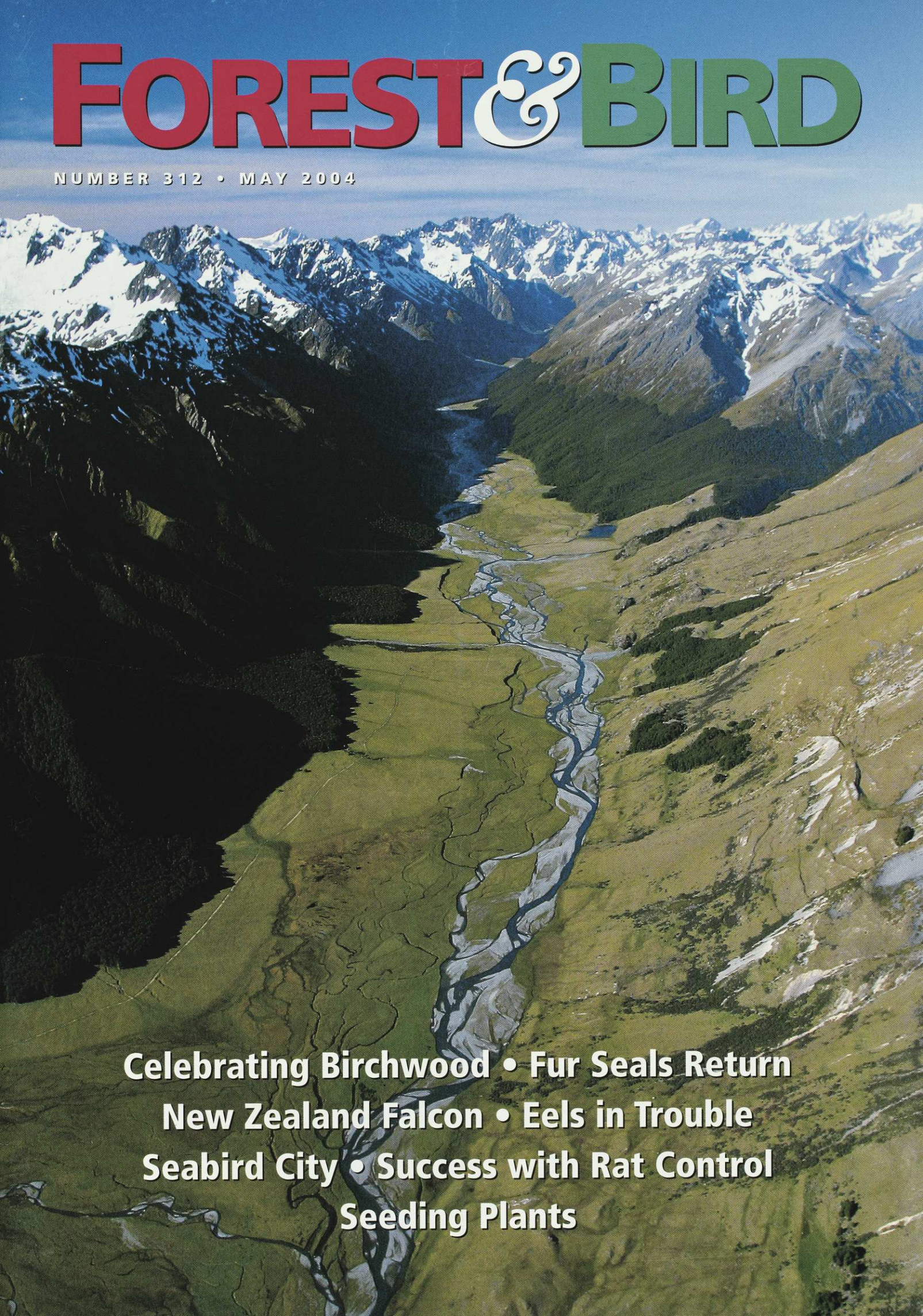
FOREST & BIRD

NUMBER 312 • MAY 2004



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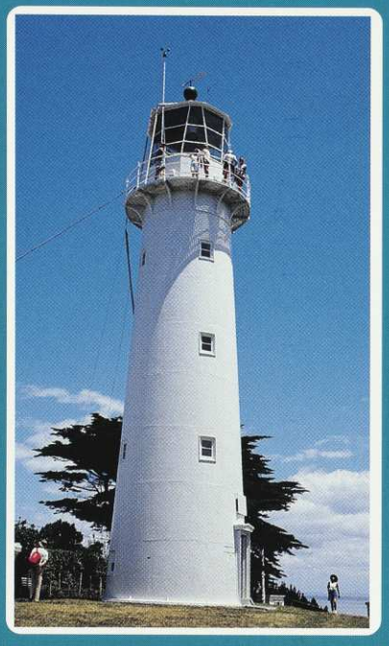

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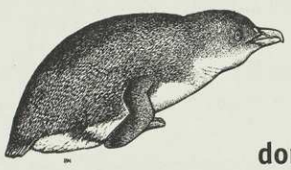

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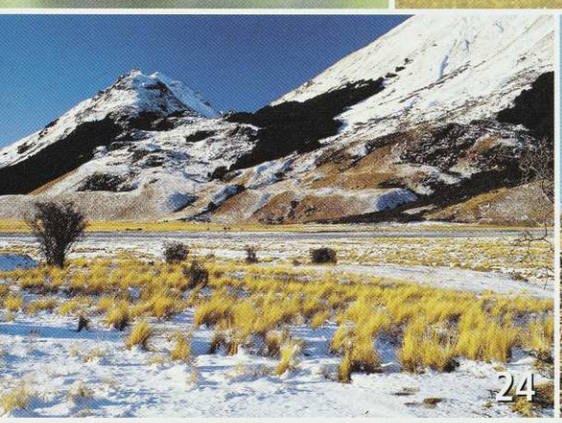

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COVER: On Birchwood Station, purchased by the Nature Heritage Fund as a high-country reserve.
PHOTO: GILBERT VAN REENEN, CLEAN GREEN IMAGES

Campaigning for Life in the Sea

Sea lions in New Zealand's subantarctic recently won a reprieve when the fishing industry lost a High Court case against the Minister of Fisheries, Hon. Pete Hodgson. The fishing industry had challenged Government efforts to limit the industry's killing of sea lions. The Court didn't agree and so limits remain in place.

This is a really good example of a conservation decision that has benefited from the pressure Forest and Bird members have put on the Government over many years of campaigning. The Government was prepared to stand up in the courts because they know New Zealanders care about protecting sea lions.

Whoever we are, wherever we are from, either ourselves or our ancestors came across the sea. We live on islands and the sea is a big part of our lives.

My work takes me onto the water to study dolphins and whales. This summer I joined a team of other scientists, from the Department of Conservation and the University of Otago, in surveys of Hector's dolphins off Banks Peninsula and along the North Island west coast. And last winter, with an international team of researchers, I sailed to Tonga to study sperm whales.

It has been a privilege to see most of the New Zealand coast from the water and to explore the open ocean. But it's been a real worry to see the pressures on the marine environment increasing steadily.

Ever-larger areas of our oceans are being explored and exploited, around New Zealand and elsewhere. The sea floor is affected by trawling, at times destroying corals older than rimu and kauri trees. Many of our fish species are declining, including those under the Quota Management System such as hoki and orange roughy. Many seabird and marine mammal populations are declining because of inappropriate fishing. And large inshore areas are taken up with existing or planned aquaculture activity.

Following the success of last year's 'High Country Roadshow', Forest and Bird will be taking a 'Marine Roadshow' to communities around New Zealand. We will use the roadshow to promote a new initiative for the public to directly influence the impact of commercial fishing on the marine environment.

In each town visited we will discuss marine issues relevant to the local area whether over-fishing, impacts on seabirds and marine mammals, aquaculture or pollution. An important part of the 'roadshow' is to engage people in discussion about solutions to the current problems of managing our oceans.

Science is on our side and we need to make sure that this science becomes better-known and understood.

The 'roadshow' will focus on 'what you can do' as a consumer, member of Forest and Bird and member of the public. One of the simple things you can do, for example, is when you next buy fish — ask how it was caught and what the bycatch was? The shopkeeper may not know the answer, but it is important that the shopkeeper knows that you care.

By working together we can make a huge difference. Our campaigning on behalf of the high country has made significant gains over the last year. The high country treasure of Molesworth Station was agreed to be transferred to the Department of Conservation last year — the largest extension to public conservation land since the protection of South Westland rainforests.

More recently, the Government purchased Birchwood Station, (featured in this issue of *Forest & Bird*). Birchwood is an important mountain area south of Aoraki/Mt Cook and home of the endangered black stilt or kaki.

We can do it again to save our seas.

Dr LIZ SLOOTEN
National Executive

TONY AND JENNY ENDERBY

Forest and Bird is campaigning to save the variety of life in the sea.

Mailbag

Forest & Bird welcomes brief comments or criticisms about items or issues in the magazine. We reserve the right to edit letters for length. The deadline for our August issue is May 31, 2004.

Introduced Fish

Your correspondent, Charles Clark (*Forest & Bird*, February 2004), says that while Fish & Game New Zealand has made 'much of the running in water issues' in the last few years readers should remember that introduced trout and salmon are predators on native fish.

Fish & Game signalled to Forest and Bird some years ago that it was prepared to help out where it could to protect the biodiversity of New Zealand's aquatic indigenous fauna. We have a long standing organisational policy prohibiting salmonid releases into catchments that have never had them before. And we do not have a closed mind to proposals for their removal in minor sub-catchments where a reasonable case can be made for that to occur on biodiversity grounds.

Yes, Fish & Game has focused on 'water issues', and Forest and Bird has joined us on some of these initiatives; the most recent example being our 'dirty dairying' campaign to get the dairy industry to clean up its environmental act. For Fish & Game's part we have welcomed this 'strategically' approach with Forest and Bird as a very effective conservation tactic.

Water quality and stream flows protect trout and the pastime of angling, but also benefit indigenous fish and other recreational users. Recent Government documents identify 209,000 hectares of potential irrigation development (a 45 percent increase on the present) and 137 potential hydro schemes.

Surely we ought to be fostering and strengthening our strategic relationship when we face such powerful common enemies of aquatic habitat.

— BRYCE JOHNSON,
Director, Fish & Game New Zealand

Correction: the letter last issue was by Charles Clark, not Charles Garden.

Pig Damage

Since 1996, a volunteer group led by Laurence Gordon has managed over 800 bait stations in the Northern Pureora Mangatutu Forest to protect a healthy expanding population of kokako.

In this 2003-2004 season we estimate that 68 percent of the bait stations were ravaged by marauding wild pigs. Many bait stations were ripped from their mountings and a number were completely lost in the thick bush.

Investigations revealed that ARC pest control teams using talon in the Hunua Ranges had experienced similar problems with pigs.

We are left with the arduous task of repositioning all the bait stations up out of reach of the pigs — about 1.5 metres above ground. Groups around the country involved in similar protection work are well advised to adopt this as standard practice.

— MIKE AND SHAREN GRAHAM
Waitakere Forest & Bird

Finding Places

The *Forest & Bird* magazine is really good and I look forward every time to the next issue. Sometimes I get a little bit 'homesick' for New Zealand because we lived there for one year.

Although I know New Zealand a little bit I always miss a little map with the area marked. For example where is Pauatahanui, or Manawatu Estuary, or Mangere Mountain? Please attach a little map to most of the articles in your magazine.

— ANDREAS WEBER *Switzerland*

Often, providing specially drawn maps is difficult for reasons of scale and space. Every effort is made to locate places through references in the text so they can be found in a New Zealand atlas.

conservation*briefs*

NZ Petrel Rediscovered

BRENT STEPHENSON

The rediscovered New Zealand storm petrel.

Believed extinct for more than 150 years, the New Zealand storm petrel has been rediscovered in waters off the Coromandel and the Hauraki Gulf. The New Zealand storm petrel, provisionally *Oceanites maorianus*, was previously known only from fossil remains and three specimens found in the nineteenth century.

The birds were first reported in January 2003, when members of a New Zealand birdwatching tour saw a strange black-and-white storm petrel while looking for seabirds out of Whitianga on the Bay or Plenty coast of the Coromandel Peninsula. The birds were photographed by a New Zealand ornithologist, Brent Stephenson, and arguments began over what they could be. A further sighting last November produced more photographic evidence.

This time two British ornithologists chartered a boat and laid a trail of fish scraps just north of Little Barrier Island, a wildlife sanctuary on the outer Hauraki Gulf. The scraps attracted 10-20 small petrels. The arguments over their form continued: it was decided the birds were neither the black-bellied storm petrel *Fregetta tropica*, nor the white-bellied storm petrel *Fregetta grallaria*. The photographic evidence led the birdwatchers, Bob Flood and Bryan Thomas, to compare the birds with records of an 'extinct' New Zealand storm petrel. The 'mystery' birds had a slighter build and structure to the other storm petrels.

New Zealand storm petrels have since been seen by other birdwatching parties searching offshore.

'Presumably the species has managed to survive on a predator-free island, possibly in the Hauraki Gulf,' says Barry Weeber, a senior conservation officer with Forest and Bird. 'A priority now is to find out exactly where these birds are breeding, assess and monitor their population, and put in place appropriate conservation measures.'

Further details and photographs may be found on the internet at www.wrybill-tours.com and in a report by Bob Flood and Brent Stephenson, on the website of Birdlife International, with which Forest and Bird is affiliated as the New Zealand member. Try: www.birdlife.org/news/news/2004/02/ nz storm-petrel.html

Bigger Survey of Favourite Plants

A new survey to find New Zealand's 10 most-loved plants has confirmed the old favourites but produced three new ones. The survey was conducted through *Forest & Bird* magazine by Prof. Ian Spellerberg, director of the Isaac Centre for Nature Conservation at Lincoln University in Canterbury.

The 2003 vote for 'the most favourite native plants' was greeted with much enthusiasm with 364 votes (104 up on the previous year). The entries came from school children, including some entries which were very colourful and well illustrated, and adults living in both New Zealand and Australia. In some cases the entries were simple lists with no explanations, but in many cases the names of the plants were woven into a text.

The 2003 vote resulted in the following top 10 being the 'most favourite'.

By far the highest score and the same as last year was pohutukawa.

Well below but very close together were kowhai (number 5 in 2002) and ti kouka, the cabbage tree (number 2 in 2002)

With a still lower score but with very little difference between them were number 4 rimu (number 6 in 2002); nikau palm, fifth (number 4 in 2002); and kauri, at six, down from number 3 in 2002.

Harakeke, or flax, was seventh.

The three plants not in the previous top 10 were clematis on 8, the tree fern on 9 and manuka on 10.

A few other native plants were also very popular, including the totara, rata, horoeka or lancewood, ponga or silver fern, puriri, beech species, kahikatea, kaka beak and tree fuchsia.

Why is pohutukawa so popular? Perhaps the following examples of quotes from the many entries gives some idea: 'better than any jungle gym as a kid!' 'Should be New Zealand's national tree. Grows everywhere and the flowers are beautiful'. 'A comfortable tree — providing little nooks to sit and read on a summer's day'. 'They have tenacity and strength — growing on cliff faces and leaning out to sea'. 'They mean summers and family picnics in the shade of massive trees — sand flecked with red stamens'. 'Pohutukawas — bush, beach and blue sea — tuis, a trunk to sit on, a picnic on the reddened shady sand and a boat moored off the beach'. 'Pohutukawas — its Christmas'.

One other favourite is worth a mention; or is it a love-hate relationship? Many people hate cabbage trees because of the leaves which become entangled in lawn mowers. Others said: 'Cabbage trees are evocative of New Zealand. I love the old specimens. At this time of year the heavy scent is beautiful and hangs in the air'. 'Cabbage trees — beautiful and distinct, evoking memories of New Zealand landscapes'. 'Used to think of them as ugly but now they are one of my favourites'. 'A New Zealand icon and great for the birds'. 'Cabbage tress like flax — there's variety and colour for every garden'. 'Cabbage trees — archetypal New Zealand tree but often overlooked'. 'Cabbage tress — the quintessential New Zealand of the open countryside'. 'Brilliant white or cream flowers and wonderful scent'. 'Cabbage trees — often taken for granted — but I fell in love with them after returning from overseas'. 'Cabbage trees — have leaves to make a fan — preparation of summer to come'.

GORDON ELL, BUSH FILMS

Pohutukawa is the outstanding 'most favourite native plant', according to a poll of Forest and Bird members. It grows naturally in the warmer regions of the North Island but has been successfully planted in cooler places including the Kapiti Coast near Wellington.

There seems to be much support for an annual vote for the '10 most favourite' New Zealand native plants. Interesting, however, that at least one person suggested having a vote for the 10 most hated exotic plants. Examples of these included phoenix palms, willow trees and thujas.

There are plans for a 2004 vote and details will be announced in the November issue of *Forest & Bird*.

— IAN SPELLERBERG

A Few Frogs Have Survived the Fungus Epidemic

High in the Coromandel hills, researchers have found pitifully few survivors of the chytrid fungus epidemic which has been killing the endangered Archey's frog. But, they say, this is a start.

As soon as the varsity term was over, Ben Bell headed to the cloudy tops of the Coromandel range and started turning over rocks. It was a long time before he found what he was looking for a glossy brown frog, no bigger than a matchbox.

His study site at Tokatea Saddle yielded just two more — including, significantly, a juvenile — but he went away happy. He'd discovered the survivors of one of New Zealand's biggest ecological disasters of recent times.

Coromandel was once a stronghold of Archey's frog, one of the world's most ancient, unique animals. Until 1996 that is, when Archey's populations along the peninsula collapsed, then vanished before a lethal, invisible presence.

Autopsies delivered the news everyone was dreading; chytrid fungus had spread from introduced Australian frogs into our native species. Dr. Bell, a herpetologist at Victoria University in Wellington, has been studying Archey's frogs for over 20 years. He says chytrid fungus may have wiped out 85 percent of known populations.

SHAUN BARNETT/BLACK ROBIN PHOTOGRAPHY

Archey's frog, an ancient New Zealand reptile on the brink of extinction.

A Department of Conservation science manager, Don Newman, sees little point in funding more research on the chytrid fungus, however.

'We still don't know how it kills frogs, and may never' he says. 'It's here now; we just have to live with it.

'Rather than DoC spending money on the disease — with no guarantee of an outcome — we're better off investing in ways to improve the chances of those frogs that are left. Things like more translocations (transferring frogs to safe refuges) to spread the risk, more intensive predator control — all those things that you would normally do to try and manage any threatened species.'

Over the last 200 million years, Archey's frogs have faced many crises — Ben Bell says they even took the upheaval of the Coromandel gold rush in their stride — but with their numbers now so perilously low, one more blow, such as predation by rats, could tip them over the edge.

'There is a so-called critical limit,' he says, 'and an 85 percent crash must have taken them awfully close.'

But Ben Bell is heartened by the discovery that some Archey's have survived the chytrid fungus; even more so by signs that they're breeding again. (When frogs reach critically low numbers, they have trouble even finding a partner to mate with.)

Ben Bell can't be sure, but the hope is that the survivors of Coromandel might have some hereditary defence against the fungus, and will start filling the gene pool with a new, genetically resistant, population.

'They're down, but not out,' he says.

— DAVE HANSFORD

Mislabelled Plant Turns Out to be Pest

Gardeners who think they have an ecologically friendly garden of native grasses may in fact be harbouring a noxious weed.

Mexican feather grass, or *Nassella tenuissima*, is popular for its attractive light-coloured foliage and fluffy seedheads, but is a major ecological weed. Unfortunately some nurseries mislabelled Mexican feather grass as a native poa tussock grass. Although it was withdrawn in late 2001, it had already made its way into gardens and is still being unintentionally distributed by people who do not realise it is a noxious weed.

It can germinate, grow to maturity and seed within four months. Each plant produces thousands of wind-dispersed seeds each season and is capable of out-competing native ground-cover plants in a wide range of habitats. It is also unpalatable to stock.

Mexican feather grass is closely related to nassella tussock, or *Nassella trichotoma*, a highly invasive native plant of Argentina which has cost New Zealand millions of dollars to control to date.

Mexican feather grass is on the National Plant Pest Accord list, which means it is illegal to sell, propogate, commercially display or distribute it. The National Plant Pest Accord originated from the Forest Friendly Award scheme. This scheme was developed by Forest and Bird in 1993 to encourage plant outlets not to sell plants that were environmental weeds, and was quickly adapted by government agencies.

In some regions where Mexican feather grass is still not widespread, such as Auckland, councils are trying to eradicate it. Contact your regional council if you think you may have Mexican feather grass in your garden.

— SARAH GIBBS

ROD SMART

Mexican feather grass, a pest species closely related to nassella tussock, was formerly sold in nurseries as an endangered species of native poa tussock. Now classified as a national plant pest it should be removed from gardens.

A Cunning Trick May Fool Offspring

A pioneering exercise in low-down deceit is approaching a moment of truth on Mana Island off the Wellington west coast. Fairy prion chicks from Stephens Island/Takapourewa in Cook Strait are being encouraged to think Mana Island is really their home.

The theory is simple enough: take prion chicks from their burrows on Takapourewa before they've had a chance to call it home. Then fly them by helicopter to Mana, a Department of Conservation sanctuary off the Plimmerton coast north of Wellington, and place them in artificial burrows. Feed them, then hope that by the time they fly the nest, they've adopted it as their birthplace.

At transfer time, the small crowd is struck silent as the echo of Anaru Paul's haka fades among the low hills of Mana Island. The only sound is a scuffling from one of the cardboard cat boxes at his feet. Inside are fairy prion chicks, perhaps six-weeks-old, plucked by Anaru Paul and some doughty helpers from natal burrows on the steep brown cliffs of Stephens Island.

To that end Colin Miskelly, a DoC technical support manager, has left nothing to chance — right down to a handful of original nest material from Takapourewa being placed in each of the artificial burrows to give all the right olfactory cues.

The prions are just the first intake in a long list of original inhabitants — birds, reptiles, insects — that DoC wants to bring home to Mana as part of an ecological restoration plan.

DAVE VEITCH © DEPARTMENT OF CONSERVATION

Fairy prion's viewpoint from an artificial nest tunnel on Mana Island to encourage them to return to the island. A Department of Conservation contractor, Helen Gummer, is placing a fairy prion chick from Stephens Island/Takapourewa into its new home.

'Just how the chicks imprint on their home site is still fuzzy science,' says Colin Miskelly. 'It could be the landscape, the wind direction, smell or even magnetic fields.'

