FOREST & BIRD

NUMBER 280 • MAY 1996

- Waitutu saved
- Treasury v conservation
- a new national park
- forgotten tussocklands
- cats and conservation
- Whirinaki revisited

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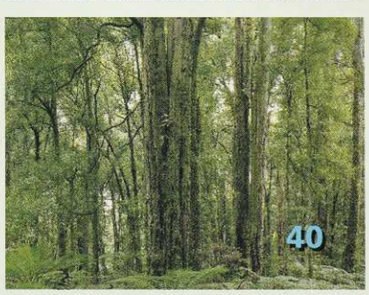
For details of the society's branches see *Branch Directory* on page 53.

FOREST & BIRD

FEATURES

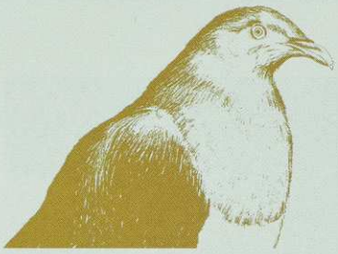


REGULARS

Cover:
The flightless Stephens Island wren lived among rocks and ran about like a mouse. Only one European ever saw it alive – and one cat (see article on cats page 34).

PAUL MARTINSON, from NEW ZEALAND'S EXTINCT BIRDS, RANDOM CENTURY, 1991.

mailbag



Shooting pigeons

Your correspondent Chris Horne, in your February issue, is "bewildered" to read that I have "encouraged iwi to exercise their right to harvest native wildlife".

I am even more bewildered, since I have never made such statements.

In early December Forest and Bird was advised in writing of my correction of the comments wrongfully attributed to me in Jacqui Barrington's article about kereru poaching. I made a statement to the media correcting these fictions and the insults to my work and my integrity.

Surely Forest and Bird had a responsibility to acknowledge my rebuttal rather than allowing Mr Horne's attack on me to appear in your magazine unchallenged.

Dr Margaret Mutu
Member, New Zealand Conservation Authority

Forest and Bird welcomes the assurance from Dr Mutu that she does not encourage the killing of native wildlife.

However, a number of observers at a series of hui and public meetings in Northland on the Northland Conservation Management Strategy provided independent reports of Dr Mutu suggesting that the killing of native wildlife for cultural harvest purposes was legal under the Conservation Act (in that the Act must "give effect to" the principles of the Treaty of Waitangi).

Dr Mutu told Kim Hill on National Radio that "kukupa are part of the food of my tribe ... part of our diet". She has told another journalist that kukupa "are part of what I expect to see on the table when I go to the local marae".

Also in her denials of evidence from DoC scientists, that hunting was risking local extinction of the bird, Dr Mutu is providing indirect encouragement to poachers.

Chris Horne's "pigeon patrol" letter (February) would no doubt be supported by this country's wilderness anglers, who enjoy New Zealand's natural environment with a similar passion and commitment to his own.

However, Chris' wish for pigeon funding similar to that for the Tongariro/Taupo trout fishery fails to realise that trout anglers pay taxes for pigeon conservation, in exactly the same manner as he presumably does, and also pay an additional licence fee to cover the total management costs of the Taupo fishery.

Please remember that it was angler money that protected the Rakaia River for wrybill plover, and hunter money that enabled the Whangamarino wetlands to be reflooded. So let's not have too much of this double standard where one alien species, to use Chris' words, piously criticises the existence of another.

W.B. Johnson
Director, New Zealand Fish & Game Council

Stranded whales

I enjoyed Kevin Smith's lucid and thoughtful contribution "Should whales be 'rescued' at all?" (November).

Whale pushing is definitely not, in my opinion, any of our business, and, as I've been at pains to point out to friends and family, I'm very glad that some self-righteous air breather wasn't there waiting when my ancestors first came struggling out of the primordial sea, all eager to push them back "in their own best interest".

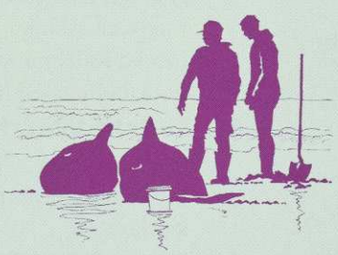
Apart from the long recorded history of whale strandings and the positive (human) benefits of that to some indigenous peoples, and *despite* the fact that there might be a tenuous link between human activities (radio frequency fields, sound waves in the oceans, pollution etc) and increased strandings, the fact is that conservationists can't have it both ways.

Either whales are the most intelligent animals in the sea, in which case they might just know what they're doing, or they are dumb like fishes. Then we could look at a number of different approaches to strandings.

Kevin Smith suggests that leaving carcases to rot could be the natural approach, but interventionist approaches too could be part of a workable strategy to come to terms with the strangeness and obvious waste that these incidents express.

Because they have big brown eyes, people get sentimental about whales. But of course no one gives two hoots about the tonnes of orange roughy, with their cold steel-grey eyes, that we pull up with each trawl from the Chatham Rise. But one seal in the net and all hell breaks loose.

Oh, and if we are serious about wanting to share the planet with whales while we are here then we could think about setting up a butchery flying squad to process stranded whales quickly and hygienically.



With suitable amendments to the Marine Mammals Act, deep frozen and attractively packaged cuts of whale meat, sent to Japan with a note that "this is strictly your quota of whale meat for 1996" and that "therefore any whale boats seen in the southern oceans will be sunk" could, in the short run, see this crazy state of affairs behind us.

Whale pushing has got to be one of the-strangest manifestations of human kindness that I've seen.

Bruce Comfort
Wellington
(abridged)

In support of the Cook Islands

Bashing the Cook Islands may be fashionable at present, but I was disappointed to see *Forest & Bird* publish an article by Jacqui Barrington (February) which is plagued by inaccuracies, misrepresentation, and unsubstantiated anecdote. While terms like "shredding the country's fragile ecosystem" may make exciting copy, the reality according to Gerald McCormack, Director of the Cook Islands Natural Heritage Project, is that "the environment of the Cook Islands is in a remarkably good state compared to that of neighbouring tropical island countries". Clearly, while there are some matters of concern in the Cook Islands, including the degradation of the Aitutaki corals, the sensationalism of Ms Barrington's article is unwarranted.