Experiments have shown (by the low-tech expedient of placing a matchstick at the mouth of each burrow) that nearly half of the chicks on Mana leave the burrow the very first time they venture to its entrance.

Once they lift off into the Cook Strait northerly, their feet won't touch dry land for two or three years.

The first batch of prion chicks — 40 of them — was brought to Mana in 2002. That means the acid test of Miskelly's theory will be conducted this winter — around July or August — when he'll be anxiously scanning the skies for signs of his brood returning.

'We've kept the bubbly on ice till then,' he says.

Just in case they still need some help, he's placed an array of weatherproof loudspeakers along the cliff, playing the welcoming calls of their kind.

Meanwhile, every day, a small army of surrogate parents put water and sardines (Brunswick, not Chilean — they tested them both) in a blender and mix up a fetid, oily puree. Then they extract each of the 100 chicks, weigh them, and measure them, before syringing the 'sardine smoothie' into the chicks. Then they're weighed again, to establish just how much food they've taken on board, and reconsigned to the darkness of the burrow.

For Colin Miskelly, scaling vertical cliffs and rummaging in reeking nest burrows crawling with fleas is a kind of investment in the future. Fairy prions aren't endangered (there are an estimated one million pairs of them on Takapourewa alone) but that's just the point. Colin Miskelly wants to practice these techniques on more common birds first before applying them to some of our critically threatened seabirds, like the Chatham Island taiko or magenta petrel (down to 15 breeding pairs), and the Chatham petrel. (See page 32 this issue.)

If it works, this curious blend of animal psychology, husbandry and deception will be a world first.

—DAVE HANSFORD,
Origin Natural History Unit

Kiwi Recovering in Bay of Islands

There's good news for northern kiwi: local people are on their side. Private individuals, especially landowners, have joined the fight to save the North Island brown kiwi *Apteryx mantelli*.

In the greater Bay of Islands alone, nearly 10,000 hectares of privately owned land is now managed for kiwi.

When a landowner near Russell asked Laurence Gordon, a predator-control expert, for advice in 2001, Laurence took one look at the map and decided to treat the whole Russell Peninsula. Now, 100 landowners are involved. A predator-proof fence crosses the peninsula (see *Forest & Bird*, November 2001), and intensive trapping plus brodifacoum poison have knocked back the predators on the 2500-hectare peninsula. The project's maintenance costs are $27,000 a year.

Two charitable trusts, Enterprise Russell and Russell Landcare Trust, got funding and raised public awareness for the Russell Kiwi Project. Residents didn't need to be told about the number of stoats — they saw them in their gardens.

Kiwi can now be heard right in Russell, at Flagstaff Hill and Matauwhi Bay. Other good listening posts on a moonless night in the Bay of Islands are: Orongo Bay; Opito Bay; Mt Tikitikioure near Russell; behind Paihia; and on Mt Bledisloe near Haruru Falls. High vantage points are best. Call counts, conducted by the Department of Conservation throughout Northland since 1995, show that the decline of the late 1990s has been halted. The Bay of Islands' average count is 10 kiwi calls per hour.

Mataka Station on the Purerua Peninsula surrounds the Marsden Cross Scenic Reserve, where boaties anchored in Rangihoua Bay can hear vocal kiwi — the call counts here are about 20 an hour.

Greg and Gay Blunden manage Aroha Island near Kerikeri under a Queen Elizabeth II National Trust covenant. This is a good place to see kiwi. Greg emphasises that no one should go crashing around in kiwi country alone. People may walk on formed tracks, but should cover their torches with red cellophane so as not to dazzle the birds.

Dr Blunden is a founding trustee of the New Zealand Kiwi Foundation, a trust that focuses on privately owned land. Laurence Gordon operates the Russell and Purerua kiwi projects for the Foundation.

Another New Zealand Kiwi Foundation trustee, Lindsay Charman, is an ex-DoC kiwi advocate. While agreeing that 'the great calling' is a joy to hear, he worries that we may be listening to 'a bunch of pensioners', the stoats and cats having got the little ones.

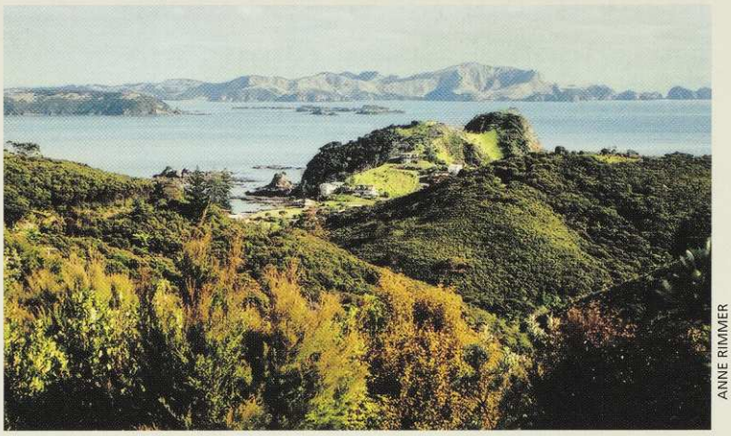
'There may not be enough adults to keep the populations viable long term,' says Lindsay Charman, 'so you have to do the work. If you aren't doing predator control, kiwi are going to disappear.'

Kiwi are also on some islands in the Bay, including Moturoa, Motukiekie, and Motuarohia (Roberton Island). Landowner Mike Alexander has planted over 200,000 trees on Motuarohia, 'giving something back to nature'. The original pair of kiwi Mike Alexander introduced in 1978 has increased to 17 fat, healthy individuals in a space which should, in theory, support only two pairs.

It's a grim way to do a census, but when juvenile kiwi show up as road-kill you know the local kiwi are managing to breed effectively. On average, five kiwi die on roads around Kerikeri each year, and the New Zealand Kiwi Foundation has stencilled kiwi silhouettes on the roads and placed warning signs in an attempt to reduce the toll.

Enhancing kiwi habitat helps other wildlife too. On the Russell Peninsula, brown teal, little blue penguins, New Zealand dotterel and weka are thriving. The number of tui in Russell township alone, attests to the benefits of effective predator control.

— ANNE RIMMER



ANNE RIMMER

Looking north over Tapeka Point, from Flagstaff Hill above Russell, shows dense cover for kiwi on the peninsula. On the far side of the Bay of Islands is Purerua Peninsula, where landowners have established another protected kiwi area.

An Ark in the City – Percy Reserve

Many of our rarest and most-endangered alpine plants are clinging to existence next to a Wellington motorway.

DAVE HANSFORD, ORIGIN NATURAL HISTORY UNIT

Jill Broome raises rare and endangered plants at Percy Reserve to save them from extinction.

Take State Highway 2 north out of Wellington. By the time you've hit third gear out of the Korokoro lights, you've already passed the country's biggest and most precious collection of threatened native plants.

Percy Reserve is a 13-hectare mosaic of cultivated borders, stately exotics and regenerating native forest. Each year, thousands of visitors find tranquility here beside the duck ponds and daffodils, but just behind a huddle of tatty sheds is Percy's true worth.

Put your shoulder to the sticking gate and you've entered a kind of living museum — a frame grab from a time when biodiversity found full, unbroken expression across our hills and mountains, before all those gaping holes appeared in the cloak.

More than 400 threatened plants huddle under the partial shelter of the alpine house. For some, this is their last recorded location. There are another 150 in the shade house, countless others spread about outside, and Jill Broome has the job of keeping them all alive and well.

Every day she does a slow patrol along the trestles, like a shepherd among her flock, casting a practised eye over ranks of celmisias, ranunculus, carmichealias for the first signs of pests or dieback.

The place looks almost shambolic, but every pot is in the optimum place, arrived at by careful trial, error and observation — and more than a modicum of gut feeling.

'Either you've got it or you haven't,' says Jill Broome. This plant prefers the morning sun, this one likes a bit more wind — many don't do well in the alpine house at all, but are thriving in the fernery. She is making this up as she goes along, because there's no manual to follow, no website to consult.

'You can look in a book, but the plants aren't in there. Or what is in there doesn't always work.'

So more often than not, she takes a second guess based on a close relation. She says the key is to establish precisely what conditions a rare plant grows under in the wild, assuming there are any left. Then she sets about replicating those conditions as best she can. But while the sheds have misting systems and heat beds, many of the plants don't respond to such coddling. That's when Jill Broome goes low-tech. A saucer of water under the pot helps bog plants. The ones that enjoy plenty of rain go under the leaks in the roof.

And because plants don't live forever, she's busy taking cuttings, propagating, collecting seed. Jill Broome has become a surrogate for the wind, the insects or the birds that would have kept these lines going, but it's a numbers game played with daunting odds; perhaps 200 cuttings might take from 1000 attempts.

None of which fazes her in the least. A member of the New Zealand Plant Conservation Network, she's forever looking for ways to build up the collections, doing swaps with other nurseries and botanical groups.

Percy Reserve is a kind of ark-cum-halfway house. Some plants have been brought into for custody here until it's safe for them to be returned to the wild.

Plants such as *Sebaea ovata*, an herbaceous coastal plant from the Wanganui dunes, have been raised here. Four hundred seedlings have since been planted out in the Kaipara. They are doing well at a site tightly managed to keep out stock, people, vehicles and weeds.

Or one of our rarest native brooms, *Carmichaelia juncea*. All searches of its former home around Lake Pearson failed, and it was thought to have been lost until someone noticed one in Broome's alpine house, grown from seed brought back from the Edinburgh Botanic Gardens. The Department of Conservation is now growing it in its Motukarara nursery.

Sadly, others may never leave.

Jill Broome's charges face threats here that even the mountains can't dish out. Next year, Transit New Zealand will bulldoze her shade house, the alpine house and much of her outdoor displays to make room for 'improvements' to State Highway Two.

She has 18 months to duplicate the collections and get them out to safe, suitably qualified havens, spreading her investment. In the meantime, floods, droughts and ageing infrastructure are a constant worry.

'We're right on a fault line here. Or if that old glasshouse broke down…' she can't bear to finish her own sentence. But she will be up bright and early doing her rounds tomorrow, and the next day, because Percy Reserve isn't about next year, it's about 100 years from now, and 100 years after that.

'We're planting for posterity,' she says.

— DAVE HANSFORD,

Origin Natural History Unit. Percy Reserve is funded by Hutt City Council.

Officially classified as a Scenic Reserve, Percy Reserve is part of the national conservation estate. It is leased to the Hutt City Council and is managed on its behalf by Excell Corporation.

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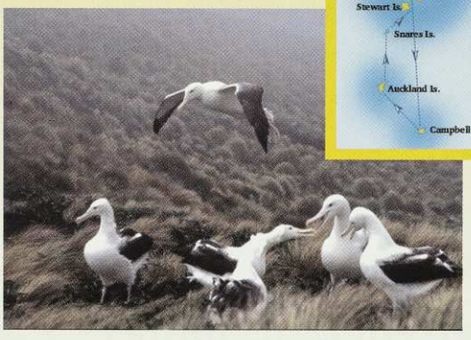

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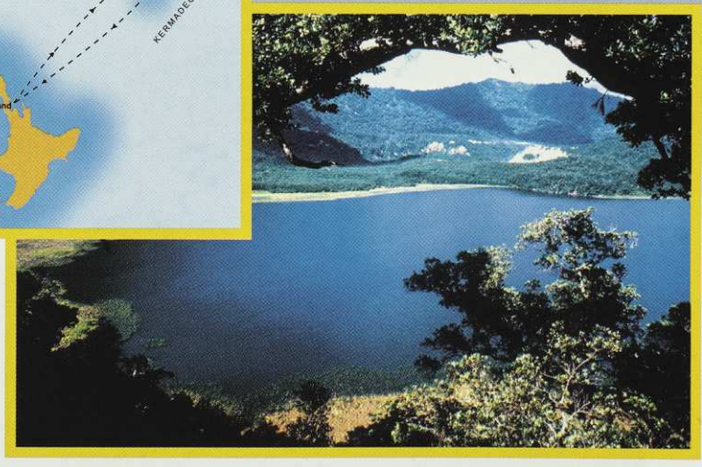

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Return of the Fur Seal

It has taken 200 years for the fur seal to recover perhaps five percent of its former numbers yet some would have it culled again, writes DAVE HANSFORD.

Each June, millions of hoki leave their feeding grounds around New Zealand and make unerringly for the dark depths of the Hokitika Canyon. In the cold mid waters between 300 and 700 metres, they swarm in nuptial fervour. By the month's end, each female will have released over a million eggs.

This annual feast of riches has not gone unnoticed by others. Ashore, along the West Coast of the South Island, female New Zealand fur seals leave their pups in small crèches and make the 165-kilometre journey west to the canyon to feed. The hoki teem at a fur seal's theoretical limit of diving endurance — a limit research has shown they routinely break by plunging to over 270 metres for 10 minutes or more, making them the deepest-diving fur seals studied anywhere in the world.

But their feats pale before the efforts of humans.

Around early June, up to 60 New Zealand and foreign trawlers arrive at the grounds, shooting nets in midwater with a gape the size of a rugby field — lengthwise, they would comfortably hold a 14-storey building. Prior to the 1970s, any hoki they caught would have been dumped at sea, but today it's New Zealand's single most valuable species.

DICK VEITCH

Two New Zealand fur seals on a rock on Rangatira, South East Island, Chatham Islands

Fur seals can only pick off the shallowest stragglers of the swarming hoki — the vast bulk are beyond their reach — so they've found it much easier to steal a meal from the fishers, who will tell you that the seals can distinguish between the sound of a winch in freespool setting an empty net, and the groan of one hauling a full net to the surface.

Which is when they pounce. As the net wallows in the trawler's wake, the seals dash inside before it can be drawn closed.

Once the net is shut, however, there is no escape. The lucky ones are drawn aboard, although they may be severely injured; the others drown or are crushed. In a workaday situation, a net may snare a couple of seals for every hundred tows, but in the rare instance when the machinery fails and the net is left trailing off the stern, seals can die in their dozens.

This 'bycatch' is not confined to the Hokitika Canyon; seals also die, though in far fewer numbers, in fisheries on the Snares Shelf, the Bounty Islands, the Chatham Rise and Cook Strait among others.

The chief executive of the Hoki Fisheries Management Company, Richard Cade, says the industry is working hard to reduce fur seal deaths. Trawler crews have changed the way they work to try to stop seals entering their nets. For instance, if seals are present, the vessel may steam flat-out for another 15 minutes before shooting the gear. Boats are instructed not to make any wide turns while the mouth of the net is still open. Crews have found it helps to keep deck lights to a minimum, and dumping offal overboard is a banned practice.

But seals still get in, and hopes for them rest with an invention called a SLED or Sea Lion Excluder Device. In simple terms, the SLED is a steel grate installed near the end of the net that allows the catch to pass through, but directs trapped seals upwards and out of the net through an escape hatch. It's been 12 years in the development, and Richard Cade says it still needs more work. The challenge has been to make sure that both seals and the valuable catch haven't been damaged against the grate.

The SLED was originally designed to save New Zealand sea lions however, and Richard Cade says that because fur seals are smaller animals, the device needs a narrower grid. But hoki can grow to a metre in length and end up getting mashed against the steel bars, raising what he calls 'fish quality issues.'

'I'm not sure how we solve those, but I want to find a solution that's good for industry and seals. We are having some effect, but we haven't got as far as we'd like.'

So while SLEDS have been tested on fur

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Life History of the New Zealand Fur Seal

There are two discrete populations of New Zealand fur seals: one around the New Zealand coast and outlying islands, including the subantarctics; and one in southern Australia. There is growing evidence for two genetically distinct subspecies, although their ranges overlap, prompting calls for a re-evaluation of their taxonomic status.

Adult females grow to about 1.2 metres in length and weigh around 40 kilograms — a petite frame beside the bulls, which can reach 1.6 metres and tip the scales at 160 kg.

Fur seals are not quite at the top of the food chain; large sharks such as white pointers and orca killer whales routinely hunt seals. New Zealand sea lions have been seen taking juvenile fur seals in the subantarctic islands.

They are itinerant hunters, following seasonal flushes of productivity and switching between a wide range of prey as abundance fluctuates. They take lanternfish, anchovies, jack mackerel, barracuda, and hoki, often hunting at night (those big round eyes aren't just there to make the pups look cute), when squid rise to within their diving range.

In summer, they hunt over the continental shelf or near its slope diving continuously from sundown to sunrise. In autumn and winter they forage up to 200 kilometres beyond the continental slope, making their deepest dives, routinely beyond 100 metres.

Outside of the breeding season, fur seals gather at haul-out grounds around the country, some well north of their breeding range.

While a hauling ground can take any form, fur seals have very specific preferences for rookery (breeding) sites, normally along exposed west or northwest coasts, with a supply of rock pools for pups to learn to swim in.

Males are sexually mature after five or six years but are unlikely to command a territory for at least another three. A 'beachmaster's' reign may last for five years, during which he will mate with every female he can attract.

From early November, bulls arrive at the rookeries to claim territory, which they then defend vigorously. The cows arrive a month later.

Females reach sexual maturity between the ages of four and six, normally bearing a single pup every year until their death — on average between 14 and 17 years. Ninety-five percent of pups are born in December.

A week later, the cows mate again but the fertilized egg will not implant in the uterine wall for another three months, bringing gestation back to around nine months.

By mid-January, the rookeries are emptying fast but cows alternate foraging trips of one to 20 days at sea with periods of one or two days ashore to suckle their pups for around another 300 days.

Pups start to feed on solid food before weaning. They spend a lot of time playing with other pups and 'toys' such as seaweed and reef fish, learning hunting skills for later life. Once weaned, pups disperse alone — juvenile fur seals have been found over 1000 kilometres from their natal rookery — and most reports from the public of 'lost' or 'sick' animals start coming in around this time.

Although fur seals have had full protection since 1897 (with a couple of brief, local lapses), they have recovered only to an estimated five per cent of their former numbers. They are also covered by the Marine Mammal Protection Act and sections of the Fisheries Act, but continue to fall victim to trawl nets, longline hooks, discarded plastic rubbish and dogs on land.

seals, they are yet to be used in everyday hoki fishing, and Richard Cade says they may never be. He says the future safety of fur seals, in the hoki fishery at least, will probably rest with individual skippers and a code of practice.

'That's not good enough,' says Forest and Bird's senior researcher Barry Weeber. 'I don't think a code of practice is going to work. In reality, it's the same code of practice that's been around since 1989, and all it's achieved is better gear deployment.' He says the industry has to try harder. 'We think the industry's been very slow; they could have been more proactive than they have been.'

Nevertheless, fishers point to the fact that fur seal bycatch has been coming down in recent years, but that trend comes with a caveat — so has the overall fishing effort. The total allowable commercial catch for hoki has fallen from 250,000 tonnes in 1997 to 180,000 last year. That means fewer trawls and, quite simply, fewer 'seal/vessel interactions'.

In all, the National Institute of Water and Atmospheric Research estimates that around 12,000 fur seals have died as fishing bycatch in trawl and longline fisheries between 1990 and 2000.

Nobody knows whether this is hurting the fur seal population as a whole, because it is simply not known how many there are. A census in the early 1970s estimated a national population of 39,000 animals, but many have questioned the accuracy of that survey and nobody has attempted one since.

Barry Weeber says hard evidence shows fur seals are making a strong comeback at the Bounty Islands, and casual observation reports smaller gains in Otago, Marlborough, Nelson, and Wairarapa. He says there are probably at least 60,000 seals around our coasts today.

'But for the big rookeries in Fiordland, the Antipodes and Stewart Island, not much has changed in the last 20 years.'

Something has definitely changed along the West Coast of the South Island, next to the Hokitika Canyon hoki fishery. Long-term studies of breeding rookeries at Cape Foulwind, near Westport, and at Wekakura and Taumaka on the Open Bay Islands show that pup births are falling further every year, as are pup weights and survival. The rookeries are shrinking.

Hugh Best of the Department of Conservation says that the fishery is responsible for the deaths of adult females that still have dependant pups ashore. That puts the rookery under pressure, but the knockout punch, he says, comes when bycatch coincides with an El Nino year.

When the immense climatic contradiction known as the El Nino Southern Oscillation kicks in, strange things happen at sea. Fur seals make the long journey to their feeding grounds to find the huge schools gone.

Cold water holds more nutrients than warm. When El Nino drives cool waters before it, the fish go with them, moving further south or simply swimming deeper, beyond the seals' reach. The thermal inertia of water means it can take months to return to normal.

After an El Nino, Best noted that pup condition and survival plummeted as their mothers returned with empty stomachs. Furthermore, females vary as to when a blastocyst — a pre-embryonic cluster of cells — can be implanted in the uterus and there's good evidence that a stressed cow may not bear young the following season.

To understand the impact of this we need to know more about fur seals' fidelity to their home rookery. We know that they travel vast distances — more than 750 kilometres — between breeding seasons. But if they remain loyal to their natal rookery, the West Coast colonies could conceivably fail altogether if not topped up by immigrants.

Elsewhere, fur seals have come under fire, sometimes literally — from some fishers who insist that they compete for valuable commercial species and must be controlled. An outspoken proponent of a fur seal cull is the managing director of Talley's Fisheries, Peter Talley.

He maintains an 'exploding' seal population is ransacking fish stocks, taking 300,000 tonnes — more than the total commercial take — every year, including

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8400 tonnes of hoki, worth between $18m and $20m.

'They're expanding at an ever-increasing rate. Population estimates of 60,000 are way out — by a factor of three or four,' Peter Talley claims. 'I reckon there are 60,000 in the northern South Island alone.'

Peter Talley says seals pillage not just hoki but ling, crayfish, blue cod, red cod, paua, blue fin and yellow-eyed penguins.

'A seal needs five kilograms a day to maintain its energy, but it will kill three times that because we've seen them biting the belly out of a fish, taking the roe and leaving the rest,' he says.

Again, there are few hard facts to back such assertions. A 1991 Department of Conservation study analysed seal scat and regurgitated matter at rookeries around the South Island. By identifying fishes' earstones, or otoliths, that survive digestion, researchers found that hoki made up less than four per cent of the seals' diet. By far the greatest component — 79 percent — was various species of lanternfish, a non-commercial midwater fish. Anchovies came in a distant second.

A second study of Cook Strait haulouts by a Department of Conservation researcher, Bruce Dix, found similar results. Despite their proximity to abundant crayfish stocks, he found no trace of them in seals' diets. Bruce Dix says their teeth are simply not designed to deal with such prey, and cites diet studies that found that seals instead target mainly smaller fish that aggregate in large shoals, particularly in the surface layers at night.

Peter Talley disputes the otolith findings.

'Seals don't eat the heads of large fish, so why should earstones turn up in their faeces?'

Bruce Dix disagrees. He says he has recovered otoliths of 'some very large fish' in the course of his studies.

Nevertheless, Peter Talley wants to see seals 'controlled', but when pressed, he argues first for an accurate census 'So we can sit down and talk about it with science, not emotion.'

There is little doubt that fur seals are steadily reclaiming their former breeding grounds. With every passing year, it seems, what were once North Island winter haulouts now clamour to the bawl of pups.

Bruce Dix agrees that the fur seal population is increasing, but only steadily.

'Not at the rate Mr Talley claims. He ignores the fact that the fur seal population is itinerant and highly mobile. They will move to areas of high productivity — just like fishers.'

The Titi Islands off Stewart Island are an example where the muttonbird harvesters of Ngai Tahu are complaining that seals are rampaging through their traditional gathering grounds, trampling vegetation and titi burrows, and menacing people as they go about their 'customary take' of muttonbirds.

This has prompted a few to join the call for a cull, but both Ngai Tahu and the Department of Conservation are quick to distance themselves from such a suggestion. While the two are in discussion over the fur seal problem, any measures to be built into an upcoming co-management plan for the islands will most likely involve only passive management such as fences.

Southland Conservator for the Department of Conservation, Kevin O'Connor, says we're simply seeing a return to a long-forgotten status quo.

'Seal numbers crashed as a result of the sealing industry,' he says. 'In the intervening 200 or so years, plants and titi took over where the seals were. We're now seeing a return to a more natural situation.'

He says the department has no concerns 'from an ecological perspective', but is sympathetic to birders living amongst seals, 'seeing the loss of productive burrows and of vegetation that have both been there since before living memory.'

While the Minister of Conservation, the Hon. Chris Carter, is quick to commend fishers for their efforts to reduce fur seal bycatch, he says there's no justification for any form of population control.

'Fur seals are a protected species and as such we should be celebrating their gradual recovery in numbers,' the Minister says. 'Their impact on stocks of commercial fish species is negligible.'

The devil lies in the lack of detail; everyone — fishers and conservationist alike — agree on the urgent need for an accurate census, but the Department of Conservation has no such plans. In fact, research spending on fur seals is about to plummet.

Felicity Wong of DoC's Marine Conservation Unit says it all comes down to priorities.

'We've got perhaps 13 breeding female southern right whales; fewer than a 100 Maui's dolphins. Even if I had a marginal dollar — and there is a problem getting marginal dollars — I'd probably spend it on New Zealand sea lions; there are still only 12,000 of them.'

And there's the rub. When you're trying to save species down in number to double figures, with budgets restricted to five figures, something has to give.

We don't even know how many seals we had to begin with, but one study has estimated that one and a quarter million watched the first sailing ships hove to.

If — and it's a big if — seals have indeed 'exploded' to the levels Peter Talley claims, then our total national population is still less than those killed in a single season during the peak of sealing on the Antipodes Islands.

There's an inherent paradox in the tension between fur seals and people. A sobering number of our threatened species are hovering as tiny remnant populations, and we spend millions of dollars every year trying to drag them back from the brink. But our goodwill, it seems, extends only to those that don't require us to share the environment — that place no demands, no challenges on us.

If we can't make room — and a few of our fish — available for an animal at just five percent of its former numbers, perhaps we're the real problem.

— DAVE HANSFORD *of Origin Natural History is a writer and photographer on natural history subjects. He lives at Makara near Wellington.*

New Zealand falcon on nest on Mt Olympus, Marlborough.

Watching Icarus

JASON ELSWORTH tells how satellite technology is revealing the life story of the New Zealand falcon.

Somewhere in the central North Island, 'Big Brother' is watching Icarus. She's not a character in some Orwellian nightmare, but part of a high-tech research project being led by Dr John Holland of Massey University. Dr Holland and his team are using a tiny solar-powered transmitter and a weather satellite to track a female New Zealand bush falcon that they've named Icarus.

By using this technology they can collect and analyse more data, with far more accuracy, than was ever possible before. The results of the research could play a significant role in the long-term conservation of the threatened New Zealand falcon.

The little falcon is the only remaining bird of prey peculiar to New Zealand. It is

GEOFF MOON

about three-quarters the size and little more than half the weight of the far more common Australasian harrier.

The falcon is a variable species with three distinct forms. The bush falcon (smaller, dark bird), frequents the North Island's and northwest South Island's native forest. The South Island's eastern falcon (a larger, paler form), is a bird of the tussock and farmland in the hills along the eastern side of the Southern Alps. The southern falcon, intermediate in size and colour between the eastern and bush falcons, is found in the southwest of the South Island, on Stewart Island and the Auckland Islands.

Dr Holland became involved in researching the New Zealand falcon after working 'a lot' with falcons in Africa.

'I found that there was a need for work to be done in New Zealand, and the fact that the falcon was a species in trouble meant that I wanted to get involved,' he explains.

The Department of Conservation lists the New Zealand falcon as a threatened species — its second-highest priority for conservation. The eastern falcon is listed as 'in gradual decline'. The more-threatened bush falcon and southern falcon are respectively 'nationally vulnerable' and 'nationally endangered'.

Raptor expert Dr Nick Fox did the 'most recent work' on falcon population levels, back in 1978. He estimated there were around 3100-3200 pairs of eastern falcon, 450-850 pairs of bush falcon and 140-280 pairs of southern falcon. Today population levels of the New Zealand falcon are not well understood, but its continued existence is certainly vulnerable.

The New Zealand falcon is under threat for some of the same reasons as many of our native birds — disappearing native forest and predation by pest species. Also, according to New Zealand's leading raptor conservation organisation, Wingspan Birds of Prey Trust, deliberate shooting by farmers to protect poultry, and by pigeon fanciers to protect their birds, remains the biggest cause of injured falcons delivered to them.

Dr Holland introduced the idea of using satellite tracking with falcons when he met Steve Lawrence, chairman of the Raptor Association of New Zealand, and Noel Hyde of the Wingspan Birds of Prey Trust.

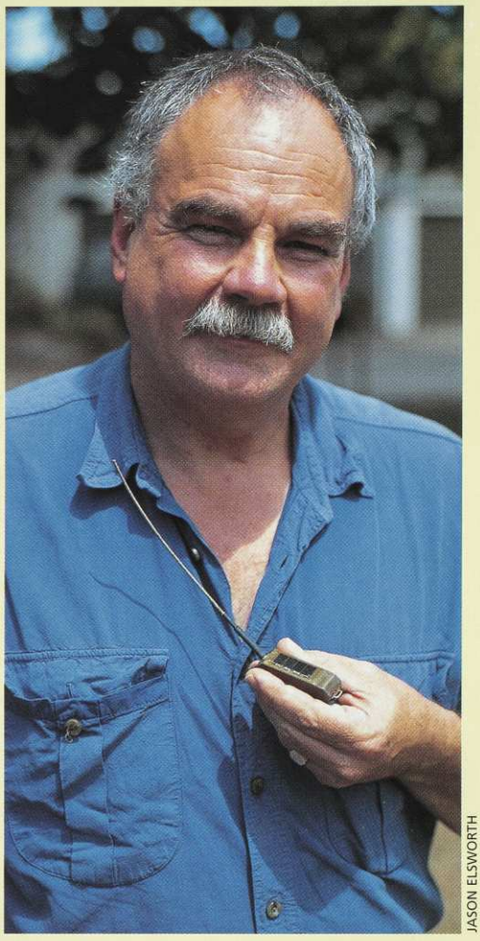
'We got together and thought what can we do? Banding is relatively useful, but would still leave us with a big gap in our knowledge about the falcon.'

Satellite tracking seemed to be the ideal method to fill this gap — Dr Holland was already using it with elephants in Africa. But a much smaller transmitter was needed for a highly manoeuvrable bird like the falcon.

'What I had in my mind was that the bird had to have the equivalent of Nike Airs, not tramping boots,' Dr Holland says.

Eventually he found those 'Nike Airs' in a transmitter the size of his thumb, solar powered and weighing only 18 grams, about the weight of one and a half twenty cent coins. It was perfect for the job, but this kind of technology isn't cheap.

Luckily 2001 was the tenth anniversary of the company that made the transmitter and to celebrate they were encouraging schools worldwide to submit a proposal to win one. Massey University and Palmerston North Girls' High School put a proposal together and came in first. Since



JASON ELSWORTH

Dr John Holland of Massey University with a model of the transmitter used to track Icarus by satellite.

JASON ELSWORTH

Debbie Stewart with a female bush falcon, Diamond, at the Wingspan Birds of Prey Trust, Rotorua.

GEOFF MOON

A New Zealand falcon in flight, North Canterbury.

then the school has continued to be closely involved with the project.

Thanks to the winning proposal the project now had a transmitter. Next, a government grant provided funding for the satellite time, but they still needed to find the right bird.

Eventually, after much effort, they were able to track down an adult-female bush falcon, surprisingly found nesting on the floor of a clear-felled exotic pine plantation in Kaingaroa Forest. This ability of bush falcons to adapt to new habitats could be a potential plus for the species. The timber companies have been extremely supportive of falcon research in their forest and the Wingspan Trust, along with Massey University, has been studying falcons there for a number of years. Recently 22 falcon nest sites were found.

Once found, the falcon was trapped and the transmitter attached in mid-February 2002. It was named Icarus. The transmitter does not appear to have affected the bird in any way, and she successfully produced three chicks in the 2002-3 season.

Once in place the transmitter started to send its signal to a satellite. From the satellite the signal is sent to a base station and from there to the researcher via the internet. The data, including location, time, date, solar-charge level and if the falcon is moving or stationary, is downloaded and fed into sophisticated mapping and analysis software.

Rob Murray, a colleague of Dr Holland, showed me the mapping and analysis system in action. On a big screen, which was initially displaying a list of the kind of equations that make most of us break out in a sweat, Rob showed me an area east of Taupo, where hundreds of yellow dots showed where Icarus had travelled each day.

Another click of the mouse and we were looking at a map combining wind speed with the position of Icarus. The map clearly showed that, just like us, on blustery days she likes to stay near home. Other weather data that can be combined with the falcon's position includes temperature, wind direction, rainfall and humidity.

Finally, another click of the mouse brought up a real crowd pleaser. I was now looking at a 3D representation of Icarus's territory. Rob worked his magic and suddenly I was getting a falcon's eye view of Icarus's travels. Amazingly, as we swooped across the screen, I could see what she saw.

So what has been learnt from all this so far? It's still early days and findings are only preliminary, but during the first week or so Icarus flew an average of about 40

JASON ELSWORTH

Female bush falcon, Wingspan Birds of Prey Trust, Rotorua.

kilometres per day. Since then though she has settled into a daily average of about seven kilometres. Once a month, however, she appears to go on a 'walkabout', sometimes venturing 80 kilometres from home before returning within 24 hours.

In the longer term the research will start to fill in many of the gaps in knowledge about falcon behaviour. We will understand the size of their territories, how fast they travel, whether they stray nomadically or occupy a well-defined area and how far they fly each day. Most importantly we will begin to understand the influence of weather conditions and human activity on behaviour. The first results will be published this year and then the plan, depending on the availability of funding, is to retrieve the transmitter and attach it to a juvenile bush falcon.

The future of the New Zealand falcon though isn't just about the high-tech world of transmitters and satellites. In New Zealand there is a small group of highly committed people, including the team at Massey, the Wingspan Birds of Prey Trust and the Raptor Association of New Zealand, working closely together to help New Zealand falcon. Central to this is a technique called 'hacking'.

Hacking was pioneered with falcons in New Zealand by the Wingspan Trust, and involves the release of young raptors, managed to be true wild birds. Hacking has been so successful with peregrine falcons in America that they have now been officially down-listed from the status of an endangered species.

In hacking, captive-bred falcon chicks are initially hand reared before being put into the 'hack box'. Once in the box they are fed via a tube, so that they don't see and 'imprint' on humans as a food source. Next, the front of the box is opened during feeding, so that the birds begin to link their food to the environment. Finally, food is slowly moved farther and farther away from the box.

Once the box has been opened the birds are free to start learning to hunt, but during this time food continues to be supplied until they are fully independent. The 'hack box' provides a safe haven as the birds find their feet in the real world.

For each of the last four years the Wingspan Trust has successfully released falcons into the wild using 'hacking'. Also Dr Holland, in conjunction with Steve Lawrence of the Raptor Association, has also recently released three young falcons at a site near Massey University in Palmerston North.

Meanwhile Icarus is still out there, oblivious to the sophisticated technology being used to research her daily life. Such research, along with the efforts of a small group of highly committed individuals, could lead to a brighter future for the New Zealand falcon.

— JASON ELSWORTH *is a freelance journalist-photographer based in Wellington.* GEOFF MOON *who took the nesting and flight photographs is, coincidentally, patron of the Wingspan Birds of Prey Trust.*

Falconry for Conservation Purposes Only

There are very few falconers in New Zealand today and all are associated with conservation projects permitted by the Department of Conservation.

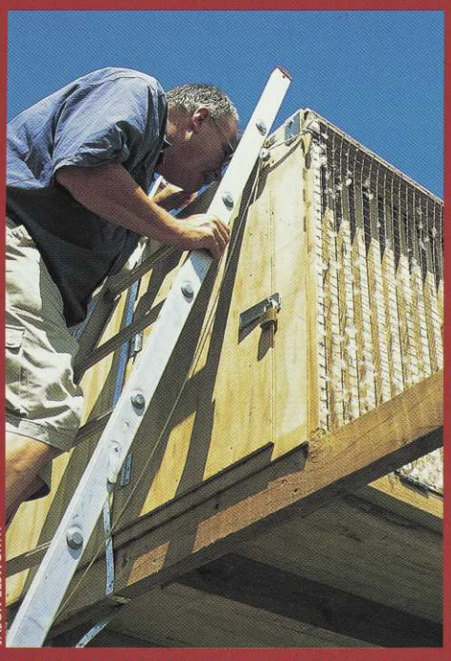
The true origins of falconry, described as 'the art and practice of flying trained birds of prey at live quarry', are probably buried in the mists of time, but available records date the practice to around 2000 BC. The use of falcons solely to hunt live quarry is not allowed in New Zealand, but the use of falconry techniques is proving important in the long-term conservation of the species.

Debbie Stewart of the Wingspan Birds of Prey Trust in Rotorua uses falconry techniques to help rehabilitate injured birds.

These techniques allow birds an opportunity to pursue their natural quarry. They are used to assess and improve the bird's fitness before releasing it back into the wild. Falconry techniques are also used with birds too injured for release. These captive birds are subsequently used to breed chicks that are then released into the wild using 'hacking'.

Finally, falconry techniques are used by the Wingspan Trust for advocacy and education via display and interactive opportunities. Giving people the chance to see a falcon up close helps to raise the public's awareness of this wonderful bird.

The Wingspan Trust can be contacted at www.wingspan.co.nz wingspan@xtra.co.nz, or 1164 Paradise Valley Road, PO Box 993, Rotorua.

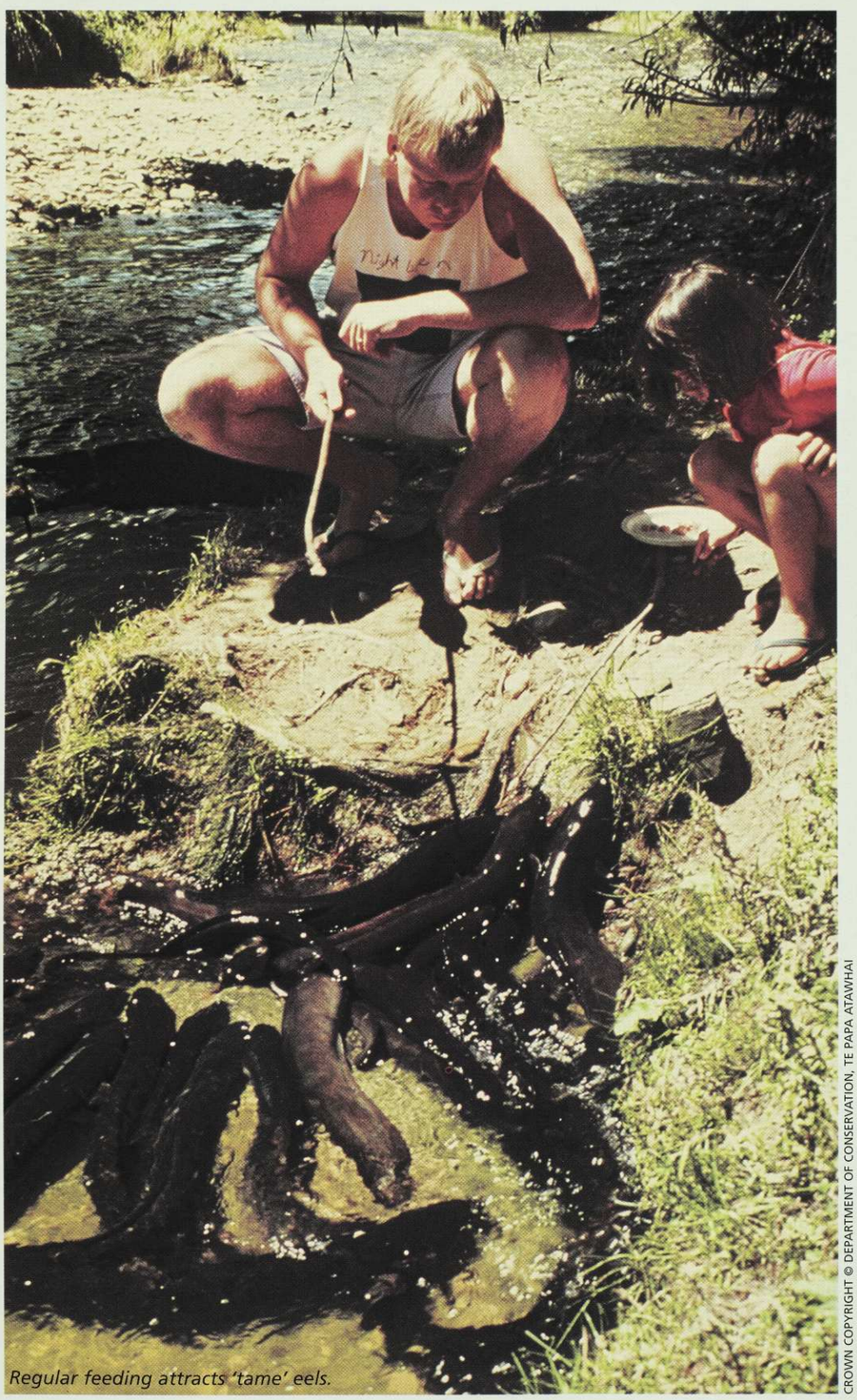


JASON ELSWORTH

Dr John Holland inspects a 'hack box' near Palmerston North.

JASON ELSWORTH

The Disappearing of Eels



Regular feeding attracts 'tame' eels.

New Zealand's native long-finned eels are disappearing from our rivers, and new research suggests that commercial fishing is 'significantly' to blame, reports BERNIE NAPP

New Zealand's eels are one of nature's mysteries. Born in tropical waters off Fiji and Tonga, the larvae of long-finned and short-finned eels drift to New Zealand, entering rivers as glassy juveniles, where they transform into elvers, and spend decades reaching maturity. The adults then migrate out to sea, swimming thousands of kilometres back to the tropics to spawn and die. That's if they don't die of natural causes or get caught first.

Long-finned eels, the rarest of New Zealand's three freshwater eel species, must avoid spears, lines and nets for decades if they are to reach breeding age, says Don Jellyman, scientist with the National Institute of Water and Atmospheric Research (NIWA). In many New Zealand rivers, the chances of that happening are practically zero.

On current trends, long-finned eels are expected to decline in numbers by five to 30 percent in the next decade, earning the species a chronically-threatened ranking in the Department of Conservation's threatened species classification. In many rivers the larger eels have gone.

Overfishing is 'a significant contributing factor' in the decline of long-finned eels, as Dr Don Jellyman reported in November last year to the American Fisheries Societies' International Symposium on Freshwater Eels. It is a global problem for the world's 15 species of freshwater eel (*Anguilla* spp).

Dr Jellyman was also among scientists from 18 countries attending an international freshwater eel symposium in Quebec, Canada, in August last year who agreed 'to raise an urgent alarm' to protect eels.

'Precautionary action — curtailing exploitation, safeguarding migration routes and wetlands, improving access to lost habitats — must be taken immediately,' the symposium's communiqué said.

This call for action may come as a surprise to many New Zealanders, for whom eels are slippery fish best not met at a swimming hole, or yanked onto a riverbank out of curiosity.

Peter Todd, a stock-assessment manager with the Ministry of Fisheries, concedes that eels do not rate highly on the public radar screen.

'They are rather slimy things that look like snakes,' he says. The Nelson-based eel scientist got hooked on eels for their fascinating life history and the special problems they present for fisheries management. While he does not believe that long-finned eels are in dire straits, he agrees with his colleagues at DoC and NIWA that more action, such as native-habitat restoration, is needed to protect New Zealand eels. Intense discussions are underway among officials, scientists and eel fishers about further directions in eel management.

Glass eel runs are estimated at only one-quarter the size of runs of 30 years ago, a concern of those drafting advice on the inclusion of North Island eels into the commercial harvest system this year. Total adult stock numbers of any species are currently unknown, as are total harvest levels, and quotas needed to ensure adequate protection.

The true effect of human impact may take decades to measure, because of eels' long life cycles, according to a report by the Ministry of Fisheries. 'Overfishing of the resource may only become apparent immediately prior to the fishery's collapse.'

South Island eels have been under the commercial harvesting regime of the Quota Management System since October 1, 2000.

No one knows whether regulations governing commercial, customary and recreational harvest will adequately protect long-finned and short-finned eels, Dr Jellyman of NIWA says. 'All we can do is to be very conservative. The most effective thing we can do is to have reserve areas.'

A NIWA report commissioned by DoC last year found that in Southland and Westland only six percent of rivers and 20 percent of lakes are protected from fishing, and then except for customary harvest by Maori — the lucky eels live within national parks. A further 14 percent of rivers and 29 percent of lakes in inland DoC reserves are protected but fishing near the sea would affect the migration success of eels from these areas.

The Ministry of Fisheries is now extending the survey to the rest of the country.