One of the unfortunate aspects of the article is that it presents a rather distorted view of New Zealand Official Development Assistance (NZODA) in the Cook Islands. In practice, NZODA specifically supports a range of environment/conservation projects in the Cooks, and has done so since the early 1980s.

Some of the deficiencies of the article include:

- there is no proposal from the tourism industry for a cross-island road so it is somewhat difficult for Gerald McCormack to be opposing it.
- there are various reasons for a reduction in the length of stay, including the increase in multi-destination holidays. There is no evidence of large numbers of "disenchanted

visitors" departing early;
- the notion that "corals outside the reef are mostly grey and lifeless", on Aitutaki is an unwarranted distortion. The Aitutaki reef is over 40 km long. There are indeed some areas which have been very badly affected by bleaching and Crown of Thorns. But to generalise this to the whole reef is simply wrong.

This sort of article does no good for the Cook Islands, the New Zealand Official Development Assistance programme, Forest and Bird, or the magazine.

Dr Peter Phillips
Dialogue Consultants Ltd
(abridged)

I must take issue with Jacqui Barrington over her article on the Cook Islands (February). I have visited the Cook Islands several times since 1985 and have felt privileged to be able to visit a group of islands with an environment in so much better shape than many other nations.

It so happened that I read her article just 24 hours before leaving New Zealand for a further visit to the Cook Islands on my way back to the UK. The Cooks had not changed since my last visit and remain one of the most beautiful places that I have visited. The pristine forests of Rarotonga contain a profusion of beautiful endemic plants and ferns while the lagoons teem with colourful tropical fish. As Jacqui correctly reports, the lovely kakerori is increasing in numbers while, contrary to her comments, the kuramo'o thrives in the modified vegetation of Aitutaki and is in no need of a reserve.

Most of the problems that Jacqui mentions – overfishing, introduced predators, fertiliser run off, waste disposal – are of course real problems and problems that require the political will to resolve. But she somehow suggests that these problems are unique to the Cooks. In truth these problems are shared by all countries and it is the world that is under siege, not the Cooks. If we have not resolved these problems in the UK and New Zealand it seems somewhat unrealistic to expect the Cook Islands to lead the way.

One way to help is through tourism. "Runaway tourism" is hardly an accurate description of a tourist industry of around 1,000 visitors a week and one that is in decline.

So come on Forest and Bird, how about some practical help for conservation in the Cook Islands? No, the paradise is not lost and making sure that it is not lost in the future merits the greatest conservation effort.

David Gordon
Cambridge, UK
(abridged)

Jacqui Barrington responds:
When I returned to the Cooks for a holiday I had wonderful memories of Rarotonga, and hoped Aitutaki would be even better. Unfortunately I found the islands in uproar with local tourism operators genuinely worried over the environmental future of the Cooks and their businesses.

I interviewed Gerald McCormack, as well as dive and tour operators, hotel, guest house and restaurant owners, and conservation service staff, both local and expatriate.

Some wished to remain anonymous for obvious reasons. Dive operator Neil Mitchell says he is happy to be identified as one of those most concerned over the death of the Aitutaki lagoon.

I found their concerns substantiated in:
- *"The Cook Islands National Environment Management Strategy" – South Pacific Regional Environmental Programme, 1993, and*
- *"The Cook Islands Tourism Master Plan" – RPT Economic Studies Group UK, 1991.*

The delay between writing and publishing may have led to some points being out of date eg. the decline in tourist numbers from an approximate high of 60,000 two years ago. However the grandiose projections of 100,000 given by the Prime Minister in 1994 still stand. The tourist "density" (number of arrivals related to number of inhabitants) of the Cooks remains one of the highest in the world.

At no point did I attempt to make a comparison of the Cooks' environmental health with that of other Pacific Island states, which may well be worse. I did, however, acknowledge at the outset that the problems damaging the islands were those of the developed world at large, made more acute by the Cooks' small size.

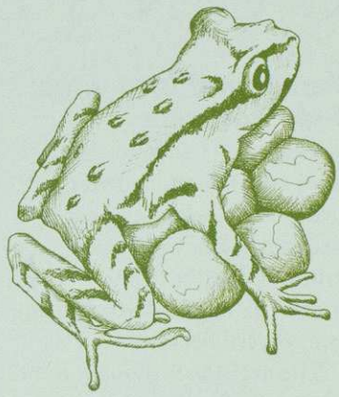
Nor, for space reasons, did I aim to give more than a passing mention to New Zealand ODA.

As far as the health of the Aitutaki corals is concerned, Neil Mitchell told me in 1994 that no recovery was in evidence and that he had to travel further afield each time to find good dive spots.

To accuse Forest and Bird of damaging tourism to the Cooks, when tourism as it is currently practised there is part of the problem, is to entirely miss the point. I hope that one positive outcome of the present trouble might be a rethink of how to tailor economic growth along more environmentally – and socially – sustainable lines.

Single parents

I too am a solo father like the Archey's frog on your February cover. And I can relate to carrying my kids on my back during their final development too. This photo belongs on my wall to remind me of "tireless effort".



Would you have a spare print, or would Rod Morris part with one for a reasonable price? I have to ask because my son won't hear of me cutting up his *Forest & Bird*.

You have my appreciation for the symbolism of your choice of cover, and my compliments to Mr Morris on his skilful photography.

J.C. Smith
Kaikohe

Real kiwi

I enjoyed your feature (February) about John Kendrick's efforts in bringing New Zealand bird calls to National Radio listeners. You should have added that listeners would hear the birds if only the announcers would keep quiet. Worst offender is David Jones who simply cannot finish his 6.45am financial report in time for the 7am bird call. I say – forget the 90-day bill rates and what the kiwi is buying. Let's hear the real kiwi for a change.