Scientists worldwide, New Zealanders among them, want urgent action to protect all freshwater eels from extinction.

The results are likely to show that the percentage of fully protected rivers and lakes nationwide is small, says Richard Allibone, a freshwater scientist with DoC.

'Many fisheries issues need to be resolved,' he says. 'The Quota Management System in the South Island is flawed because it does not differentiate between species. Long-finned eels are four times more likely than short-finned eels to be caught because they live longer and reach a larger size. Females, which grow larger than males in both species, are more likely to be caught.'

It gets worse, Dr Jellyman of NIWA says. Removing the bigger eels allows more smaller eels to survive, increasing overall eel numbers. While that may appear to be a good thing, it seems that the majority of young eels in such conditions turn into males. In one river surveyed, 95 percent of eels were males. He is extending this research elsewhere to confirm this hypothesis.

Proposals to farm eels, based on captured glass eels, will not immediately solve the overfishing problem, Dr Jellyman says. Eel farming from captured glass eels is a practice popular in Japan, Taiwan and China, but is in its infancy in Australia and, closer to home, in the Wairarapa and in Northland. Eels spawn only once in their lives. Glass eel harvests would need to be sustainable, and the current sustainable level in New Zealand may be zero till species recover.

Eels face many other serious problems, says Dr Todd of the Ministry of Fisheries. More than 90 percent of wetlands — key habitat for short-finned eels — have been removed from New Zealand in the last 150 years.

Hydro dams block eel passage on the way upstream. Even if they do get around dams, migrating eels get chopped up in power turbines on the way down. Huge areas of South Island river habitat are consequently shut off to eels, in particular, long-finned eels.

In the Waikato River system with its several hydro dams, eel fishers are transferring around a million elvers each year from below the last dam, Karapiro, and introducing them to upstream hydro lakes for later harvest.

Long-finned eels are a taonga species for Maori. One tradition has it that eels (tuna) were descendants of the ocean people,

Eel life cycle:

- Adult female eels lay millions of eggs each in deep water off Tonga and Fiji, during spawning in September-December.
- Leaf-shaped larvae, *leptocephali*, drift for 9-10 months in ocean currents and change into glass eels.
- Glass eels enter estuaries and river mouths in September-November; earlier in the North Island, and later on the east coast of the South Island.
- Glass eels turn into dark-coloured elvers on entering fresh water and begin moving upstream in January and February.
- Adult eels spend decades living in estuaries, rivers, lakes and swamps, without breeding. Short-finned eels migrate at 9-41 years, and rarely, up to 60 years. Long-finned eels migrate at 49-56 years, and up to 100 years or more.
- During periods of heavy rain in autumn (March-May), migration-ready eels, having narrowed heads and enlarged eyes, move downstream and out to sea.
- Migrating eels swim thousands of kilometres to the tropics, without feeding for up to five months, to spawn.

Hine-moana and Kiwa. In another, the eel came down from the sky and seduced Maui's wife. Maui dug a trench, and as the eel swam along it, chopped it into bits in revenge. From these pieces sprang other life forms, including the conger eel, vines, rata and other plants.

Maori knew when to catch eels: 'the silver-belly eels are caught on the flood waters of the first heavy rains after summer'. They were observing eels of breeding age — having narrower heads, enlarged eyes, and a silvery sheen — leaving freshwater haunts for the sea, Dr Jellyman says.

He recently tagged 10 migrating females to determine where they went. The eels were to get to their destination, spawn and die, upon which the tags would detach, float to the surface and emit satellite signals. Information was received from only four of the tags. One started signalling near New Caledonia but only after several weeks had elapsed since it rose to the surface. For now, Fiji and Tonga are his best guess for spawning sites.

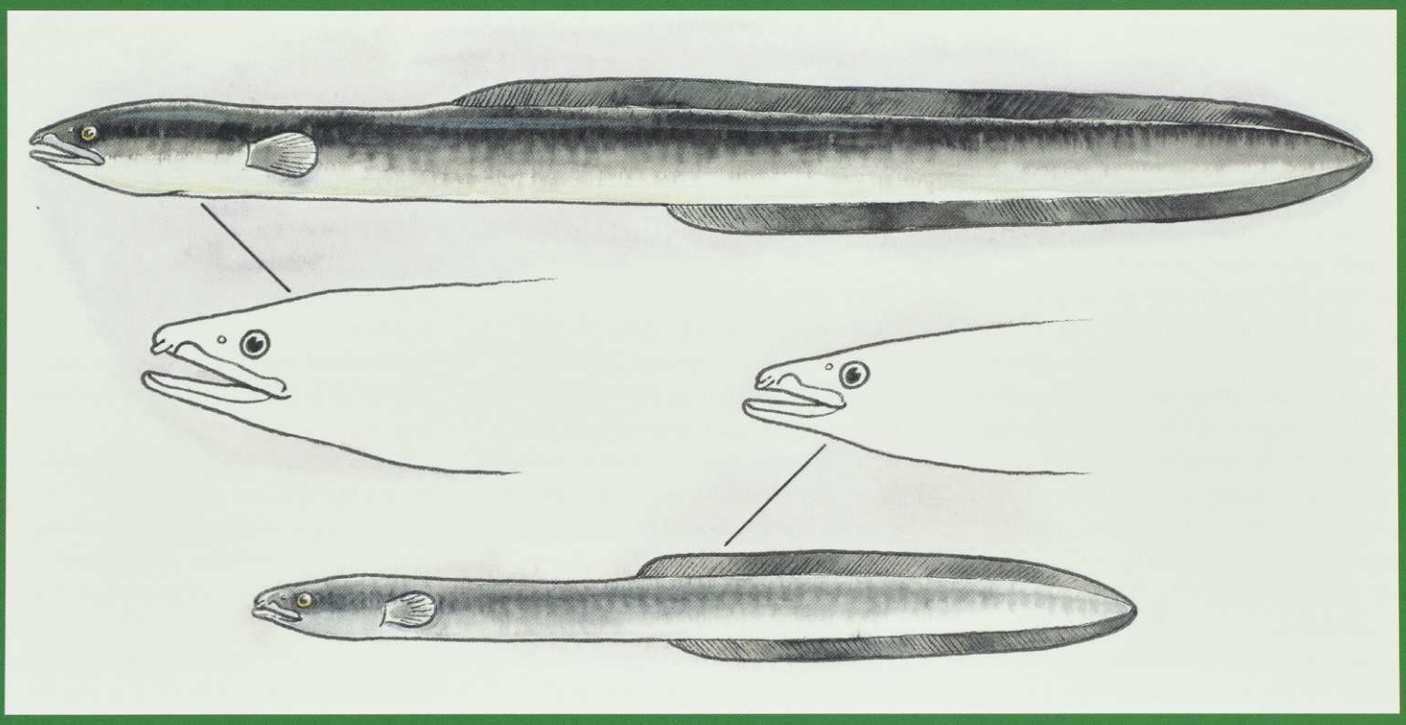
Eels may originally have been tropical species, Dr Jellyman says, which invaded temperate waters over the aeons, yet never lost their spawning habits. Continental drift would have gradually shifted eel rivers far from the tropics.

Will New Zealand eels survive? Dr Allibone says: 'Long-finned eels won't become extinct in the short term but at this rate will become rare. If not enough fish are spawning, they will reach a point of no return.'

— BERNIE NAPP *is a media adviser to the Department of Conservation.*

Long-finned or short-finned

Here's how to distinguish the long-finned eel from its short-finned cousin. Both species range in colour from grey to black, and both may get called yellow-bellies or silver-bellies. A third species, the Australian longfin eel was first confirmed in northern New Zealand in 1997.



TIM GALLOWAY FOR FOREST & BIRD

Long-finned eel *Anguilla dieffenbachii*

- The dorsal fin extends much further forwards than the ventral fin, distinguishing this species from short-finned eels.
- More likely to have a yellowish than a silvery belly, and more likely to be black in overall colour.
- May grow to more than 20 kilograms in weight and nearly two metres long.
- Live in estuaries, rivers and lakes from the coast to the mountains, preferring stony rivers and clear water.
- Peculiar to New Zealand.

Short-finned eel *Anguilla australis*

- Dorsal fin is only slightly longer than the ventral fin.
- More likely to have a silvery belly than a yellowish belly and have a greyish overall colour.
- Typically grow to no more than a few kilograms in weight and one metre long.
- Live in estuaries, rivers, lakes and swamps near the sea.
- Native to New Zealand, eastern Australia and Tasmania, and South Pacific islands.

Australian longfin eel *Anguilla reinhardtii*

- Resembles the long-finned eel but has numerous black blotches on the back and sides.
- Native to eastern Australia and Tasmania, and appears intermittently in the Waikato River, and other areas of the northern North Island.

Eel farming – a sustainable option?

Worldwide, eel farming is a huge industry, dwarfing New Zealand catch levels.

• Japan alone eats up to 130,000 tonnes of eels a year, a market worth more than $US1.3 billion. In 1999 Japan farmed 23,211 tonnes (of *A. japonica*) and caught 817 tonnes in the wild. It imported the remainder of its requirements, mainly from China, Taiwan and Europe. Only 0.6 per cent of the total was wild-caught.

• A US study (by the National Oceanic and Atmospheric Administration) suggests that glass eel harvesting levels in Japan are not sustainable.

• Taiwan produces 26,000-56,000 tonnes of farmed eels every year, worth more than US$400 million, in exports and for domestic consumption. That's based on a harvest of 30-150 million glass eels a year, which may be 45-75 per cent of total glass eel runs.

• A NIWA study on the potential for eel aquaculture in Northland, for the Enterprise Northland Aquaculture Development Group, did not consider the environmental impacts of eel aquaculture. Nor did an Australian feasibility study for farming *A. australis* and *A. reinhardtii* in New South Wales.

• In 1999, the Australian State of Victoria was producing 300 tonnes of eels a year. Instead of taking 10 years to grow to adult size, they took around 18 months. Ten per cent of glass eels taken are put back into the wild fishery after three months to conserve wild populations. The impact of this is as yet unknown.

• New Zealand scientists agree that sustainable eel farming is feasible.

Eel management tools

Despite threats to their survival, eels are classified as a commercial fishery to be governed by the Quota Management System.

• Eels, as commercial species, are managed by the Ministry of Fisheries.

• The Department of Conservation advocates for conservation of eels, as native species and, in the case of long-finned eels, as a chronically-threatened species.

• South Island eels entered the commercial harvesting regime of the Quota Management System in October 2000, with no differentiation between species. Long-finned eels in this fishery make up 80 percent of commercial catch.

• Harvest under the Quota Management System is mainly on the basis of 'maximum sustainable yield' — that is, to allow fishers to remove as many eels as possible over time, without driving them toward extinction. Quotas, in theory, are set to ensure sustainable use of the resource.

• In the North Island, the Ministry of Fisheries issues eel-harvesting licences, but fixes no quota. The North Island fishery will enter the Quota Management System on October 1 this year, with separate quotas for long-finned eel, and short-finned/Australian longfin eels.

• North Island commercial catch distribution is estimated to be: long-finned (20 percent), short-finned (70 percent), Australian longfin (10 percent). Estimated commercial catch levels have dropped from 656.9 tonnes in 1990-91 to 534.1 tonnes in 1998-99, a fall of 19 percent in eight years.

• Minimum commercial catch size in the South Island is presently 220 grams and the maximum four kilograms; except at Lake Ellesmere, and in the case of Maori customary or recreational harvest. It can take a female long-finned eel 35-50 years to reach four kilograms.

• Customary harvesting by Maori is approved ad hoc and is permissible in national parks, where all other forms of eeling are prohibited. Customary catch levels are unknown.

• Recreational fishing regulations introduced in 1994 fix a daily bag limit of six eels a day and one fyke net per person.

• Eel experts agree that more action is needed to protect eels. More reserve areas where eeling is prohibited would be an effective first step.

Looking east across the valley to the Diadem range from near Ahuriri Road.

Preserving the High Country

The Crown purchase of Birchwood Station opens a huge area of South Island high country for New Zealanders, writes AINSLIE TALBOT. Photographs by GILBERT VAN REENEN.

Travelling into the Ahuriri Valley in North Otago, it's easy to understand why conservationists, trampers, climbers and fishers have long enthused about this outstanding high country. There are very few alpine valleys east of the Main Divide which are as scenic and as ecologically significant as this. Or as accessible — by a dusty, shingle, no-exit road that runs off the northern side of the Lindis Pass which links inland Canterbury with Central Otago.

The Ahuriri is a delight. The countryside runs from wide, grassy, valley floors, with their mixture of tussock, introduced species, and extensive alpine wetlands, through thousands of hectares of dense beech forest, up to alpine tussock and shrublands and high alpine fellfields.

Peaks like Mt Huxley and Mt Barth soar over 2000 metres with permanent snow and large glaciers. Through the centre of this stunning landscape flow the crystal-clear waters of one of the best trout rivers in the country, the braided Ahuriri and its tributaries; Canyon Creek, Watson's Stream, Hodgkinson Creek and Snowy Gorge Creek. The Ahuriri and its glistening mountains are a superb example of a glaciated valley landscape, an iconic part of New Zealand's natural heritage. It would

GILBERT VAN REENEN. CLEAN GREEN IMAGES

Valley floor under snow

have been a great loss if the public had been excluded forever because of private freeholding through the Crown tenure review process.

The recent announcement by the Minister of Conservation, Hon Chris Carter, of the decision by the Nature Heritage Fund to spend $10 million purchasing the Birchwood property might be considered by some as somewhat extravagant. But this is a narrow economic view. Although this is the largest-ever purchase by the Government's conservation fund, the preservation of this unique alpine environment. with its exceptionally high conservation values, is a forward-thinking decision for New Zealanders.

Ron and Jennifer Williamson and other members of their family have leased Birchwood from the Crown for 62 years, although leasehold tenure goes back to 1873. The Department of Conservation's recommendations under the Crown lands tenure-review process led to Birchwood being identified as a possible acquisition because of its outstanding ecological and recreational values; in fact it was initially considered in 1991.

More recently though, obtaining this extensive 23,783 hectare leasehold property, has been encouraged and supported by Forest and Bird, Federated Mountain Clubs, Fish & Game, the New Zealand Deerstalkers' Association, Public Access New Zealand and local tramping clubs. The concern of all parties was preservation and

GILBERT VAN REENEN. CLEAN GREEN IMAGES

The Ahuriri River flows through the valley floor of Birchwood Station.

protection of the landscape and ecology of the area, and providing public access — something that has not always been easy in the past, with the road running right through locked gates in the station's stockyards.

Dr Gerry McSweeney, national president of Forest and Bird and a member of the four-person Nature Heritage Fund, was delighted when the Minister of Conservation announced the purchase.

'Birchwood is one of the crown jewels of the high country — there are very, very few properties like this,' he says. 'The Ahuriri itself is protected by a Water Conservation Order and is a superb trout fishery, one of the best in the country. This purchase guarantees access to that, and the preservation of the important wetlands that feed the river. This could all have been under threat if new owners had taken over the place and locked it up. The property was on the market — it's not a case of DoC gobbling up farmland, and I think it's great that it has happened.'

He also makes the point that the money is not coming from DoC 's budget and therefore other conservation initiatives will not be affected. He says the Government is obviously interested in retaining key high-country properties for the public, as has been shown by its recent decisions on Molesworth, and the Poplars Station in the Lewis Pass.

GILBERT VAN REENEN. CLEAN GREEN IMAGES

The road to Birchwood Station in winter.

One of the important effects of the Birchwood sale, which comes into effect in July, is that cattle will no longer be allowed to graze the valley floor. Critically important wetland habitat and vegetation and riverbed will be enhanced for severely endangered species like black stilt, black-fronted tern, wrybill, and banded dotterel. The Ahuriri is also home to many other species such as pied stilt, oystercatcher, marsh crake, scaup, black-backed gull, black-billed gull and shags, which will benefit from enhancing these rare, alpine-valley wetlands.

It is an interesting comment on species degradation that former owner Ron Williamson says 50 years ago there were around 70 black stilts on the property, but competition from Canada geese, stock disturbance and predation have seen these cut back to just seven today. DoC will be working hard to boost that population through predator control and its intensive captive-breeding programme based at Twizel in the Mackenzie Country. After all the Ahuriri should be perfect black stilt habitat.

In fact the whole 30-kilometre-long valley and its beech forests have a wealth of bird species with at least 52 examples recorded in the last decade. The forests of mountain and silver beech are habitat for a wide range of birds: rifleman, grey warbler, New Zealand falcon, fantail, brown creeper, bellbird, pigeon, tomtit, cuckoo

GILBERT VAN REENEN: CLEAN GREEN IMAGES

Beech forest and tussock grasslands are among the habitats protected.

and yellow-crowned parakeet, with kea and rock wren at higher altitudes.

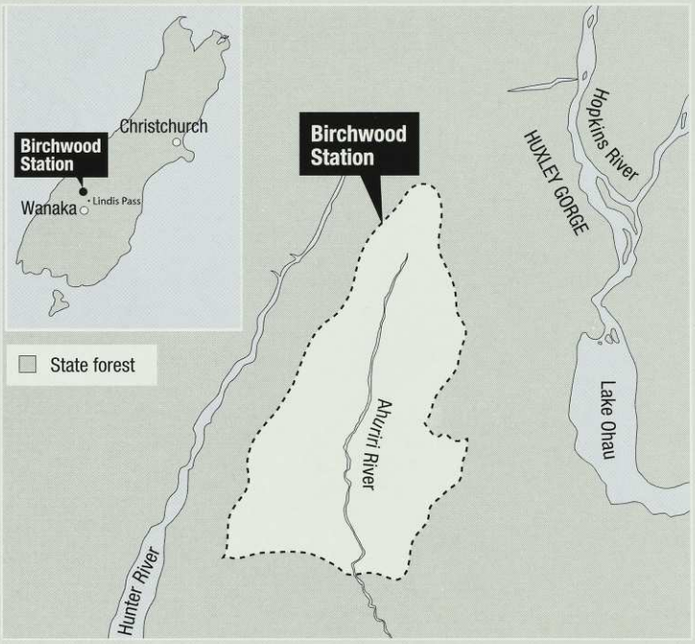
Nonetheless, according to Dr McSweeney, the forest margins have been badly damaged by cattle and grazing, with a distinct absence of young beech trees and undergrowth. There is also a lack of mistletoe up to two metres above the ground, again because of cattle which, like possums, love eating the species with its brilliant red flowers and succulent leaves. But with the removal of cattle this year, sheep within five years, and with few deer or rabbits, there should be rapid regeneration of forest margins over time.

Birchwood and the Ahuriri Valley are important for other ecological reasons too. Professor Alan Mark, an expert on tussock land and alpine landscapes and also a member of the Forest and Bird national executive, extols the area as 'highly significant' because of its unbroken spectrum of high-country plant species and habitat, preserved from valley floor to mountain top. The Ahuriri is the closest thing we have to an untouched pre-European alpine ecosystem in New Zealand.

The valley floor is a mixture of short tussock, exotic grasses, mosses and lichens including the Mackenzie Basin's only low-altitude area of hard tussock *Festuca mathewsii*, with matagouri and other shrub species on shingle fans. Extensive and impressive swathes of mountain and silver beech forest meet the park-like valley floor on the western side in the lower Ahuriri, and cover both eastern and western slopes above the confluence of Watson's Stream in the upper valley. Fire has destroyed much of the beech from the eastern slopes below Watson's Stream. The same has happened in the adjoining upper Dingle Burn Valley, also a part of the purchase, where burnt logs can still be seen in the grassland on the eastern slopes.

In other areas there is a diverse range of natural subalpine shrublands, above the bushline, and in those places inaccessible to stock, or where forest cover has been destroyed by fire. The threatened *Pittosporum patulum* has been identified in the Dingle Burn, Canyon Creek and Hodgkinson Creek. Above the bushline tall tussock and snow tussock dominate, sometimes reaching down to the valley floor, but again interspersed with scattered shrubs such as *Dracophyllum longifolium*. Surveys have shown that slim-leaved snow tussock has all but disappeared in some areas because of grazing. In the high alpine areas cushion vegetation is found along with a range of other hardy species.

The Ahuriri also contains three species of skink (spotted, McCann's, and common) and two geckos (common and jewelled) and a range of invertebrates including eight species of butterflies. The river is a nationally important fishery for brown and rainbow trout, in a stunning high country landscape. Native fish recorded include several species of galaxias and upland bully.



The Director-General of the Department of Conservation, Hugh Logan, a mountaineer himself, says the Ahuriri area is a superb addition to public conservation land adjacent to the Ohau Conservation Area. This purchase, along with adjacent land obtained through the process of tenure review means there will be an additional 82,665 hectares of contiguous public recreational land in this area. Along with the Ohau Conservation Area, this points to the eventual formation of a new High Country Conservation Park.

'The Birchwood purchase is a wonderful conservation asset for New Zealand and one of the great recreational areas in the South Island,' enthuses Hugh Logan. 'It has a superb range of opportunities, from short walks, to demanding alpine ascents, to wonderful fishing, and it's all so accessible. On a fine day it's quite superb; you've got mountains, big glaciers, and beech forests, with a magnificent river running through, and five accessible huts. There was definitely overseas interest in this property, but in their hearts the Williamsons wanted it to stay in New Zealand.

'We're now in a transition phase and have got to take it step by step — you can't just go from one regime to another on a property like Birchwood which has been farmed for 125 years,' he says. 'We're committed to keeping it weed free and we'll do that, but the Department of Conservation has to watch how the place changes, and adapt to those changes as they come about.'

— AINSLIE TALBOT *prepared this article on behalf of the Nature Heritage Fund. See more of* GILBERT VAN REENEN'S *work on the website www.cleangreen.co.nz*

Life and Death in Seabird City

HELEN GUMMER finds a fast, competitive and often dangerous world in the Chatham Islands.

HELEN GUMMER

Brown skua are at the top of the food chain on Rangatira; they will always advertise their presence and vigorously defend nesting sites.

Main picture: Pitt Island shag nesting on Rangatira.

It's like a central city station, late afternoon, rush-hour. From every building's orifice commuters ooze, spilling across the floor, pushing, shoving. Tolerance levels run low as bodies barge towards a bottleneck, squeezing through impatiently to reach a destination where food and rest await.

Transplant this busy scene to a dark, cool and breezy forest on a remote South Pacific island. There is a sparse understorey of vegetation and leaf litter has little opportunity to accumulate on the dusty floor of the forest. Replace the station platforms with large, uprooted trees, and people with grey birds the size of a clenched fist. In place of the loudspeaker announcements are sounds like the 'rak-rak-rakking' of agitated hens in a large-scale 'chook' house. Experience a world seabird capital.