M.L. Matthews
Palmerston North

Forest & Bird welcomes comments on items in the journal or on environmental matters generally. Please address letters (maximum of 250 words) to the Editor, Forest and Bird, Box 631, Wellington. We reserve the right to edit letters for length and sense.

CONSERVATION briefs

Forest and Bird wins fight for river

A PROPOSAL to dam and divert the Rangitaiki River for hydroelectric development has been turned down on the grounds that the likely environmental damage outweighed any commercial benefits.

The decision is thought to be one of the first times that local authorities have recognised the importance of the natural environment in rejecting a hydro dam proposal. "It's a decision that sends out the right message," said Forest and Bird field officer Basil Graeme. "Hydro energy is not necessarily clean energy. Once you put a dam on a river you have lost its wild character forever."

Bay of Plenty Electricity had sought 19 separate consents for a 14-megawatt scheme involving the almost total dewatering of over a kilometre of the scenic Kioreweku gorge, the flooding of a further four kilometres, the diversion of the river along a canal above the gorge, the construction of a dam, the dredging of three kilometres of river below the gorge and the blasting of some scenic gorge bluffs.

A joint hearing committee of the Whakatane District and Bay of Plenty Regional Councils rejected the proposal in February because the committee did not consider the proposal met the goal of the Resource Management Act to promote the sustainable use of natural resources.

Forest and Bird strongly opposed the dam proposal and Eastern Bay of Plenty branch committee member Mark Fort galvanised local environmental groups into a "Rangitaiki – No More Dams" coalition. Forest and Bird deputy president Keith Chapple made a major submission to the hearing committee and Basil Graeme helped organise witnesses.

However the proposal is not yet dead. Following the decision of the local authorities, the power company, complaining that the Resource Management Act favoured environmentalists, lodged an appeal with the Planning Tribunal. The appeal is likely to be heard later this year.

New high country reserve in Otago

A TENURE DEAL covering one of Otago's largest and oldest pastoral leases – the 25,000-hectare Earnscleugh station overlooking Alexandra and Clyde – will result in more than 8,000 hectares of significant high-altitude tussock grasslands, herbfields and wetlands being protected as conservation land.

The area to be transfered to DoC includes the Old Man Tops, Fraser Basin and the Omeo Creek headwaters. It will create a conservation corridor stretching along the summit of the Old Man Range and the adjoining Old Woman Range.

On lower country, two species of endangered flightless chafer beetle and a number of threatened plants will have their habitat protected.

The remaining, northern, section of the lease – apart from five small conservation reserves within it – will become the freehold property of the current runholder, Alistair Campbell. He is likely to sell part of it for lifestyle and horticultural blocks, an option unavailable to runholders under a pastoral lease.

Under a special lease, Mr Campbell will still be able to run stock on about half the land being transferred to DoC, although the department will set the stock levels and ground cover will be monitored.

The deal is regarded as a significant one by conservationists. Earnscleugh was considered a "tough nut" in the current process of tenure review of high country leases, in that many observers could not envisage how the necessary conservation values could be protected while retaining a viable production unit for the runholder.

Forest and Bird played a major role in the settlement. The success of the deal suggests that if a lease such as Earnscleugh can be divided by consent between production and conservation uses under the existing Land Act, then there is little need to enact the current, highly deficient, Land Bill, now before Parliament.

Penguin numbers tumbling

A SURVEY OF the remote Antipodes Islands in the New Zealand subantarctic last November indicates a catastrophic decline in the number of penguins over the past century.

Two species of penguin nest at this island group – the erect-crested and the slightly smaller rockhopper. It seems that the populations of both species have declined but that rockhoppers have suffered the most.

Preliminary calculations from last year's counts came up with totals of 50,000 to 60,000 erect-crested and less than 4,000 rockhopper pairs. This is down from estimates published in 1990 of 115,000 erect-crested and 50,000 rockhopper pairs. Early photos going back to the 1920s show huge colonies of rockhoppers where now only a handful of birds remain.

The decline in rockhopper numbers was not entirely unexpected. Surveys of New Zealand's other rockhopper colonies on the Auckland and Campbell Island groups show similar declines. The best documented is that at Campbell where numbers have declined by 94 percent since the 1940s.

ALAN MARK

Looking north-west over the upper Fraser Basin from the summit of the Obelisk on the Old Man Range, an area to be added to the conservation estate as part of the Earnscleugh land swap. The vegetation is dominated by Celmisia viscosa *(in flower) in more sheltered hollows, with cushions of mainly* Dracophyllum muscoides *and* Raoulia hectorii.

ALAN TENNYSON

Rockhopper penguins at Anchorage Bay in the Antipodes Islands. The birds breed on islands throughout the south Atlantic and south Indian Oceans as well as in the New Zealand subantarctic. They nest in large packed colonies, often together with erect-crested penguins.

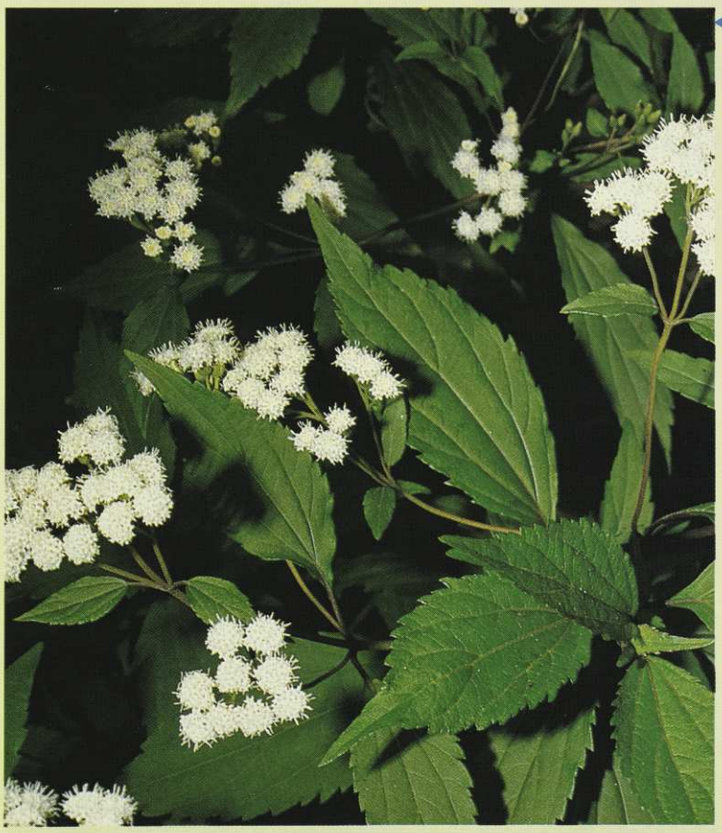
Researchers believe that sea temperature increases, possibly as a result of the Greenhouse effect, have affected the bird's food supply and led to the decline.

While the remaining colonies of penguins are still spectacular on places like the Antipodes, the outlook for these penguins in our region seems bleak. If the current rate of decline continues, rockhoppers will become extinct in the New Zealand subantarctic within a few decades. Hopefully the species itself is more secure as rockhoppers occur on several islands around the southern ocean and declines have not been detected outside the New Zealand region.

Perhaps more of a worry is the erect-crested penguin which although apparently not declining as rapidly, is almost entirely confined to nesting on the Antipodes and nearby Bounty Islands. A survey of the Bounties is needed to determine the current status of the species there.

Alan Tennyson

EWEN CAMERON



One of the listed weeds is mistflower (Ageratina riparia, *formerly* Eupatorium riparium), *a native of Mexico that has become a major forest invader in Northland, Auckland, the Waikato and, occasionally, Wellington. As shade tolerant as wild ginger and producing many wind-blown seeds, it forms dense low-growing mats on the forest floor. Mistflower is the most significant weed of the Puketi, Waipoua and Waitakere forests and has even reached the Poor Knights Islands.*

Breakthrough on garden weeds

FOREST AND BIRD'S Forest Friendly Award scheme has spawned a major breakthrough in the fight against invasive weeds.

Regional councils all over the country have adopted a generic Plant Pest Management Strategy to ban the sale and distribution of 110 plant species nationwide. The brainchild of Northland Regional Council land management officer and Forest and Bird committee member Jack Craw, and Auckland Regional Council biosecurity officer Lance Vervoort, the concept has been successfully promoted to all regional and unitary authorities (except West Coast, which to date has failed to produce any management strategies for plant pests under the Biosecurity Act).

Once notified by each regional council, the pest management strategy will be open for submissions. Some councils have already started this process.

The strategy should mean that in most areas, after 1 July 1997, plants like Mexican daisy, smilax, white monkey apple, pampas and common heather may not be propagated, sold, offered for sale, distributed or even kept on premises where plants are sold.

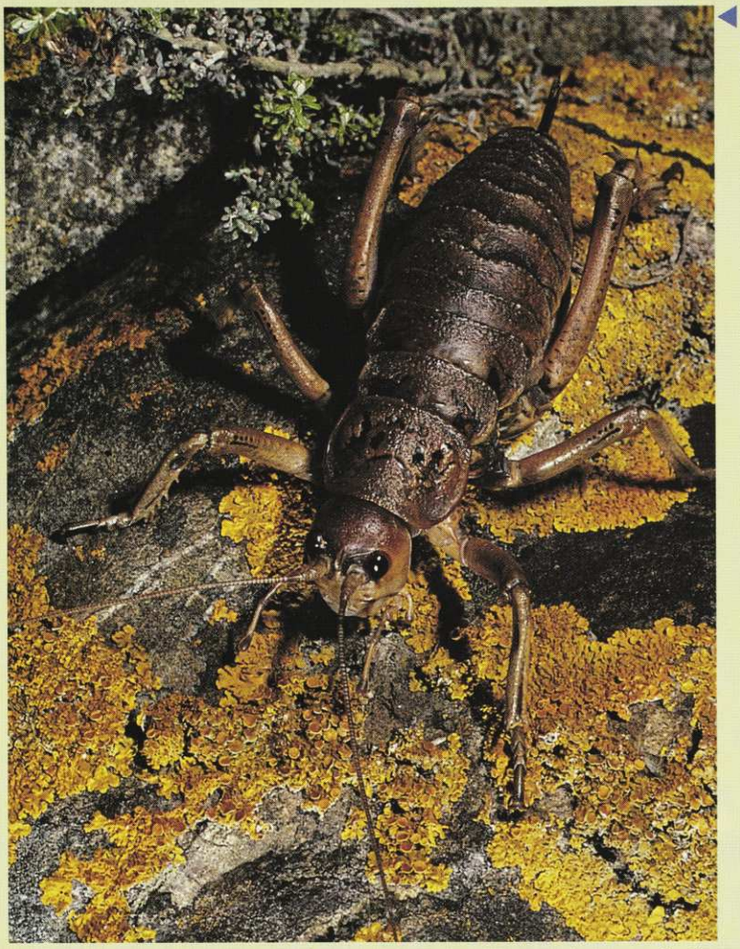
Many of these species have already been included in various regional strategies but much confusion arose, especially in the nursery industry, over where exactly the bans were to apply. Regional councils were also faced with the problem of growers in regions where plants were not banned, supplying plants to merchants in other areas where they were.