This is Rangatira or South East Island, in the Chathams group, 800 kilometres east of New Zealand. Here, where subtropical and subantarctic waters meet in the South Pacific Ocean, is the feeding range of one of the largest diversities of oceanic bird species in the world.

Before the dawn light breaks over a steely horizon, thousands of broad-billed prions leave Rangatira, returning to the ocean to feed by day. Emerging from nesting chambers below ground, like pedestrians from a subway, they restlessly queue for their turn to climb up a tree trunk. They clamber up bark, grooved by claws and smoothed by webbed feet, to the leafy canopy from whence they mysteriously vanish into the night. Stand still in a clearing and you can feel wing tips gently brush past like whispers, while beneath the trees the fight for a turn to take-off continues.

With over 333,000 pairs of broad-billed prions resident on this 218-hectare island for most of the year, competition for the facilities is rife. There simply aren't enough breeding burrows to go round; dwellings are occupied on a 'first-come, first-served' basis.

Prions grumble and growl throughout the night: burrows must be maintained and defended, pair bonds established or reaffirmed. Nothing must obstruct the course of this nightly business. Squabbling over access to take-off trees — most seabirds require elevation and wind for departure — leaves little time for courteous behaviour. Community spirit's lacking, that's for sure.

Before daybreak the musky forest acquires an eerie silence. It's hard to imagine the bustling metropolis beneath the tree roots only hours before. Warm rays soak into honeycombed soil, but the aftermath of a busy seabird night is revealed.

Ghostly corpses hang in trees, heads jammed between branches; tongues of regurgitated orange krill paste lie below. Slender wings are entangled in roots, dislocated. It's inevitable, with each nightly mass arrival and the pre-dawn exodus of thousands of birds, that many individuals suffer misadventure. Like it or not, this is a place where the cycle of life and death is 'in-your-face'.

On the tidal platforms above the sea, more carcasses lie desiccating in the morning sun. Beheaded bodies stripped of flesh, bony wings and broad-billed skulls are strewn incongruously on carpets of soft, pink-flowering ice plant; grim evidence of the formidable brown skua's night-time feasting.

Victims can be swallowed whole, then churned, crunched and ground, with indigestible remains ejected in a tidy pellet. Pairs of gangly legs may be identifiable amongst broken bones and feather fragments: delicate white-faced storm petrels, or blue-legged, downy diving petrels.

HELEN GUMMER

A single tree can be the same trap for more than one prion attempting to land in the forest at night.

HELEN GUMMER

Rainy nights on Rangatira are often the busiest in terms of seabird activity. A tiny grey-backed storm petrel lands in a grassy clearing in the drizzle.

HELEN GUMMER

Endangered Chatham petrels are rarely seen on the surface. With dirt on its bill, this bird has probably just emerged from a nearby burrow.

HELEN GUMMER

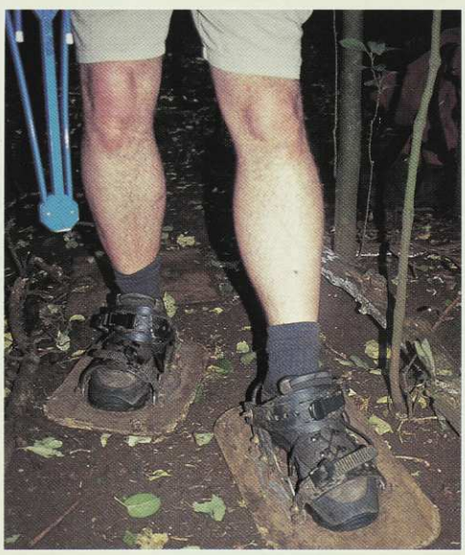
Virtually every square metre of forest floor on Rangatira is perforated with seabird burrows.

In addition to the prions, there are an estimated million pairs of storm petrels nesting on Rangatira. That's a lot of burrowing birds, each looking for a vacant hole in the ground in which to breed.

This is a cosmopolitan 'conurbation'. Seven petrel species choose Rangatira as their breeding destination, arriving from every direction of the surrounding oceanic wilderness, each at specific times of the year. Those returning from their annual break — maybe as far afield as the northern hemisphere — are likely to experience travel delays during what to them are adverse weather conditions: fine and calm with clear visibility! In this open-air stadium, the biggest crowds turn out on the most dismal of nights.

Clearly, this island is of international significance and, as such, New Zealand has an obligation to protect it. The Department of Conservation has to ensure that the island remains free from threats such as predators and fire — essential if seabird colonies are to thrive. DoC also has the task of managing some of the country's most endangered flora and fauna.

Rangatira is the stronghold for a range of threatened species. Rare, forest birds peculiar to the Chathams include the black robin, which received world attention when rescued from the brink of extinction in the 1980s, placing the Chatham Islands firmly on the conservation map. There are also Chatham Island tui, Chatham Island snipe, Chatham Island warbler, Chatham Island tomtit and Chatham Island red-crowned parakeet. Breeding on the shoreline are Chatham Island oystercatcher, Chatham Islands pipit , and the most significant remaining population of New Zealand shore plover.



HELEN GUMMER

'Petrel-boards' enable conservationists to walk through the forest without destroying burrows and their inhabitants.

Regular monitoring is required to assess the stability and security of these populations. It is difficult to perform even basic monitoring techniques on such unstable terrain. Dare to leave the track anywhere on this island and you're treading a dangerous path: the most fragile of seabird burrows — their thin crumbly roofs held together by tiny rootlets — are ready to cave in at any instant. One is almost afraid to sneeze in their immediate vicinity.

Fortunately, the use of 'petrel-boards' — cumbersome 400mm x 300mm pieces of plywood strapped to boots with snowboard fittings — allows conservationists to work in the forest with minimal impact on burrows and birds below. The going can get tough; sloping forest floor becomes a treacherous downhill slalom after a light coating of drizzle with slippery exposed tree roots and trip wires of ground-hugging vine set to catch staff out.

The tiny grey-backed storm petrel lays its single egg in relatively modest accommodation. It occupies the 'suburbs' of the bush margin, avoiding competition from other burrowing species, sharing a secret world beneath thick beds of sedge and impenetrable vine with a rare skink, a lizard found nowhere else. This puts grassy clearings off-limits to field workers. Forest margins mean more pie-crust zones, and shuffling below are large, black sooty shearwaters.

Sooty shearwaters arrive at dusk. Like iron-filings to a magnet they gather at sea and are drawn to the island, crashing into scrub right next to their 'front doors'. There's no neighbourhood watch scheme here. They often arrive home to find Chatham Island blue penguins claiming unauthorised possession of the premises. Real estate is costly, tenancy agreements non-existent.

On the island's southern edge, vegetation struggles to establish on dry, compacted slopes. Here the southerly blasts are more than invigorating, challenging bluffs and encouraging waves to pound over rock platforms with a force that feels as if the island might dislodge from the sea bed on the next impact.

Nevertheless, Pitt Island shags, balancing precariously on sky-scraper ledges, must raise a brood regardless of the marine forecast. There is a constant zig-zagging of low-flying birds, backwards and forwards over the fur-seal colony. They carry home pre-digested fish meals for chicks or grass offerings for partners on nests. Noisy white-fronted terns make less fuss over their nests, laying eggs on

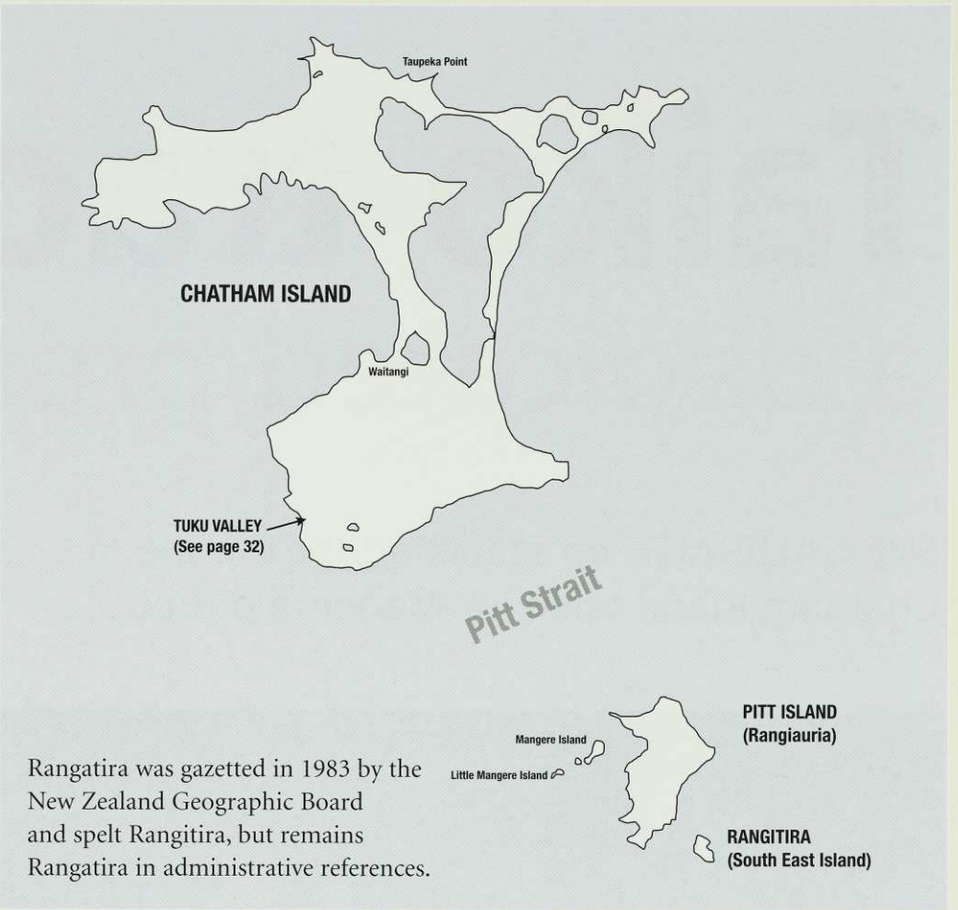
bare rock and delivering fast-food fish catches fresh to their charges. Traffic is busy at this time of year. Pedestrians are a nuisance, and black-backed gulls kerb-crawling in search of a snack, the enemy. Oceanic juggernauts cruise by — giant petrels in search of seal carcasses to scavenge on.

Even the rocky peak's penthouse apartments are in demand. Here, more treats are to be found. Muzzled in moonlit mist, black-winged petrels flash white underwings in spectacular aerial courtship acrobatics, their 'seep-seep-seep' calls echoing through the gullies. At their most southerly breeding range, there are just a few pairs thought to nest in rock crevices and under flax on the summit.

A close relative, the endangered Chatham petrel, was once found throughout the Chatham Islands and now breeds only on Rangatira. In the forest, these elusive birds prospect for burrows close to the island's swamp. Sadly, the species is being rapidly out-competed by the more abundant prions; keen breeding 'broad-bills' return to shore just when the Chatham petrel eggs are hatching and parents are leaving their tiny chicks 'home alone' while they head out to sea to collect food. Prions will enter these burrows and injure, kill or oust the chicks in order to claim the chamber as their own. DoC manages a challenging programme aimed at relieving the intensity of competition by protecting individual Chatham petrel burrows from undesirable incursions. It has also initiated the establishment of a new Chatham petrel colony at a different island location where accommodation options are spacious and more plentiful!

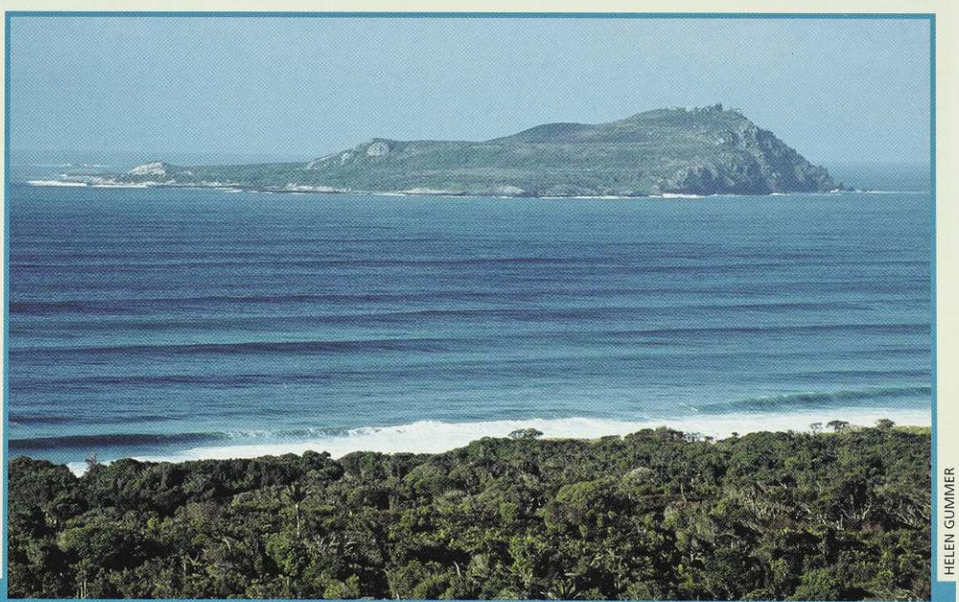
Rangatira's residents meanwhile continue to march on — no law enforcement, no justice system — just city-dwellers coping as usual with everyday life, and death, in the fast lane.

— HELEN GUMMER *is a contract bird ecologist involved in the management programmes on Rangatira/South East Island for the Department of Conservation.*



Rangatira was gazetted in 1983 by the New Zealand Geographic Board and spelt Rangitira, but remains Rangatira in administrative references.

Rangatira/South East Island lies approximately 20 kilometres southeast of the main Chatham Island, 800 kilometres east of New Zealand, and three kilometres from Pitt Island. Composed of volcanic rocks around four million years old, it extends over only 218 hectares but it is currently the major sanctuary for flora and fauna peculiar to the Chathams group.



HELEN GUMMER

Rangatira/South East Island as seen from Pitt Island, Chatham Islands.

The Status of Rangatira

Rangatira Island has long been recognised by scientists for its unique and threatened species. It was purchased by the Crown in 1954 and declared a Nature Reserve following a century of sheep farming.

The last stock was removed in 1961 after which the island vegetation made a dramatic recovery.

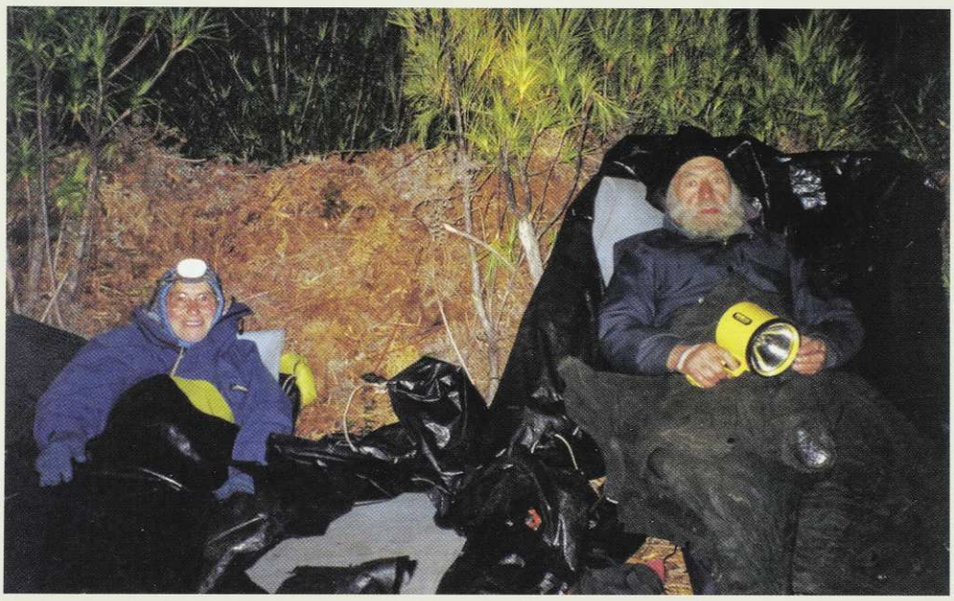
It is remarkable that mammalian pests and predators failed to reach or survive on Rangatira, despite the presence of sealers, whalers and farmers within the last two centuries. Cats still remain a pest on neighbouring and inhabited Pitt Island, and the main Chatham Island is also overrun with rats, pigs and possums. Mustelids, a major threat to birdlife on mainland New Zealand, were never introduced to the Chathams.

Colonisation of Rangatira by millions of burrowing seabirds has created an extremely fragile habitat and a unique ecosystem highly vulnerable to human influences. The island harbours significant populations of some of the country's most endangered wildlife.

For these reasons, the island remains off-limits; entry is restricted to permit holders only, mostly Department of Conservation staff implementing management programmes for threatened species.

Taiko trackers
a dedicated breed

SUE GALBRAITH on searching for the the Chatham Island taiko, or Magenta petrel.



RODGER WASLEY

The night watch for Chatham Island taiko. Wrapped up in plastic sheeting to protect them from rain and windchill Jennifer Wasley and Reg Cotter are ready to spotlight incoming birds. They then guide them down so radio tags can be attached, a step toward locating nests in the dense forest.

To the uninitiated the scenario is decidedly bizarre.

It's 3am on a chilly morning in rugged country on the southwest corner of the main Chatham Island. Two people, each wrapped in plastic sheeting for protection from the cold, lie face up on the ground at the edge of a dense forest. They've been in this position for hours. Beside them a large floodlight illuminates a moonless sky. Conversation and the occasional hot mug of tea from a thermos helps keep sleep at bay and distract them from the aches and pains of their position. But their eyes remain firmly focused on the patch of brightness in the sky.

When a large silhouette appears in the light they're suddenly on their feet, shining lights into the sky and whooping like movie Indians preparing for war.

This ritual is repeated nightly during October and November every two years by Department of Conservation staff, contractors and volunteers. It's all part of a mammoth effort to save one of the world's most endangered seabirds — the Chatham Island taiko. Birds coming in on the cool southerly wind to breeding colonies are dazzled by the floodlights and skilfully guided to the ground by hand-held spotlights. Transmitters are then fitted to their tails so they can be tracked to burrows.

In a military-like operation, telemetry operators in tents on hilly vantage points around the Tuku Valley pick up the signals of taiko returning from the sea. Human trackers with aerials are dispatched into the rugged bush under cover of night, hoping the trail will lead them to new nesting burrows. For all the hours spent in hot pursuit of taiko, just one or two burrows are found by the end of the operation. In fact, the known tally of active burrows now stands at about 30. Between 12 and 14 taiko pairs are expected to breed this year.

Run jointly by DoC and the Taiko Trust, the taiko telemetry programme is helping to unravel the mystery surrounding this critically-endangered seabird, with its population totalling around 120. This year's tally of 18 birds caught in the spotlights is up by six on the previous record, suggesting the population is responding well to the predator control carried out around the breeding colony for over a decade. Most of the birds caught had been banded previously.

Encouragingly, some were young birds that had fledged from managed burrows, returning to the breeding colony for the first time. Seven birds not captured previously were also brought to ground. They may be offspring from burrows only recently discovered but benefiting from the widespread predator control in the area, or from as-yet-undiscovered burrows. DNA samples taken from the birds will provide information on whether there are further breeding burrows waiting to be discovered.

Thought to be extinct for more than a century, the Chatham Island taiko or Magenta petrel was rediscovered by teacher and ornithologist David Crockett and a band of keen volunteers who gave up many summers in warmer places to search for them. As a schoolboy in 1952, while helping sort through Moriori midden

material from the Chatham Islands at Canterbury Museum, David Crockett found petrel bones that did not fit any known specimens.

They were eventually linked to a single petrel specimen held by the Turin Museum in Italy. Labelled 'Magenta Petrel', it had been collected in 1867 by the crew of the Italian research ship *Magenta*, 800 kilometres east of the Chatham Islands.

Taiko was once a major food source for Moriori on the Chathams, until cats, pigs and other predators helped decimate the population.

Beginning his search for living birds in 1969, David used spotlights to try and attract them, a method based on early whalers' accounts of petrels flying into tripot fires. In 1974 two fast-flying petrels fitting the description of taiko flew into the light, amazing volunteers with their aerial antics.

On the night of New Year's Day 1978 the first two birds were caught by the lights, captured and confirmed as the Chatham Island taiko. Following the discovery of these first taiko, the focus shifted to finding their breeding sites.

When taiko — renowned for their navigation skills — start returning from sea, to seek out their nesting burrows, about 10 people at a time congregate at the taiko camp. They stay in a scattering of humble dwellings or in tents. From all walks of life and of varying ages they come from throughout New Zealand and elsewhere for a taste of taiko adventure. During the day they might be involved in trapping wild cats, carrying out maintenance or undertaking other species

GRAEME TAYLOR, DEPARTMENT OF CONSERVATION

Adam Bester, DoC programme manager for fauna in the Chatham Islands, holds a taiko chick.

GRAEME A TAYLOR

Diagnostic underwing markings help identify the Chatham Islands taiko from other petrel breeding on the Chathams.

work. By night they take it in turns to settle down in pairs for a long session by the lights, or to radio track the taiko to their burrows. There are usually two taiko watch shifts — 9.30pm to 2am and 2am to dawn. It's a long time in the outdoors when a cold wind is blowing.

Taiko come in from the sea on the southerly breeze. The taiko watchers remain ever vigilant and respond rapidly when taiko are seen in the lights. They attempt to land the birds by shining spotlights in their eyes. Some do a 'war whoop' — seabirds are attracted by the loud call which vibrates and echoes through the valleys.

'Humans get a high from catching taiko,' says volunteer Reg Cotter, aged 73, of Petone who has taken part in 18 expeditions since 1977. His 'top tally' is three taiko in an hour. Many nights have yielded nothing. Some taiko can be landed easily with spotlights, some take an age to bring down; some fly right through the lights without stopping and others circle the lights for hours before disappearing out of view.

Taiko are aggressive birds, equipped to survive in harsh conditions and more than able to take on interfering humans.

'They're wonderful birds but some can be quite vicious. They're worse than kaka,' says Reg Cotter, who has learnt to keep his hands well away from their bills.