Regional councils that might otherwise not have been part of the strategy were given every encouragement to join, partly because Forest and Bird

EWEN CAMERON

Another listed plant is Japanese spindle tree (Euonymus japonicus), *which forms dense colonies on forest margins and offshore islands eventually replacing native shrubs and small trees. It is commonly sold, almost always as a yellow variegated form.*

ROD MORRIS



A Cook Strait giant weta on Mana Island. These weta, the most docile of all giant weta, managed to coexist on Mana with a large population of mice for 150 years, before the rodents were exterminated in 1990.

branches were actively persuading garden centres all over New Zealand to join the Forest Friendly Awards. But, as a voluntary scheme, the awards were never going to get blanket coverage while some merchants, most notably the Palmers Garden Centres, declined to participate. The fact that at least 800 plant shops did join the awards meant that regional councils could hardly refuse to do likewise.

Forest and Bird can be proud of its achievement in leading this campaign, as the pest management strategy adopts nearly all the plants on the Forest Friendly list.

However, some growers and retailers remain opposed to the strategy as there is money to be made in selling pretty, but insidious, exotic plants. Once each regional council opens up the process for public comment, submissions supporting the strategy will be required to ensure that regional councils don't back down in the face of opposition.

Successful first year for resource management service

THE RESOURCE Management Service at the Christchurch Community Law Centre celebrated its first year of operation in February, having helped over 500 people overcome barriers in the understanding and use of the Resource Management Act.

"Five years after the passing of the Act, there is still no financial or legal assistance, apart from free advice services such as ours, for those who wish to voice their concerns over development proposals," said Amelia Davis, coordinator of the service.

The service is funded by four of the city council's community boards and is staffed by over 45 volunteers, both senior resource management students and practitioners in the field.

Weta return to Somes Island

SOME 60 COOK Strait giant weta began a new life on Somes Island in Wellington Harbour during March and April.

The weta are found naturally only on a number of islands in the Cook Strait-Wellington area. They became extinct on the mainland in the 1930s and are the first threatened species to be transferred to rodent-free Somes since the Department of Conservation took over the island's management last year.

Being nocturnal animals, the transferred weta were collected from Mana Island off the Porirua coast at night and kept in plastic shrub-lined boxes during the day before being released the following evening on Somes. More giant weta will be released over the next year to help the population build.

A small population of Wellington tree weta has also been transferred to the island.

Forest and Bird members have been revegetating Somes for some 15 years, and DoC's goal is to restore as much as possible of the island's original ecosystem. The department plans to release a draft restoration plan in June for public comment.

Antarctic impacts

A NEW PANEL has been set up to provide advice to the Ministry of Foreign Affairs and Trade on the potential environmental impact of New Zealand activities in Antarctica.

The Environmental Assessment and Review Panel will make environmental assessments of projects submitted by the recently established New Zealand Antarctic Institute and others undertaking activities in Antarctica (such as tour operators and private expeditions).

Establishment of the panel is a requirement under the international Protocol on Environmental Protection to the Antarctic Treaty (still awaiting ratification, see *Forest & Bird* November 1995).

The panel will comprise four members: Professor Vernon Squire from the University of Otago as chair, representatives from the Ministry of Foreign Affairs and Trade (Louise Sparrer) and the Department of Conservation (Dr Harry Keys), and Dr Alan Hemmings, an independent Antarctic consultant from Auckland and contributor to *Forest & Bird*, representing non-government organisations.

Success continues for mainland kokako management

KOKAKO IN the "mainland island" reserve of Mapara in the southern Waikato have doubled in numbers in four years.

The latest kokako census in the 1,400-hectare forest puts the

IAN FLUX

A kokako chick born last December in Mapara forest: above, at four days; right, six days; and, far right, at 28 days just prior to fledging. The chicks' pink wattles develop soon after birth and turn lilac at fledging.

number of adults at 86. Only banded birds were counted and many more were sighted by DoC staff. At least 17 chicks have fledged this year.

Mapara is the first of DoC's "mainland island" experiments in conservation management. The concept involves treating a discrete but critical environment as an island reserve, with intensive control of exotic predators and competitors as well as habitat restoration. The success of the Mapara programme since 1989 in rebuilding a kokako population has spawned other such managed sites around the country for kokako populations and other threatened species.

In Northland, where kokako were considered close to regional extinction two years ago, the protection of all known kokako nests last summer led to each one producing at least one chick, while at Mangatutu in the Waikato at least three chicks fledged from six nesting pairs.

Although kokako are doing well in the managed reserves, populations continue to fall in other areas.

The supposedly strong Urewera population, for example, has fallen from 620 birds to 400 in only four years. The lesson is that without active pest management, many threatened species will continue to be pushed closer to extinction on the mainland.

In Mapara, intensive management of the reserve will continue. "But the mature and responsible conservation approach is to 'pulse' the management," said Philip Bradfield, manager of the project. "Once the population is in a healthy state as it is now, there are enough females to keep it ticking over." After next season, DoC plans to reduce the intensive trapping and baiting for about three years although it will still carefully monitor the population.

DoC's kokako work is supported by the Threatened Species Trust, a joint arrangement between the department, Forest and Bird and the sponsor, State Insurance.

Protection for regenerating forest in Gisborne

ONE OF New Zealand's most important natural assets is the large area of regrowth native forest on land that had once been unwisely cleared for farming. In areas where most of the original forest cover has been lost, regenerating forest will form the high-forest habitat of the future.

In the Gisborne district, containing some of the most extensive regenerating forest in the country, Forest and Bird has recently been able to achieve changes to the council's regional policy statement to make sure that regenerating native forest will be given its proper status as a natural resource, not an agricultural nuisance.

While some original forest cover remains in Gisborne, most of the region was cleared in the early years of this century. The consequences of that clearance are well known.

Apart from the obvious ecosystem loss, the geology of the local hill country was such that it could not hold together under pasture. The soil of the region began to slide down the hillsides and into the rivers – a process which continues today whenever heavy rains fall. The erosion effects of a natural disaster such as Cyclone Bola merely exacerbate the ongoing depletion.