The support of local landowners has been essential for the search effort and a base camp is set up on private land now owned by Liz and Bruce Tuanui. Bruce's parents Evelyn and Manuel Tuanui gifted to the Crown the 1238-hectare Tuku Nature Reserve, where most of the burrows are located. Other important areas of taiko habitat have been protected by covenant, by the Tuanui family and other landowners.

— SUE GALBRAITH *is a journalist with the Department of Conservation in Wellington.*

Funding boost for Chatham Island taiko protection

Recent grants totalling $236,000 are a welcome boost to efforts to protect the endangered Chatham Island taiko from predation.

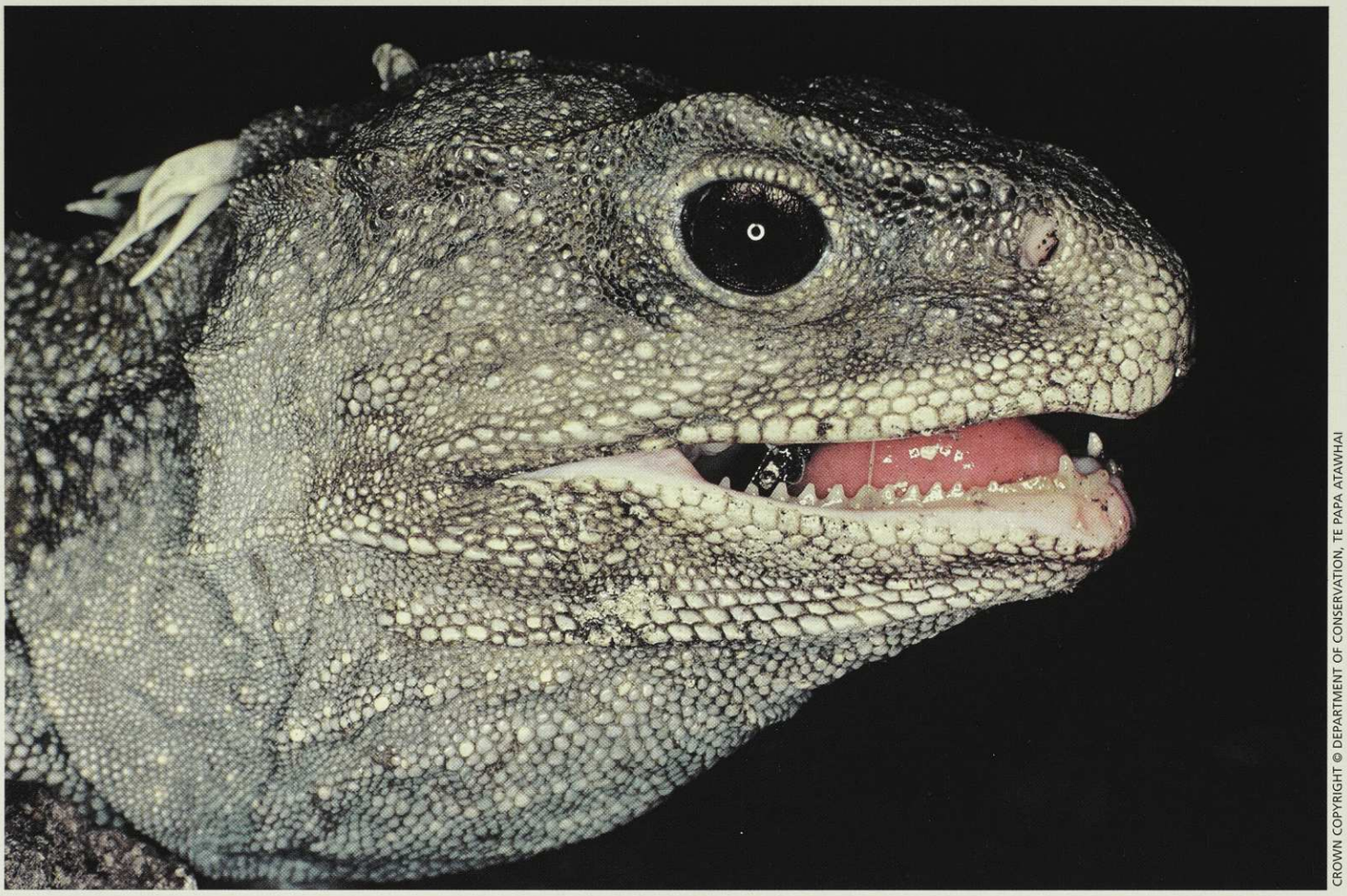
An $80,000 contribution from the Biodiversity Condition Fund, followed by a $156,000 Lottery Environment and Heritage grant, will enable a predator-proof fence to be built around a new breeding colony for taiko within the next two years.

The grants have been welcomed by the Chatham Island Taiko Trust which plans to establish the colony on four hectares of remote forest, a site used by taiko more than 50 years ago. The land is protected by a conservation covenant.

'We are overwhelmed and delighted', says Trust chair Liz Tuanui.

Taiko recordings will be played to attract sexually active, unpaired birds to the new colony, and radio-telemetry tracking equipment will be installed.

Trust volunteers have donated time and equipment to the value of $1 million over the past decade and will match this amount for the new taiko colony project during the next five years.



Rat eradication is a huge advance for wild tuatara populations. During the lengthy incubation period, rats dig up the eggs, and also kill young.

A New Chance for Nature

KATHY OMBLER tells how developing technology is removing rats from larger island sanctuaries.

When pest-control teams turn later this year on the rugged wildlife sanctuary of Little Barrier Island, nature will get a second chance. When cats were removed from there years ago, rare bird numbers grew, sufficient to allow their capture and spread to other island sanctuaries. But while Pacific rats, or kiore, were allowed to survive on the island, its few tuatara had to be caged and their young confined to what looks remarkably like a chicken run. Experts predicted the early demise of the giant weta, and ground-nesting seabird colonies remained threatened, unless the rats could be exterminated — and they can.

Evolving methods for the control of rats now makes the task of removing them from an untracked, rugged mountainside technically possible. The success of these methods has been rapid and spectacular.

Five years ago, conservationists celebrated the eradication of rats from the nature reserve of Kapiti Island, off the Wellington west coast. (See *Forest & Bird*, November 1999 for technical detail.) At the time this was by far the largest island to be rid of rats in New Zealand, but larger islands have

since been tackled, most notably the remote Campbell Islands group in the subantarctic.

The Kapiti success brought to 54 the number of offshore islands, ever-increasing in size and complexity, that the Department of Conservation had cleared. The removal of rats paved the way for often-spectacular forest recovery and the relocation of threatened species to the new predator-free sanctuaries. The technology and expertise that blitzed rats from all of Kapiti's steep and rugged 1965 hectares attracted attention from conservationists worldwide, and set the way for even more ambitious eradication targets.

Bigger islands, including islands with multiple pest species such as rats and cats, and islands so far from mainland New Zealand they are at the very limits of helicopter reach, moved into the firing line.

Five years on, rats and cats have been blitzed from Tuhua (Mayor Island) in the Bay of Plenty. In the remote Subantarctic World Heritage Area, Campbell Island, over 10 times the size of Kapiti and five hours' helicopter flying from the mainland, has been declared rat free. Raoul Island, halfway to Tonga in the Kermadec group of islands, is in the final monitoring stages following a rat and cat control operation in 2002. Now in the Hauraki Gulf, after protracted negotiations, resource consent and iwi blessing have been given to the eradication of kiore from Little Barrier Island/Hauturu.

Aerial pest-control operations happen in a very short space of time. However, the logistical planning, resources and technological expertise required for their successful execution are huge. Post-operation monitoring, over rough terrain in harsh environments, adds to the mammoth task. Here's how DoC tackled the different projects.

Tuhua (Mayor Island), Bay of Plenty

Two significant factors marked this operation, in September 2000. First, multiple species of predators — Norway rats, kiore and cats — were targeted. Second, the operation was carried out in collaboration with the island's iwi, Te Whanau A Tauwhao ki Tuhua. Tuhua also served as a trial for Raoul Island, which is topographically similar and contained cats, Norway rats and kiore.

The key question, whether the cats would succumb to secondary poisoning from eating the dead or dying rats, was happily answered. Prior to the aerial drop six cats were fitted with transmitters. Within ten days of the operation all six cats had died, and intensive monitoring of the island since has found no trace of either cats or rats.

DICK VEITCH © DEPARTMENT OF CONSERVATION, TE PAPA ATAWHAI

The giant weta of Little Barrier Island is another species endangered by rats.

Predation by pests had decimated bird populations on Tuhua and the operation's success paved the way for species relocation. In May 2003, 42 North Island robins were released on the island and within six months were successfully breeding. DoC plans the release of further species, and expects recovery of the island's seabird colonies.

Campbell Island

According to the Director-General of Conservation, Hugh Logan, rat eradication has never been done at such an inhospitable site as the 11,300-hectare Campbell Island — it's 700 kilometres and five hours' flying time from the mainland. In the winter of 2001, two helicopters shifted 120 tonnes of baits onto the island from a ship moored offshore and another three flew bait-spreading missions, during gaps in storms and heavy cloud cover, over a month-long period.

In a survey last May, DoC scientists found no trace of rats on the island. What they did discover was significant wildlife recovery. Greg Lind, DoC's area manager for the subantarctic islands, explains:

'The insect life now is just incredible. Before you hardly saw any movement in the vegetation and now the place is alive with weta and other insects. There is a proliferation of perching birds, such as waxeyes, which indicate their nests are safe and there is an increase in their food. The territory of the Campbell Island pipit has increased from less than ten percent prior to the operation to over half of the island and there is evidence the island's remnant seabird populations, such as titi and grey petrel, are increasing.

DICK VEITCH

Cook's petrel on Little Barrier: rats attack burrow-nesting birds.

'The next move is to accelerate these changes. We are proposing to reintroduce Campbell Island teal from Codfish Island and Mt Bruce over the next two years, although this will require huge funding and we are currently looking for sponsorship.'

Raoul Island

With its multiple predator species and the huge distance involved, Raoul has been possibly the greatest challenge of all for the DoC eradication teams. The island lies 1000 kilometres north from the New Zealand mainland, beyond the range of most helicopters. The 52 tonnes of bait required was beyond the carrying ability of ships normally used for transport to the island — yes, even the Navy frigates.

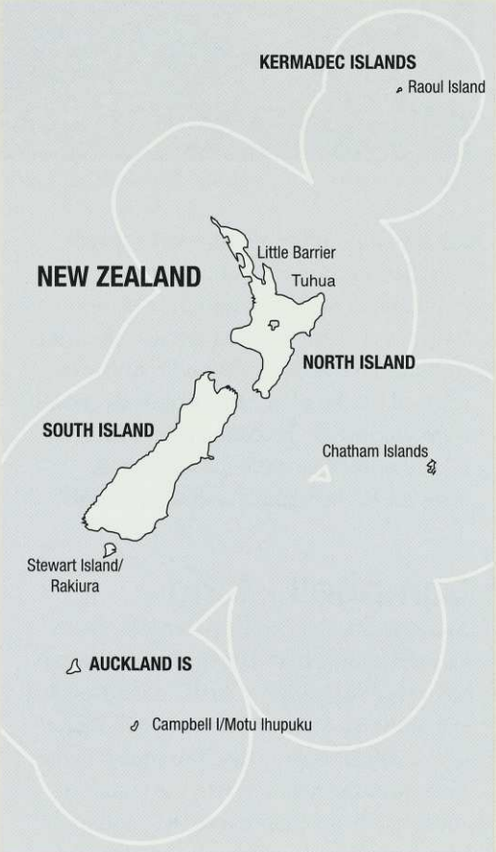
Two Iroquois helicopters loaded with nothing but long-range fuel tanks flew to the island. Meanwhile a barge carried bait, plus 30 tonnes of helicopter fuel and four gigantic spreader-buckets to Raoul. Landing these supplies in 30-knot winds was a 'nightmare scenario', according to DoC's project coordinator Mike Ambrose. However, the two poison drops — a main application then a follow-up five days later — went smoothly.

Mike Ambrose says subsequent monitoring has shown no sign of rats; however cats have proven more problematical.

'There was probably a 90 percent cat kill achieved through the rat poisoning, but not the 100 percent achieved on Tuhua.' A programme of bait laying, trapping and searching by specialist tracker dogs has since snared four cats. 'We can be fairly sure there has been no breeding of cats on Raoul since the eradication. Either there are no cats left or there is perhaps a tom. So it's getting close but we're not certain yet.'

In the meantime, the vegetation, which had already recovered 'amazingly well' since goats were culled from Raoul in the 1980s, was looking even better, according to Mike Ambrose.

'There are literally carpets of seedlings up there. Nikau is the most noticeable. As well, the Kermadec kakariki, previously extinct on Raoul, has self-relocated from the neighbouring Meyer group and is already breeding, while active petrel burrows have been seen for the first time in decades.'



New Zealand showing Exclusive Economic Zone.

What's next?

Eradication of kiore, the last remaining predator from Little Barrier Island, was initially planned two years ago. Now, following a long and expensive but successful resource consent process, DoC's Auckland regional conservator, Rob McCallum, says the poison operation is now programmed for this winter. He says that after initial dissension, local iwi also supported the eradication plan.

'There were a range of views within the Ngatiwai hapu. They are now unified in giving their support to the Department. Their concern for other taonga [treasured] species on Little Barrier, such as tuatara, dactylanthus, Cook's petrel and giant weta outweigh their concerns for kiore.

'DoC is going to be working with iwi,' Rob McCallum says. 'We are looking forward now to where we're going with species that need rehabilitation, in particular to the most spectacular tuatara release ever done.' At present some 90 tuatara live in cages on the island, unable to be released because their young would be at risk from kiore predation.

In the meantime, ongoing efforts are being undertaken to prevent or deal with reinvasion of rat-free islands which could occur by means such as illegal boat landings or shipwrecks. The development of long-life baits, lures and bait stations attractive to rats is the focus of current studies by Landcare Research. The development of early detection systems, such as traps with remote sensing devices, have been discussed in theory at least. In Auckland, a PhD student James Russell is studying rodent behaviour patterns in controlled releases on three small and heavily modified islands,

GORDON ELL, BUSH FILMS

Zoo-bred tuatara have been protected in these cages on Little Barrier Island for some years while the future of the Pacific rat population was debated with local Maori.

© DEPARTMENT OF CONSERVATION

Helicopter dropping rat poison on Campbell Island.

with a view to determining optimum management methods in the event of reinvasion.

While each DoC conservancy operates its own reinvasion contingency plan, the department is nearing completion of a national island biosecurity 'standard operating procedure', which covers measures to prevent the accidental introduction of weeds and animal predators to its offshore island reserves.

— KATHY OMBLER *is a Wellington-based writer.*

Problems with Poison

While brodifacoum continues to be the favoured poison for use on island aerial pest-control operations, the Department of Conservation has restricted its use of the poison for pest control on the mainland.

The restriction came as a result of a review four years ago, after MAF tests had shown the presence of brodifacoum in wild pigs in game-packing houses. A DoC fact sheet states that 'as a second-generation anticoagulant, brodifacoum is persistent in living animals for at least nine months, which means small doses can build up over time.

'Although the real risk is difficult to measure, DoC is concerned about the possible impacts this could have on native species exposed to brodifacoum, and on people who eat game such as pigs or deer. It has chosen to take a precautionary approach.'

Keith Broome, a senior technical officer for DoC, says using brodifacoum in one-off applications such as island operations does not constitute the same risk. Nevertheless, resource consents are sought for all offshore-island operations through the appropriate regional council. In the case of remote islands such as Campbell and Raoul, which fall under the Minister of Conservation's jurisdiction, the Minister has sought consents from an independent commissioner.

As part of the Department's review on the overall use of pesticides, all DoC offices now have pesticide summaries that list all DoC pest-control operations happening on public conservation land.

As a point of interest, major changes are likely for all agencies involved in pest control in New Zealand as the Environmental Risk Management Authority takes responsibility, during a gradual transition period, of the use of pesticides according to the Hazardous Substances and New Organisms (HSNO) Act 1996.

ROD MORRIS

Fruits colour the foliage of kahikatea in a 'mast' year of heavy fruiting.

Too Rich A Diet

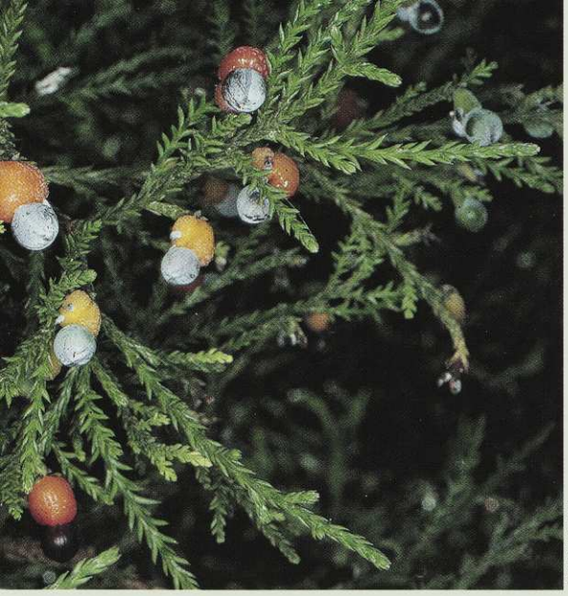
HAYLEY MEEHAN explains why a good year for plants can be bad for birds.

The prolific seeding of native plants can be a disaster for native birds. While the birds may have an easier time, so do the animals which prey on them.
The phenomenon is known among scientists as 'masting' — the setting of much larger amounts of seed than normal. The consequence is that native birds find food more easily; 'masting' even triggers more breeding in some cases. Unfortunately, 'masting' also helps mice and rats, and the animals which prey on them.

When stoats and other forest pests run out of this abundance of food, they turn on the newly replenished bird populations and can ravage them.

Already 'masting' has cost a large part of the population of orange-fronted parakeets, when the Department of Conservation failed to recognise that an explosion of the rat population was possible in the last high-country valleys the birds inhabit. The Department of Conservation has also blamed two consecutive 'masting' events for the loss of kiwi in Okarito Forest in South Westland. In 2002 there was a rimu mast and the following year a kahikatea mast. Both years had high numbers of rats and stoats which led to high levels of predation of the kiwi chicks.

Mast seeding is the technical term for the production of large seed crops by plant populations over wide areas. The huge increase in seed abundance can improve the



ROD MORRIS

plants' reproductive success but it can also drive big changes in the populations of seed-consumers. This in turn can significantly impact on other parts of an ecosystem.

Although it is a worldwide phenomenon, heavy seeding appears to be especially common in the New Zealand flora. The reason for this remains a mystery.

In New Zealand, the 'masting' of beech is probably the most studied. In the extensive beech forests of the South and North Islands, 'masting' usually occurs once every two to five years. It is rare for there to be two beech masts in a row. In beech forests kaka and kakariki usually nest only in mast years and 'masting' has been found to boost breeding success of other birds such as yellowhead/mohua.

The unfortunate downside to a good beech-seeding season is the increase in rodent populations, which in turn results in prolific breeding by stoats. Many native birds, including kaka and mohua, now have greatly reduced distribution and populations due largely to predation by rats and stoats.

But 'masting' is not confined to our native beech species. It is also known to occur in hinau, pigeonwood, tawa, some podocarps, cabbage trees, flaxes, and tussocks. For beech and the majority of these species, the trigger is believed to be particularly high temperatures the summer before seed fall.

This cue is linked with the 'La Nina' phase of the Southern Oscillation. As they respond to the same trigger, most species mast in the same year. However, because it takes two years from floral development to seed production, rimu 'masting' is usually a year later.

Many species, like hinau, are patchily distributed throughout the forest so the total of extra food available in a mast year is generally a lot less than in a 'masting' beech forest.

On southern islands such as Stewart and Codfish/Whenua Hou, however, there are stands in which rimu forms a continuous canopy. In these forests the huge production of rimu fruit is crucial to the breeding success of kakapo. The population of kakapo was boosted by 24 young in the last mast season (2002), but last year kakapo did not breed at all.

In the winter of 2002, rimu fruit production in Southland's Waitutu forest attracted flocks of kaka, but this was followed by an irruption in mouse populations. A rapid build-up in stoat numbers followed — bad news for the survival of hole-nesting kaka. This was the first time this pattern had been documented in response to rimu 'masting'.

The ups and downs of mast years and their impact on rodent populations have been observed only once in non-beech forests in the North Island. In the mixed podocarp-hardwood forest of the Orongorongo Valley east of Wellington, in the summer of 1971-72, some 711 kilograms of fruit and seed — chiefly hinau, and pigeonwood — fell per hectare. This heavy crop of fruit was observed to boost the numbers of ship rats and to also improve the survival rate of young possums still in the pouch.

It may not just be the increased seed production which can lead to the increase in rodent and therefore stoat populations. Often in mast years invertebrate numbers also increase.

The invertebrates may be feeding directly on the flowers and seed, or they may be responding to the same climate signals as the 'masting' plants. For example, successful breeding in the previous warm summer may lead to good survival rates into the start of the following spring. This could set the scene for high invertebrate numbers coinciding with the seed mast. High numbers of invertebrates in spring may explain the rodent increases prior to the fall of the bumper seed crop.

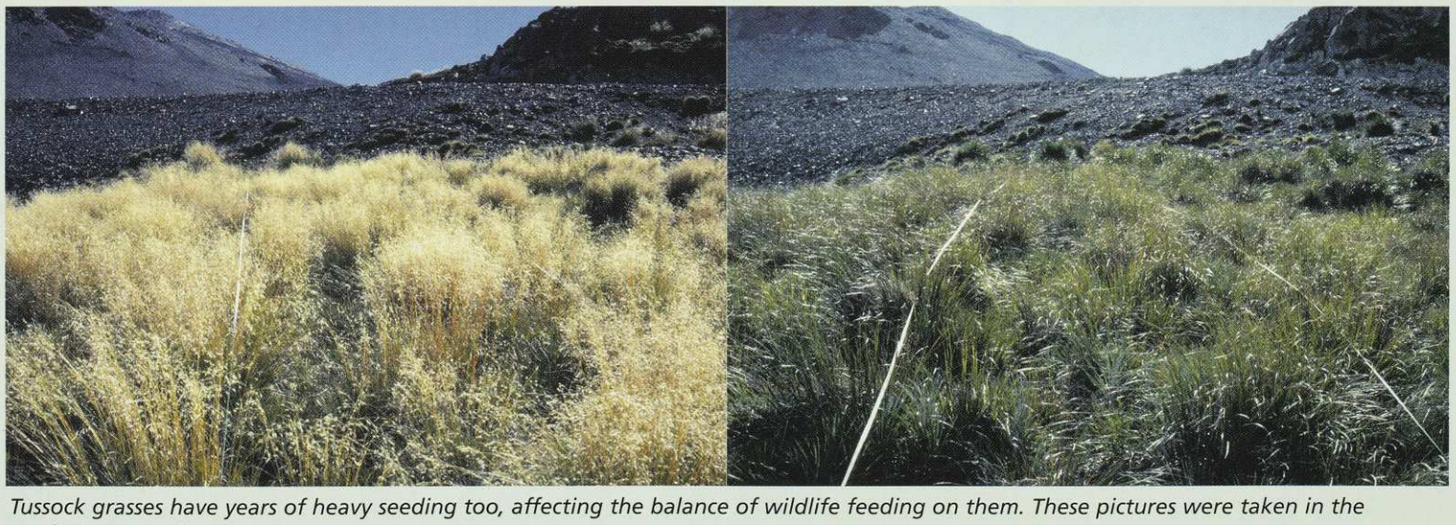
In the North Island the increased seeding of podocarps, and hardwoods such as hinau and pigeonwood, appears to increase the number of breeding attempts by fruit-eating birds such as New Zealand pigeon, kokako and kaka. Sadly, in these mixed forests, the normal number of rodents and stoats is generally much higher than is usual in beech forests. This means that while more chicks may be produced in a mast year, this can be offset by the death of adult birds, particularly females, in non-mast years.

'Masting' is an energy-intensive process, Plants reallocate significant resources away from vegetative growth, such as leaves and twigs, into the production of flowers and seed.

If climate change leads to warmer summers, we may be in for more regular 'masting' events. Not only could this increase the stress on the plants, it could also increase the prevalence of high rodent and stoat populations.

Unfortunately, for much of our already hard-pressed native fauna, this would be a bleak outlook.

— HAYLEY MEEHAN *was till recently a conservation officer with Forest and Bird in Wellington. She now works for the Environmental Risk Management Authority.*

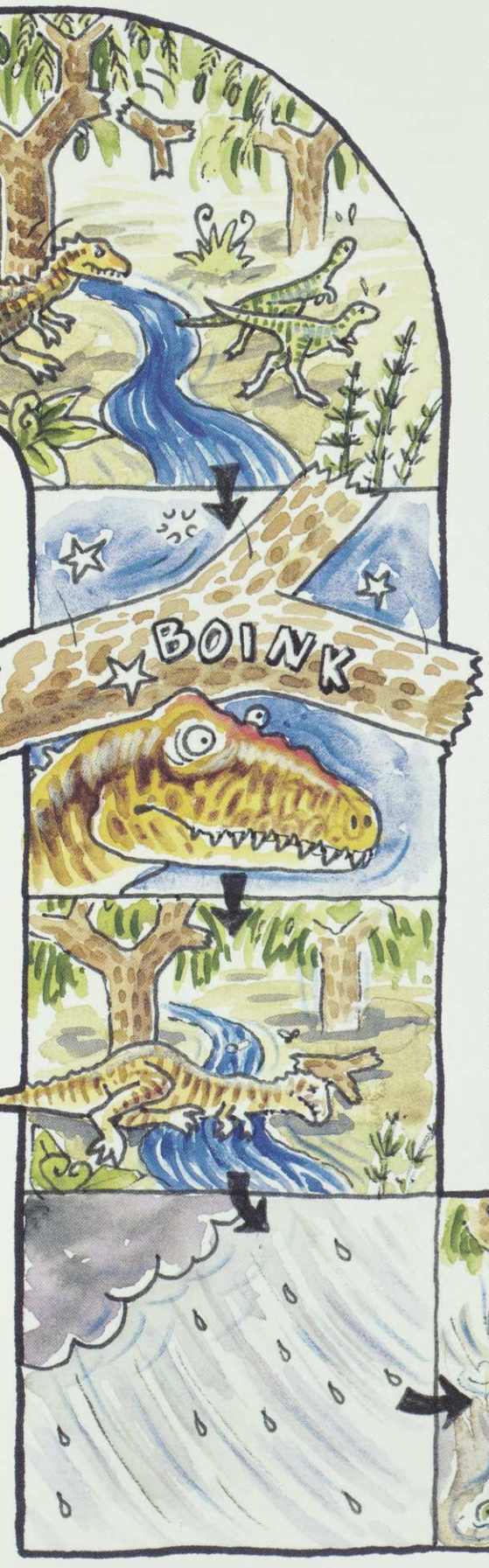


DAVE KELLY

Tussock grasses have years of heavy seeding too, affecting the balance of wildlife feeding on them. These pictures were taken in the seeding season three years apart.

Dinosaurs in

After visiting an exhibition of Chinese dinosaurs, ANN GRAEME asked 'Did dinosaurs ever live in New Zealand?' Illustrations by TIM GALLOWAY



Did a Brontosaurus once lumber over your backyard, or a Tyrannosaurus terrify the Tararuas, or a Stegosaurus shake the plains of Canterbury?

Well, not exactly.

There were dinosaurs in New Zealand, lots of them, but it was not New Zealand as we know it. When the earliest dinosaurs first appeared, 250 million years ago, all of Earth's land was joined in a massive super-continent called Pangaea. With no seas to divide them, the dinosaurs could spread across the whole land mass.

Then, about 25 million years later, Pangaea split into two super-continents, the northern Laurasia and the southern Gondwana. Over the millennia, sediment eroded and washed off the eastern margin of Gondwana. Later, in the Jurassic period, this sediment was pushed up again to create the ancestral New Zealand, a huge land mass stretching from New Caledonia to the Campbell Islands.

The Jurassic was the heyday of the dinosaurs and they would have spread from Gondwana far across that ancestral New Zealand. For millions of years they would have been the dominant animals in old New Zealand, just as they were in the drier plains of the Northern Hemisphere. There, flash floods and sandstorms buried countless dinosaurs in sediments which remained stable to the present day when erosion (and spades) have revealed the bones to curious fossil hunters.

In ancestral New Zealand conditions were not good for preserving fossils. Carcasses rotted in the warm, moist forests and the humic acid in the boggy ground dissolved the bones. Even so, many dinosaur fossils could have been preserved — had the land remained.

But old New Zealand began to erode. For 100 million years the weather whittled it away until most of it was back under the ocean and most of the life on land and the fossils had been destroyed.

Dinosaurs became extinct everywhere 65 million years ago. It was not till 50 million years later, at the end of the Miocene period, that the local mountain-building which created present-day New Zealand began. The old sediments on the sea floor were crushed and thrust up again to create the Southern Alps and the mountain chains of the North Island. Volcanoes covered the land with ash. Eroded, buried, uplifted, covered with ash: the chance of finding a dinosaur fossil in present-day New Zealand seems very slim indeed.

But someone did!

Enter an amateur — Joan Wiffen. Armed with knowledge, enthusiasm, persistence and a measure of good fortune, she found the first dinosaur fossil in New Zealand.

Joan was not a professional geologist. Her interest began on family field trips with the local rock and mineral club. She attended night classes in geology, standing in for her sick husband. Then Joan taught herself palaeontology and began fossil hunting. She set her sights on finding a dinosaur fossil, although at the time many scientists did not

New Zealand

think dinosaurs had ever lived in ancestral New Zealand.

In 1972 she bought an old geology map of the Taupo region. The notes with it read, 'reptilian bones found in the Te Hoe valley'. The Te Hoe valley was not far from the family home in Hawkes Bay, and that summer, the family set out for their first trip to look for fossils.

'Who knows, we may find a dinosaur,' quipped Joan.

They found the Mangahouanga stream, the site referred to on the map, and clambered down its steep, forest-covered banks. The stream bed was a jumble of boulders, and they were encrusted with fossils — shells, sharks' teeth, fish scales and bones. The boulders were concretions of sandstone which had been laid down in an estuary some 70 million years ago.

Joan and her husband Pont found many fossils of extinct marine reptiles — ferocious mosasaurs and long-necked plesiosaurs and both sea and land turtles. Joan became adept at recognising the bones of animals that lived in the sea and used their limbs for swimming, but none was from a dinosaur. Then, in 1975, she found a fossil vertebra that didn't fit the patterns.

It was not till 1979, however, while visiting the Queensland Museum, that she spotted a dinosaur vertebra that looked like the odd fossil she had found. She sent the museum a cast of the vertebra and in no time came back the response:

'You've found a dinosaur!'

That first find belonged to a theropod, a member of the group of meat-eating dinosaurs which walked on two legs, and to which the well-known *Tyrannosaurus rex* belonged. Dinosaurs were land animals. How had this theropod come to lie on a sandy sea floor amongst the sea shells and fish bones?

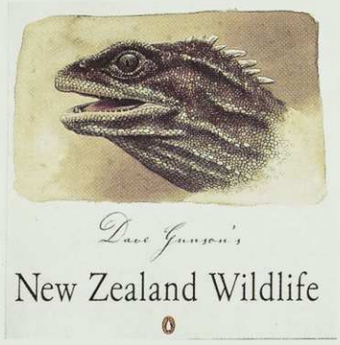
About 70 million years ago a watercourse, perhaps a broad, shallow river, had emptied out into a bay. After a great storm, the carcass of a theropod may have floated down the muddy river and been washed out to sea, its bones scattered and then buried in the storm-eroded sediment. (See Tim Galloway's picture sequence below.) Over millions of years, layer upon layer of mud and sand built up and hardened. Then the sea floor was uplifted and the sandstone sediment containing marine fossils and the theropod vertebra came to lie deep in the ranges of Hawkes Bay. There they remained hidden until the Mangahouanga stream chewed down into the bedrock and exposed them.

Joan Wiffen also found fossils of hypsilophodonts, plant-eating dinosaurs about the size of a sheep. Evidence of similar species from North America suggests that they lived in small groups, browsing in the forest and were hunted by the theropods.

Altogether Joan has found six of the seven New Zealand dinosaur fossils. The evidence of dinosaurs in New Zealand is indisputable, but like all initial fossil discoveries, it is rather insignificant in size. All of Joan's dinosaur fossils would fit into a shoebox, but this is no reflection of the study and effort that went into their discovery.

In 1994 Joan Wiffen was awarded an Honorary Doctorate from Massey University, a fitting recognition for a remarkable woman who put New Zealand on the dinosaur map.

— ANN GRAEME *is the coordinator of Forest and Bird's Kiwi Conservation Club for younger members. Joan Wiffen's work is featured in a display at Napier Museum and in her book* Valley of the Dragons *published in 1991 by Random Century.*

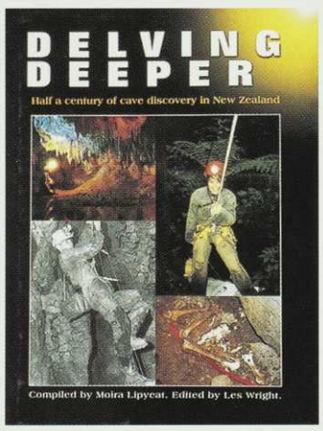


Dave Gunson's New Zealand Wildlife

by Dave Gunson, 144pp limpbound, Penguin Books 2004, RRP$45.00.

When Dave Gunson arrived in New Zealand as a boy, his imagination was immediately captured by a little blue penguin swimming about the berthing immigrant ship. Since then he's painted wildlife and plants for many books and posters, illustrated children's books and designed stamps for several countries (and written a novel). This book gathers his favourite work, much of it previously unpublished, along with spare notes about the animals and plants illustrated. This is not a guide book to New Zealand wildlife: the author regards his pleasant album as a 'personal response to New Zealand's incredibly diverse and fascinating natural world'.

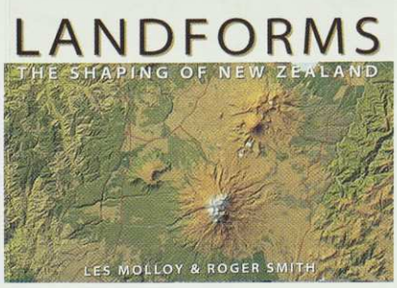
Delving Deeper, Half A Century of Cave Discovery in New Zealand



compiled by Moira Lipyeat, edited by Les Wright, 312pp hardback, Hazard Press 2003, RRP$49.95.

This book celebrates 'underground' New Zealand. The text traces the development of speleology in New Zealand, and there are supplementary notes about caving generally — longest caves, caving terms, Maori words, etc. Like the alpinists of old, caving has its heroes and explorers; here they are in a detailed history likely to fascinate anyone penetrating this other world.

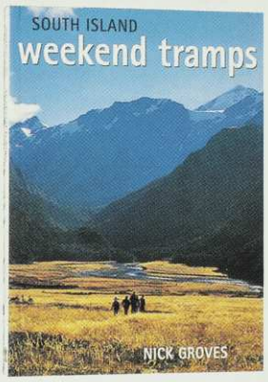
Landforms: the Shaping of New Zealand



by Les Molloy and Roger Smith, 160pp limpbound, Craig Potton Publishing, Nelson 2002, RRP$49.95.

Looking at New Zealand from above, this book makes our topography easy to appreciate. Based on digital images developed from topographical maps, the 73 aerial views use colours not contours to show the shape of the land. The excellent essays by Les Molloy tell what lies underneath and how that geology (and subsequent natural processes) has shaped the land. The book is particularly interesting for its assembly of the latest theories about the role of vulcanism in shaping broad reaches of our countryside, the effect of earthquakes and glaciations, and the other natural forces which have created our varied coastlines.

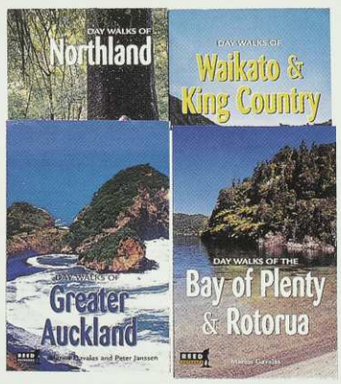
South Island Weekend Tramps



by Nick Groves, 168pp limpbound, Craig Potton Publishing 2003, RRP$29.95.

A companion to Shaun Barnett's *North Island Weekend Tramps* also published by Craig Potton and noted in *Forest & Bird* last November. These books are too good to take into the field. Fine paper and photography make them more useful for planning at home. The authors know their outdoors and the advice is helpful. The books are great for the armchair, and a pressing invitation to get out of it. This is fairly serious tramping, not to be undertaken lightly (for easier stuff see the popular 'day tramps' featured below). Each tramp has a sketch map, route notes and guidance, while the general text describes historic and natural wonders along the way. Weekend tramps (2-3 days here) may also extend a further day or two because of the time it takes to get to them. But once there, enjoy the best of New Zealand.

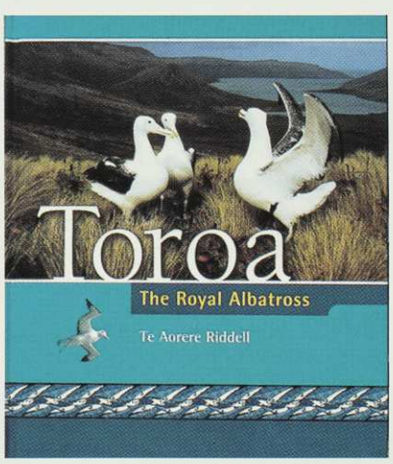
Day Walks series



by various authors, 92-128pp limpbound, Reed Outdoors, Auckland 2003, RRP$19.95 each.

A straightforward series of walking guides covering *Greater Auckland, Northland, Bay of Plenty and Rotorua* (Marios Gavalas) and *Waikato and King Country* (Sonia Frimmel). Shorter walks are enjoying popularity among those too busy to take a week off, or who simply want to get 'out there' and enjoy the outdoors. These guides offer a useful range of walks, with sketch maps and advice of what's to be enountered. A useful series to keep handy for 'time out' in the north.

Toroa, The Royal Albatross



by Te Aorere Riddell, 32pp hardback, Huia Publishers, Wellington 2003, RRP$19.94.

Initially a children's book in Maori, this one has been translated into English for the wider audience it obviously deserves; it tells of the species which nests on Taiaroa Head on Otago Peninsula. The presentation is a colourful collage, and the simple text usefully fills in the facts about the birds and their conservation. *Toroa* offers interesting cultural perspectives, in the context of Forest and Bird's campaign to save the albatrosses of the Southern Ocean.

Part of the Matuku Reserve

A Living Legacy

In 1992 Mary and Bill Cole from West Auckland died within a few months of each other. Both were longstanding members of Forest and Bird. They shared a keen love of the outdoors and, in particular, of the native forests of the Waitakere Ranges.

In their will, the Coles made a generous bequest to Forest and Bird to assist the Society's conservation work in the Auckland area. They requested that the enhancement of Forest and Bird's Matuku Reserve in the Waitakeres be one of the projects funded by the bequest.

Enthusiastic supporters of the branch's Matuku Reserve project, the Coles had watched it grow from the original 50 hectares of goat-infested native forest and wetland alongside the Waitakere River, purchased in 1979. Led by John Staniland, the branch further extended the reserve and actively managed it for conservation. The goats were removed, possums trapped and invasive weeds eradicated.

The Coles and other branch members enjoyed the spectacular regeneration of native plants and the flourishing of native wildlife. Funds from the Cole Bequest, supplemented by $35,000 from the Nature Heritage Fund, were used to purchase an additional adjoining 20 hectares of native forest and wetland. The enhanced reserve is of significant ecological value. School groups, scientists, branch members and others all frequent the trails developed in the reserve and enjoy today the native forests and birds Bill and Mary had cared for so passionately.

Their legacy lives on beyond Matuku, however. The Society's Auckland branches formed a committee in 1993 to determine the best way to allocate the remainder of the bequest funds. A memo calling for project proposals from the Society's then northern conservation officer, Jacqui Barrington (who has since died, leaving Forest and Bird her own bequest), noted it was the Coles' wish that the money be spent wisely on conservation projects benefiting nature in the Auckland area.

Since then the Cole bequest has helped fund the purchase of Whakanewha Reserve on Waiheke Island, now a regional park managed by the Auckland Regional Council. Other Cole Bequest projects have included fencing of the Colin Kerr Taylor Reserve in Waitakere and the initiation of the proposed Te Matuku Marine Reserve at Waiheke Island.

Bill and Mary Cole have indeed left a living legacy that has made a significant and lasting contribution to the protection of the native plants and wildlife that had enriched their lives.

You too can leave a living legacy by remembering Forest and Bird in your will

South Auckland Forest and Bird Branch members enjoying a rest stop in the Matuku Reserve

To receive a bequest pack contact:

Royal Forest and Bird Protection Society
PO Box 631, Wellington
New Zealand
phone: 04-385 7374
fax: 04-385 7373
email:
office@forestandbird.org.nz

FOREST & BIRD

Sailing for the Albatross

Forest and Bird staffer CAROL KNUTSON writes of sailing with John Ridgway's 'Save the Albatross' voyage and its local impact.

The British adventurer John Ridgway has spent part of each of the last six decades in the Southern Ocean, sailing with the albatross. He says he wants to come back as one. But this will not be possible if they are extinct.

If you have sailed with an albatross you will know the pleasure of their company at sea. But you do not need to be a sailor to understand that albatrosses are heading for extinction because of the threat of longline fishing.

Over 300,000 seabirds are killed by longlining each year. The birds are attracted to a 'free meal' set on long-line hooks and then dragged to their death beneath the waves.

These deaths are needless and preventable.

Over the past decade we have witnessed a decline in seabird deaths from the legal fisheries within New Zealand waters. Forest and Bird can take some of the credit for this improvement, but we must keep up pressure on the legal fisheries to improve, and continue to campaign to stamp out illegal or pirate fishers.

That's why Forest and Bird teamed up with John Ridgway, one of Britain's most celebrated adventurers, to raise public awareness about this issue.

John Ridgway first came to fame in 1966 when he rowed the Atlantic with Chay Blyth. Amongst other adventures, John has sailed in the Whitbread Around the World Race and held the world record for the fastest non-stop sailing voyage around the globe. Last year he decided to set out around the world again. This time it would be for the albatross.

The 'John Ridgway Save the Albatross Voyage' would sail from Scotland to Cape Town and then circumnavigate the globe, following the track of the wandering albatross. Conservation organisations around the world agreed to join the adventure to help raise public awareness about the needless slaughter of the albatross.

FOREST AND BIRD

The Prime Minister, Rt Hon Helen Clark, with Kevin Hackwell, conservation manager of Forest and Bird, as she farewelled the 'English Rose VI' from Wellington. Helen Clark has also signed an international petition to stop pirate fishing 'hosted' on the Forest and Bird website.

For Forest and Bird the voyage was the catalyst for hosting an international petition on our website, and the chance for representatives to join the yacht as volunteer crew.

The petition is targeted at lobbying the United Nations to put an end to the pirate fishing industry and shut down their trade in illegally caught fish. Over 13,000 people have signed already. John Ridgway and BirdLife International will present this petition to the United Nations in Rome this June.

Forest and Bird staff member Carol Knutson was aboard 'English Rose VI' when it sailed into Wellington on January 10, after a 13-day Tasman crossing from Melbourne, Australia. The story of the 'albatross adventure' was captured by national media and John and Carol spoke about the fate of the albatross to a capacity audience at Te Papa's theatre.

On January 24 'English Rose VI' sailed from Wellington. Many well-wishers joined the Prime Minister, Rt Hon. Helen Clark, in farewelling the crew and wishing them a safe passage around Cape Horn on their way to the Falkland Islands.

You can follow the voyage on www.savethealbatross.org reading John's log, which is sent from the boat.

John Ridgway's visit to New Zealand was a wonderful opportunity for us to tell people about the albatross. Please sign the petition. We must keep up this battle to save the albatross — *Symbol of the Southern Ocean.*

— CAROL KNUTSON.

FOREST AND BIRD

'English Rose VI' sails out of Wellington bound for the Falkland Islands. This will be the third time she has circumnavigated the globe: first in 1977-78 for the Whitbread Round the World Race; second in 1983-84 to break the non-stop around the world record. The voyage in 2003-04 is to raise awareness about the needless slaughter of albatrosses.

Access to the petition can be had directly on the internet at the Forest and Bird website at www.forestandbird.org.nz OR for a printed version contact the Forest and Bird office in Wellington.

Encouraging young conservationists

The conservation message is spreading through the youngsters of Kaikoura, thanks to an initiative by Linda Kitchingham and the Kaikoura Forest and Bird. Linda arranged sponsorship so that the six schools in the district will receive multiple sets of the Kiwi Conservation Club magazine. In all, 245 magazines will be distributed, a magazine for every child in the classes of the appropriate reading age.