On most of this hill country, farming is uneconomic. Since the withdrawal of agricultural subsidies, large areas have been abandoned and an estimated 80,000 hectares of the region are now covered in regrowth forest – mainly kanuka. This is already proving a saviour for the region's soil and water resources.

Recent studies of soil holding capabilities show that kanuka is the best erosion control vegetation available, far better than exotic pine plantations in which so much faith has been placed in the past.

Afforestation with pines, seen in Gisborne as both an environmental and economic saviour, is occurring rapidly. However, it is often a mixed blessing for the environment as traditional plantations are just a partial answer to erosion problems. There is a window of up to five years after harvesting where there is an 80 percent chance of significant soil loss.

Felling kanuka forest in order to plant pine trees makes even less environmental sense. This is the major problem with the government's misguided East Coast Forestry Project, which provides subsidies for forest planting regardless of whether it involves the clearance of native vegetation.

Against this background, the Gisborne District Council (administering the area from Mahia Peninsula to East Cape) prepared a regional policy statement (RPS) which identified the management of regenerating forest as a key issue, but gave no indication that the council would give it any form of protection.

Since the RPS sets the parameters for the district plan

IAN FLUX

IAN FLUX

which will eventually determine the management of regenerating forest, Forest and Bird appealed against the proposed RPS to the Planning Tribunal.

The council has subsequently agreed to most of our requested amendments and a costly court case has been avoided.

The agreement adds a new objective and a policy to the RPS, which commits the council to ensuring the sustainable management of native forest, and to seeking "to maintain the abundance and diversity of indigenous fauna". Native forest has been defined to include kanuka.

The methods specified recognise that the council needs to control the modification of indigenous vegetation, including the clearance of kanuka for plantations. They also ensure the council will actively encourage the full protection of these areas, although such protection will not be forced on landowners.

Forest and Bird looks forward to working with the council, Ngati Porou, other landowners and interest groups to develop workable management prescriptions for regenerating forest in the district plan.

Duane Burtt

It's all in the timing

MANY FOREST and Bird members will have noticed how native fruits and flowers can be found throughout the year in New Zealand forests. But have you noticed how closely they dovetail?

Astrid Dijkgraaf is a PhD student researching the timing of fruiting and flowering (phenology) of native tree species. Her work is partly funded by the J.S. Watson Trust administered by Forest and Bird. The key plants of her study are those with large fruit (bigger than a centimetre in diameter) or with large nectar producing flowers.

Astrid has been able to show that the phenology of these species dovetails very closely but hardly ever overlaps. Although such a tight sequence of events initially seemed somewhat surprising, it makes perfect sense from an evolutionary viewpoint.

A tree with a crop of ripe fruit that needs to be distributed by birds would benefit if it were the only species with fruit at a particular time. All the birds would have to forage for this species and thus the fruit would be dispersed most widely. Thus tree species within a forest would evolve to produce fruit at a time when not many other species have ripe fruit, leading to staggered fruiting throughout the year.

RITA DIJKGRAAF

Astrid Dijkgraaf empties a seedfall trap at one of her research sites at Whitford.

For the birds, it is much easier and saves on flight costs, to live in an area where food is available all year round. By staggering fruit production throughout the year the trees assist in maintaining a good local population of birds to disperse fruit. Thus both plants and animals benefit from this arrangement. The same concept applies in relation to birds and flower pollination.

The introduction of exotic animals into the equation has severely disrupted this tight pattern. Possums, for example, tend to eat the flowers of some species, thus preventing or severely reducing fruit set, or eat the juvenile or immature fruits before they are ripe enough to be eaten by native animals. Some species, such as kohekohe, do not produce any flowers at all because there isn't sufficient leaf area left after possum browsing to generate the energy required. This creates huge gaps in the food available to native birds, and will reduce their overall success and survival rates.

Another intriguing aspect is the (sometimes large) geographic differences in the timing of fruiting and flowering. Astrid's two original research sites, Wenderholm, north of Auckland, and Whitford, south of Auckland, are only 100 kilometres apart yet differ in fruiting or flowering by up to a month. Astrid is now gathering information on how the phenology of certain plants changes up and down the country and how this relates to the animals that depend on those plants.

Direct action on Kaituna River

IN LATE FEBRUARY, a large gathering of local residents watched the locks on sluice gates on the Kaituna River in the Bay of Plenty being illegally forced open with an axe.

The action, aimed at restoring some of the natural flow to the Maketu estuary, was in breach of a High Court injunction. It has, however, received wide support in the Maketu community, both Pakeha and Maori, and even sympathetic editorials in the regional press.

Forty years ago, as a flood control measure, the Kaituna River was diverted away from the estuary, straight into the sea. The estuary, with no river to flush it, began slowly filling with sand and today is no more than a large puddle, unable to support its former rich populations of sea and shore life.

There was no consultation with the large local Maori community over the original diversion, and, about 18 years ago, residents began the fight to have the river restored to the estuary. Six separate inquiries over the years recommended the diversion of river water back into the estuary and, since 1987, the Department of Conservation has overseen a plan for the gradual reintegration of the river with the estuary.

In what was thought to be the final stage of the restoration plan, a channel with four culverts and gates was completed last October. But the department had failed to sort out a dispute with the owner of the land involved in the rediversion. He took out an injunction and the High Court ordered a halt to any rediversion of water pending a full hearing of the dispute.

There matters stood, with residents increasingly frustrated at the delay, and no date set for the hearing. Finally residents opened the locks on the gates thus allowing the river to enter the estuary.

DoC has withdrawn a complaint to the police, two of the four sluice gates have been left open and the case, which three months ago did not even have a hearing date, has now been heard. The decision, which will determine whether the local estuary can be given a new lease of life, is eagerly awaited in Maketu.

A feast of nature in our newest national park

The creation of a new national park is rare enough in New Zealand so the opening this month of our 13th park – Kahurangi – is a significant event. JUDITH DOYLE goes tramping in the Kahurangi high country.