The sponsors are two local businesses, Earthshine Organics and Solutions Multipliers, and Kaikoura Forest and Bird itself.

This is a far-sighted initiative by Linda and the Kaikoura branch.

— ANN GRAEME

Queen's Honours and Conservation Awards

A distinguished life member of Forest and Bird, Hon. Sandra Lee-Vercoe was made a Companion of the Queen's Service Order for Public Services in the New Year Honours List. The award acknowledges her work in government, first in local government, then as a member of Parliament from 1993-2002. Sandra Lee-Vercoe was the first Maori woman elected to a general seat in Parliament (Auckland Central representing the Mana Motuhake Party), and was a Minister of the Crown from December 1999 to August 2002, when she was reponsible for local government and conservation. In the early 1990s she was a member of the Forest and Bird executive and was made a distinguished life member of the Society on her retirement from Parliament. She is now New Zealand High Commissioner to Niue.

A long-serving chairman of Fish and Game New Zealand (1991-2000), David Lawrie of Pukekohe, was made a Member of the New Zealand Order of Merit for services to conservation. His broad span of interests has included the chair of the Waikato Conservation Board and the Auckland-Waikato Fish and Game Council. A founder of the Miranda Naturalists' Trust he has been its chairman since 1999, when he was also appointed inaugral chairman of the National Wetland Trust. The Forest and Bird Council recognised his work with an 'Old Blue'Award at its last annual general meeting..

Don Merton OBE has been further recognised for his pioneering work in devising methods for the breeding of rare and endangered bird species. Birdlife International, to which Forest and Bird is affiliated, recognised Don Merton with one of 12 Conservation Achievement Awards at its recent conference in Durban, South Africa. The citation recalls that as a senior technical officer with the Department of Conservation, Dr Merton has 'pioneered rat and cat eradication programmes on islands in the Pacific and Indian oceans'. Besides his work saving the Chatham Island black robin from extinction, and work with the DoC threatened species unit, he has helped several Birdlife Partners set up eradication programmes against invasive species.

J.S. Watson Conservation Trust

FOREST & BIRD

This trust is administered by Forest and Bird. Applications are invited from individuals or conservation groups for financial assistance for conservation projects over the 2004-2005 year.

The criteria for assistance are:
- the conservation of plants and animals and natural features of New Zealand;
- the advancement of knowledge in these matters by way of research, literary contribution, essay or articles, or other effort;
- general education of the public to give them an understanding and love of the world in which they live.

A total of around $20,000 is available for distribution. Individual applications should be limited to a maximum of $4,000.

You are invited to request a preliminary one-page application form by writing or emailing:

J S Watson Trust
Forest and Bird
PO Box 631, Wellington
office@forestandbird.org.nz

Or download an electronic form from Forest and Bird's website:
www.forestandbird.org.nz

PRELIMINARY APPLICATIONS CLOSE 7 JUNE 2004

Support conservation by purchasing from Forest and Bird

Society Badge

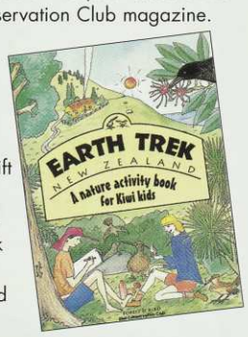
FOREST & BIRD

This high quality cloth badge is suitable for stitching to clothing and packs

$6 each

Earth Trek Book

This wonderful children's activity book combines puzzles, stories, pictures and things to make and do from the best of the past issues of the Kiwi Conservation Club magazine.



A great gift for 7-12 year olds. It's a book that will inform and entertain.

Was $16.95
Now just $10 each!

Oral History CD's

Stories of Forest and Bird recounted by the people involved in significant conservation successes.

CD1 Reflections of Manapouri
The West Coast Accord

CD2 Rangiteki Bush Reserves
Salvage at Solomon Island

CD3 The Whanganui River Campaign
South West NZ World Heritage Park

CD4 Kiwi Conservation Club
Northland Kauri Park

$10 each or all for $35

Magazine Binder

Give your Forest & Bird magazines a good home in these custom-made binders. Each binder holds 12 magazines.

$14.95 each

Place your order

Post your order and cheque to: Forest and Bird, PO Box 631, Wellington
Phone 04 385 7374 with your order and credit card details.
All prices include P&P within New Zealand. For postage costs outside New Zealand please contact us.

Forest and Bird Members – Save Dollars for Conservation

DIRECT **DEBIT** YOUR **MEMBERSHIP** FEE AND HELP **SAVE** THE SOCIETY THOUSANDS OF **DOLLARS** FOR **CONSERVATION** WORK

Help us save time, money and paper by arranging a Direct Debit for your Membership and Donations to *Forest and Bird*. That way we'll save much of the costs of processing some 25,000 subscriptions annually – and so have more money to spend on conservation.

Direct Debit is a very simple, cheap and safe method of payment, and one that's becoming increasingly popular for all household bills.

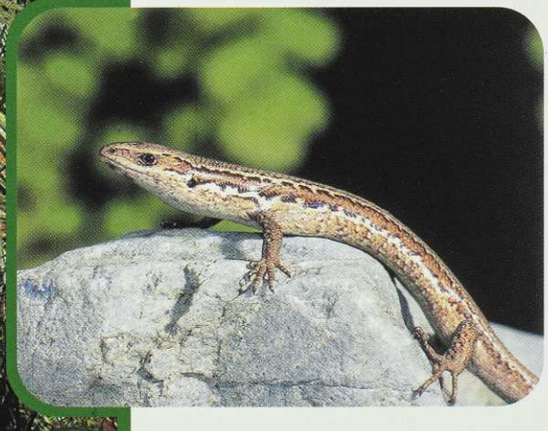
How to set up a direct debit for *Forest and Bird*

All you need do is phone us on **0800 200 064** or Wellington (04) 385-7374 and we'll send you a copy of Forest and Bird's Direct Debit brochure. This outlines the Direct Debit process and includes an Authorisation Form which you can fill in: send it back and we'll do the rest.

PHONE *FOREST AND BIRD* DIRECT DEBITS ON 0800 200 064 AND WE'LL DO THE REST.

Remember, Direct Debits save dollars for conservation not paperwork.

PLEASE ACT NOW!



Notice of Annual General Meeting

The 81st annual general meeting of the Royal Forest and Bird Protection Society of New Zealand Inc., will be held in Wellington on Saturday June 26, 2004 at 8.30 a.m. in the Kingsgate Hotel and Conference Centre, 355 Willis Street, Wellington. The business to be transacted will include the receipt of the annual accounts and annual report. All members are welcome.

The meeting will be followed by the Society's Council meeting which is conducted by branch representatives.

Spreading the word through *Forest & Bird*

If you have finished reading your *Forest & Bird* magazine, pass it on to a friend, take it to the doctor's, dentist's or hairdresser's waiting room, or leave it in a hut if you go tramping or camping.

If you don't want to let go of your magazines, we have back copies that we are happy to give away for this purpose. Just email office@forestandbird.org.nz for a supply.

Forest and Bird Treasures

At Central Office we are beginning to gather together Forest and Bird taonga/treasures for an archive. If you have any documents, posters, cards or badges that you think may be of interest please email general.manager@forestandbird.org.nz , or phone 04 385 7374 or write to Forest and Bird's central office at PO Box 631, Wellington.

We are currently checking our sets of the *Forest & Bird* journal and will publish details of missing volumes in the next Bulletin.

Handbook of Environmental Law

Forest and Bird' s new *Handbook of Environmental Law* is the result of a huge team effort over the past three years. The editor, Rob Harris of Nelson, drew together contributions from 26 authors, who gave their advice for free, to make a book of more than 280,000 words in 608 pages. The book is designed to help lay people and students find their way through the complex of laws and processes for environmental protection.

In the foreword, the national president of Forest and Bird, Dr Gerry McSweeney, describes it as 'a handbook for action to protect our beleaguered environment, our natural and historic heritage.'

As the book was being completed there were major changes in environmental law, calling for many last-minute revisions to the text. The book is now up-to-date to the end of 2003. (For availability of copies at a substantially reduced price to members, see the advertisement on page 45).

Join, renew or make a regular donation by direct debit

Every year we process over 25,000 cheques. Processing them is a time consuming and labour intensive job. You can help by paying your membership and donation by direct debit.

For direct debit please complete the forms and return to Forest and Bird

For direct debit please complete the:
1. Membership and Donation Form
2. Direct Debit - Bank Authority Form

Please post completed forms to:
Forest and Bird, PO Box 631, Wellington
For assistance phone 04-385 7374

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☐ Student	$35	☐ Corporate	$395
☐ Life (single only)	$780	☐ Donor member	$250

Kiwi Conservation Club Membership (Prices include GST)

For you and your family		*For your school or group*	
☐ Single	$12	☐ Mini Set (4 magazines)	$28
☐ Family (# of children___)	$20	☐ Class Set (30 magazines)	$65
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Please debit my account:

☐ Annually (January)
☐ Twice a year (January and July)
☐ 5 instalments yearly (last day of January, February, March, April and May)
☐ Monthly (may only be used where donation is included)

Please complete the relevant boxes below:

$	Your annual membership
$	Gift membership for _____
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$	Donation (annual amount)
$	Total annual amount (membership and donation)

If you are an existing member this authority will operate from the next date your membership becomes due for renewal.

If you join part way through the year a partial payment by direct debit may be required. Should the membership fee be increased Forest and Bird are authorised to automatically increase this amount.

2. Direct Debit - Bank Authority Form

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(of Bank Account)

Authority to Accept Direct Debits
(Not to operate as an assignment or agreement)

Bank account from which payments are to be made:

Bank	Branch	Account number	Suffix

Authorisation Code: 0 6 1 0 3 5 3

(Please attach an encoded deposit slip to ensure your number is loaded correctly)

To: The Bank Manager

Bank:

Branch:

Town/City:

I/We authorise you, until further notice, to debit my/our account with all amounts which ROYAL FOREST AND BIRD PROTECTION SOCIETY OF NEW ZEALAND INC. (hereinafter refered to as the Initiator) the registered Initiator of the above Authorisation Code, may initiate by Direct Debit.

I/We acknowledge and accept that the bank accepts this authority only upon the conditions listed below.

Information to appear on my/our bank statement

Payer Particulars	Payer Code	Payer Reference
FOREST&BIRD	SUBSCRIPTION	THANK YOU

Your Signature/s _____ Date / /

Approved
1035
02 | 1999

For bank use only
Original - Retain at Branch

Date received:	Recorded by:	Checked by:

Bank Stamp

Conditions of this Authority

The Initiator:

(a) Has agreed to give written advance notice of the net amount of each direct debit and the due date of debiting at least four business days before the date when the direct debit will be initiated. The advance notice will include the following message:- "The amount of $..... will be direct debited to your bank account on (initiating date)".

(b) May, upon the relationship which gave rise to this Authority being terminated, give notice to the bank that no further Direct Debits are to be initiated under the Authority. Upon receipt of such notice the Bank may terminate this Authority as to future payments by notice in writing to me/us.

The Customer may:

(a) At any time, terminate this Authority as to future payments by giving written notice of termination to the Bank and to the Initiator.

(b) Stop payment of any direct debit to be initiated under this authority by the Initiator by giving written notice to the Bank prior to the direct debit being paid by the Bank.

The Customer acknowledges that:

(a) This Authority will remain in full force and effect in respect of all direct debits made from my/our account in good faith notwithstanding my/our death, bankruptcy or other revocation of this Authority until actual notice of such event is received by the bank.

(b) In any event this Authority is subject to any arrangement now or hereafter existing between me/us and the Bank in relation to my/our account.

(c) Any dispute as to the correctness or validity of an amount debited to my/our account shall not be the concern of the Bank except in so far as the direct debit has not been paid in accordance with this Authority. Any other disputes lie between me/us and the Initiator.

(d) Where the Bank has used reasonable care and skill in acting in accordance with this authority, the Bank accepts no responsibility or liability in respect of:

- The accuracy of information about Direct Debits on bank statements.
- Any variations between notices given by the Initiator and the amounts of Direct Debits.

(e) The Bank is not responsible for, or under any liability in respect of the Initiator's failure to give written notice correctly nor for the non-receipt or late receipt of notice by me/us for any reason whatsoever. In any such situation the dispute lies between me/us and the Initiator.

The Bank may:

(a) In its absolute discretion conclusively determine the order of priority of payment by it of any monies pursuant to this or any other authority, cheque or draft properly executed by me/us and given to or drawn on the Bank.

(b) At any time terminate this authority as to future payments by notice in writing to me/us.

(c) Charge its current fees for this service in force from time-to-time.

Protecting New Zealand's WILDLIFE AND WILDPLACES

since 1923

The **Royal Forest and Bird Protection Society** is New Zealand's leading non-government conservation organisation.

Forest and Bird members enable the Society to carry out important conservation work to protect and enhance New Zealand's native species and habitats.

Members receive the *Forest & Bird* magazine four times a year with the campaign newsletter *Conservation News*.

Members can participate in conservation initiatives and enjoy organised talks and trips with their local branch. They can also stay at Forest and Bird lodges around the country.

Forest and Bird members are at the heart of our success in protecting Aotearoa New Zealand's wild life and wild places

Join today

Cool Club for Kids!

Forest and Bird's club for children started in 1998. The magazine now goes to over 18,000 children!

The **Kiwi Conservation Club** encourages children to love, respect and understand the natural world through fun conservation-based activities.

Members receive the Kiwi Conservation Club (KCC) magazine five times a year. Where there are active groups members receive notification of local trips and events from their local KCC volunteer coordinator.

New members receive a starter pack that includes a KCC member certificate and cool KCC stickers!

To learn more visit www.kcc.org.nz or phone us to receive a free introductory copy of the magazine.

FOREST & BIRD

Royal Forest and Bird Protection Society of NZ
172 Taranaki Street, PO Box 631, Wellington
Phone 04-385 7374 Fax 04-385 7373
office@forestandbird.org.nz
www.forestandbird.org.nz and www.kcc.org.nz

Join or donate now!

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☐ Single	☐ Family	$52	☐ Business	$120
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☐ Student	☐ School	$35	☐ Donor member	$250
☐ Non-profit	☐ Library	$52	☐ Life (single)	$780
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Kiwi Conservation Club Memberships (Prices include GST)

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☐ Cheque enclosed to Forest and Bird

or charge my ☐ Visa ☐ Mastercard ☐ Amex ☐ Diners

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Donation $ _____ (donations over $5 are tax deductible)

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To join Forest and Bird or give a donation please complete this form and **post to** FREEPOST No. 669, Forest and Bird, POBox 631, Wellington
Phone 04-385 7374 with your credit card details or **join online** at www.forestandbird.org.nz or www.kcc.org.nz

Join or donate now!

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Phone 04-385 7374 with your credit card details or **join online** at www.forestandbird.org.nz or www.kcc.org.nz

lodge*accommodation*

Arethusa Cottage
An ideal place from which to explore the Far North. Near Pukenui in wetland reserve. 6 bunks, fully equipped kitchen, separate bathroom outside. For information and bookings, contact: John Dawn, Doves Bay Road, RD1, Kerikeri, Tel: (09) 407-8658, fax: (09) 407-1401.

Tai Haruru Lodge, Piha, West Auckland
A seaside haven set in a large sheltered garden on the rugged West Coast, 38km on sealed roads from central Auckland. Close to store, bush reserves and tracks in the beautiful Waitakere Ranges. Double bedroom and 3 singles, plus large lounge with open fireplace, dining area and kitchen. The self-contained unit has 4 single beds. Bring food, linen and fuel for fire and BBQ. For details and rates send stamped addressed envelope to Jan Harvey, 25 Kauri Point Road, Laingholm, Waitakere City, Tel: (09) 817 8282. Email: janharvey@xtra.co.nz.

Waiheke Island Cottage
Located next to our 49ha Wildlife Reserve,10 minutes walk to Onetangi Beach, general stores etc. Sleeps up to 8 in two bedrooms. Lounge, well-equipped kitchen, separate toilet, bathroom, shower, laundry. Pillows, blankets provided. No pets. Ferries 35 minutes from Auckland. Enquiries with stamped addressed envelope to: Robin Griffiths, 125 The Strand, Onetangi, Waiheke Island, Tel: (09) 372-7662.

Ruapehu Lodge, Tongariro National Park
Situated 600 metres from Whakapapa Village, at the foot of Mount Ruapehu, this lodge is available for members and their friends. It may also be hired out to other compatible groups by special arrangement. It is an ideal base for tramping, skiing, botanising or visiting the hotpools at Tokaanu. The lodge holds 32 people in four bunkrooms and provides all facilities except food and bedding. Bookings and inquiries to Forest and Bird, PO Box 631, Wellington.Tel: (04) 385-7374, fax: (04) 385-7373. Email: office@forestandbird.org.nz

William Hartree Memorial Lodge, Hawkes Bay
Situated 48km from Napier, 8km past Patoka on the Puketitiri Rd (sealed). The lodge is set amid a 14ha scenic reserve and close to many walks, eg: Kaweka Range, Balls Clearing, hot springs and museum. The lodge accommodates up to 15 people. It has a fully equipped kitchen including stove, refrigerator and microwave plus tile fire, hot showers. Supply your own linen, sleeping bags etc. For information and bookings please send a stamped addressed envelope to Pam and John Wuts, 15 Durham Ave, Tamatea, Napier. (06) 844-4751, email: wutsie@xtra.co.nz

Matiu/Somes Island, Wellington Harbour
Joint venture accommodation by Lower Hutt Forest and Bird with DoC. A modern family home with kitchen, 3 bedrooms, large lounge and dining room, just 20 mins sailing by ferry from the centre of Wellington or 10 mins from Days Bay. Ideal place to relax in beautiful surroundings, with accommodation for 8. Bring your own food and bedding and a torch. Smoking is banned everywhere on the island, including the house. For information sheet, send stamped addressed envelope to: Accommodation officer, PO Box 31-194, Lower Hutt. (04) 567-1686.

Tautuku Lodge
State Highway 92, Southeast Otago. Situated on Forest and Bird's 550ha Lenz Reserve 32km south of Owaka. A bush setting, and many lovely beaches nearby provide a wonderful base for exploring the Catlins. The lodge, the Coutts cabin and an A-frame sleep 10, 4 and 2 respectively. No Animals. For information and rates please send a stamped addressed envelope to the caretaker: Diana Noonan, Mirren St, Papatowai, Owaka, RD2.
Tel: (03) 415-8024, fax (03) 415-8244.
Email: diana.n@clear.net.nz

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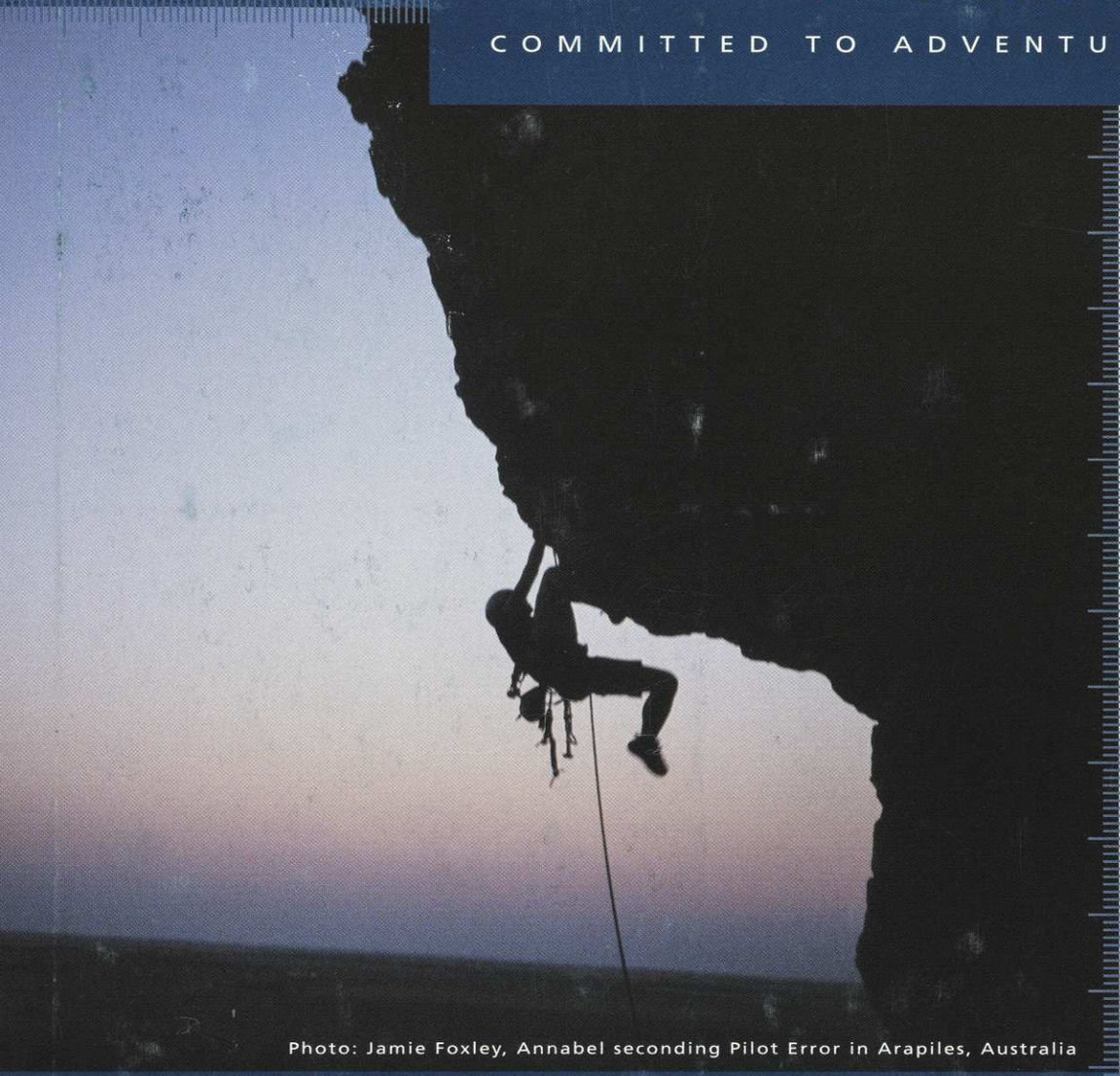

Photo: Jamie Foxley, Annabel seconding Pilot Error in Arapiles, Australia

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