CRAIG POTTON

One of Kahurangi's famous limestone "islands" – the Matiri Tops.

KAHURANGI is a wilderness – one of the largest unbroken, least modified landscapes in New Zealand. Most of it is derived from the former North-West Nelson Forest Park and extends from Farewell Spit to the Buller River.

Here, some of our rarest birds can still be seen on the mainland. Biological curiosities such as giant snails and New Zealand's largest native spiders live here and an incredible 1,000 or so native plant species – about 40 percent of all the native plant species in New Zealand and 80 percent of all our alpines.

Kahurangi covers some 452,000 hectares and its geology is amazingly varied.

In the west, there's the granites. Then there are very old sandstones and other sedimentaries such as slates and shales. The central sedimentary belt is composed of conglomerates and debris from volcanos 500 million years ago. Further east, the marbles and limestones shape the land dramatically.

This geological diversity leads to the extraordinary range of plants and variety of birds.

We started a four-day tramp into the marble and limestone region of Kahurangi at the Flora carpark.

A sharp-eyed member of our party soon spotted the rare blue duck, the whio. They are usually in pairs but this one was solo. It kayaked the Flora Stream for a bit, the splashing water drowning out its strange breathy whistle.

Later we watched another rare bird – the kaka – using its strong, curved beak to hoist itself up the trunk of a beech tree, in search of honeydew. The kaka has to contend with wasps seeking the honeydew and possums eating the foliage.

Perhaps our strangest encounter was *Powelliphanta,* the giant snail. Rated by scientists with the kiwi and the tuatara in biological importance, it has a shell like polished mahogany and the size of a toddler's fist.

But as we emerged from the filtered light of the beech forest into the open country of the Arthur Tablelands, it was the flora that more and more demanded our attention.

At first, it is the sculptural curves of the *Astelia,* their silver leaves glinting in the sun. There is a myriad of different hebes in this area, too, and the tracks are often lined with scarlet snowberries.

As we climbed higher, clumps of gentians appeared. We were in Kahurangi in mid-February and this is the gentians' time of glory. Their waxy-white flowers are luminous against the tussock.

Climbing the shale and rock slopes of Mt Peel, we met little heaths; willowherbs growing on bare stones and a great variety of cushion plants clinging to the rocks.

And then there is the exquisite South Island edelweiss, growing on the slopes of Mt Peel. Its tiny "cottonwool" petals are grouped round a furry gold centre with light grey leaves, the exact colour of the rock.

Anyone who tramps in our high places is familiar with the mountain daisy *(Celmisia).* In fact the daisy family are kingpins in this area. The tree daisy can reach two metres in height. Then there is the showy snow Marguerite; the golden groundsel; the other *Celmisia* (there are 50-plus species); the little rock *Haastia;* the tiny edelweiss and even the famous vegetable sheep cushion plant – all members of the daisy family – New Zealand's biggest family of alpine plants.

Plants were at their most varied on the track from Lake Peel to the beech forest above the Cobb Reservoir. It is to this area that foreign botanists, interested in alpine plants, are often brought to see the widest variety in the one compact area.

Deer and goats have taken their toll on the park although numbers have been reduced. We saw masses of hare droppings right up to the higher altitudes – another introduced animal.

Animal pest control over the enormous area of the national park is a colossal challenge. Much of it is too inaccessible for trappers or hunters to be used. In the forest areas, aerial control is used against possums.

"We have concentrated our wild animal control on the marble and limestone areas which have the greatest concentration of plant species," said Shannel Courtney, DoC's senior botanist in the Nelson office.

"We need to look at hare control as we suspect they have a major impact on the alpine environment," he said.

The tremendous plant diversity is due to the region being a meeting place of north and south. The North Island alpines can survive in the region and it is the northern extremity of the South Island alpine plants as well.

There is also a weak botanical link between Taranaki and north-west Nelson. Some species, such as the coastal carrot, *Oreomyrrhis minutiflora,* are found only in the two regions and not in the Wellington area in between.

"The two areas share other species which are also absent from the Wellington area," said Courtney. "The northern cedar; kauri grass; the wonderful-smelling, large-leaved *Alseuosmia* and the trunked hardfern are found in Taranaki and also pop up again in north-west Nelson." This could be best explained by a former land bridge.

Kahurangi has about 100 plant species which do not occur anywhere else at all. Some of these plants have a very specific habitat and this makes them extremely vulnerable.

"The moonwort, for instance, a small alpine fern. At present, only 22 plants have been found, all in marble depressions," said Courtney.

There has been momentum for a national park in north-west Nelson since the 1970s. It is now five years since the Conservation Authority set in train a national park investigation, and the proposed park has had to face court action from disgruntled electricity companies, Treaty claims and determined political lobbying before it could be gazetted.

It is certainly cause for celebration that Kahurangi National Park, after a long and tortuous battle, has now become a permanent refuge for our unique bird and plant life.

Judith Doyle is a freelance journalist from Wellington.

Seal slaughter in Newfoundland

THIS YEAR sealers off Newfoundland have killed the largest number of harp seals in more than a decade.

The hunters – many of them former fishermen, unemployed since the collapse of the Grand Banks cod fishery in 1992 – reached the government quota of 250,000 adult harp seals in April. The total kill was five times more than last year, and the first time sealers have reached the quota since, in an effort to salvage the hunt's image, the hunting of baby white-coated seals was banned in the early 1980s.

The Canadian government, which subsidises the hunt, maintains that a burgeoning harp seal population is further endangering already depleted cod stocks off the Atlantic coast. It argues that seal numbers have doubled in the past 15 years and that cod makes up some three to five percent of seal diets.

Yet independent fisheries scientists disagree with the official analysis that killing seals will help the cod stocks improve. They question the accuracy of government figures on the size of the herd and point out that the contribution of cod in seal diets is based on old studies from before the collapse of the cod fishery.

These scientists also point out that the seals are only a small part of a complex marine ecosystem so that no matter how much fish they eat, there is no guarantee that dead seals mean more cod in the sea.

David Lavigne, a seal biologist at the university of Guelph, Ontario, says that cod have other predators, such as Ilex squid, that are also eaten by seals. "The government has not even begun to do the multi-species assessment needed to predict the impact of killing seals," he says.

The International Society for Marine Mammalogists also stated late last year that "the evidence indicates that [cod] stocks will recover, and killing seals will not speed that process".

Meanwhile sealers are arguing for an increase in the quota. They claim that European markets for seal pelts have strengthened this year in response to a weakening of the anti-fur lobby and that markets in North America have been found for seal blubber and meat. There is also a ready and growing underground market in seal penises used as aphrodisiacs in Chinese medicine.

Grand Canyon flood goes ahead

IN LATE MARCH, US Interior Secretary Bruce Babbitt triggered the opening of gates on the 220-metre-tall Hoover dam on the Colorado River, sending water streaming into the Grand Canyon in an attempt to restore parts of the canyon's damaged natural environment.

The dam's opening represented a decision to recreate a periodic disturbance in the ecosystem by simulating the natural spring flood (see *Forest & Bird*, August 1995, page 10). For 34 years the dam has altered the hydrology of the canyon and taken its toll on the unique desert ecology.

The March "flood" deposited nutrient-rich sediment along the sides of the canyon, and recreated sandbars, beaches and back water channels, helping to rebuild spawning areas and habitat for humpback chub and endangered local fish.

Scientists saw no loss of fish as a result of the flooding and no harm to bald eagles or peregrine falcons. Nesting trees of the south-west willow flycatcher were safe, although they were in the flooded areas, and archeological sites were also unharmed.

The flood cost an estimated $4.3 million as water levels in the dam dropped by over a metre. The dam provides electricity and water for 15 million people in eight south-western states.

"From all indications, the test flooding has worked brilliantly," said Babbitt. He said the lessons learned at the canyon set a "powerful precedent" that could be applied in such areas at the Florida Everglades and Washington's Columbia River.

Saving Hawaii's critically endangered puaiohi

LAST YEAR scientists with the United States Biological Service began a two-year study of the rare puaiohi *(Myadestes palmeri)* in the rain-drenched Alakai Wilderness Preserve on Kaua'i – the most western of the main islands in the Hawaiian archipelago.

For many years the puaiohi was believed extinct, and the bird was only rediscovered in 1960. But a population estimated to be 175 in 1975 has now dropped to less than 50.

Found nowhere else on earth, the surviving birds cling to a precarious existence among the towering cliffs, hidden valleys and high windswept cloud forests of the island's rugged interior.

A member of the thrush family, the puaiohi is one of 15 Hawaiian forest birds – six of which are found on Kaua'i – with populations of less than 100.

When Cook arrived in Hawaii 215 years ago, there were 79 forest bird species and subspecies inhabiting the islands. Since then, 31 have become extinct, 25 are endangered, and the remainder all have reduced populations. Hawaii now contains the greatest concentration of rare birds on the planet, including over 40 percent of the United States endangered bird list.

Many factors have caused this horrible loss of biodiversity. In a scenario familiar to New Zealanders, bird populations have been depleted by the combined effects of avian disease, loss of habitat, competition from introduced birds, predation by cats, rats and mongoose, food shortages, museum collecting and damage to the fragile rainforest understorey by feral pigs.

The puaiohi research team plans to conduct studies of the bird's foraging, nesting and

STEPHEN J. KRASEMANN/BRUCE COLEMAN LTD

Harp seals are the most common Canadian seal species. Over a quarter of a million were killed by Canadian hunters in March and April amid storms of international protest – one of the largest legal massacres of wildlife (apart from fish) anywhere in the world for decades.

MICHAEL WALTHER

A rare photo of a young puaiohi. The endangered birds feed on berries, beetles, caterpillars, spiders and snails.

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social behaviour and to develop procedures for collecting eggs and chicks for captive propagation. A US$1-million forest bird breeding centre is currently under construction where scientists have begun developing techniques to hand raise puaiohi using a common surrogate species, the 'oma'o.

Efforts to protect the remaining birds include reducing feral pig populations, rat poisoning, disease research and restrictions on public access to the Alakai Preserve. Hopefully, biologists will be successful in preventing the extinction of any more beautiful Hawaiian forest birds. Far too many have been lost already.

Michael Walther

Penguins and environmental change

ANALYSING parenting skills seems to be a '90s phenomena and, last summer, Adelie penguins were up for assessment. Rather than positive affirmations and anger management, the penguins were being judged on their foraging efforts amongst Antarctica's pack ice.

Growing interest in the commercial harvesting of krill in the Ross Sea prompted New Zealand scientists to begin studies of penguin colonies in 1981. Krill is the staple of the Southern Ocean's food chain and the results are proving to be even more valuable than first thought.

Adelies are an ideal species for the study. They spend the breeding season on land and are dependent on one key food source – krill. Over half of the world's Adelie penguins breed in the Ross Sea and Landcare scientist Kerry Barton says the birds provide a good indicator of environmental changes such as global warming and krill population dynamics.

While warmer temperatures during the 1980s caused the total Adelie population to increase, the three colonies on Ross Island responded in different ways. At the small Cape Royds and medium-sized Cape Bird colonies, easy access to open water within the sea ice pack caused populations to increase dramatically. However, the large Cape Crozier colony, with 150,000 breeding pairs, experienced only a very small rise in numbers, and Barton believes the penguin population here is limited by the available krill.

Sea ice is the critical factor for the smaller colonies and when it is slow to break up, open water may be 40 kilometres away. Parents take it in turn to lurch across the well tracked sea ice to forage and then return to feed their chicks. Walking costs penguins far more energy than swimming and much of the food collected at sea is expended in the journey.

A bar-coded tag is injected under the penguin's skin to identify individuals. The information tells Barton how long the bird spends feeding, while a weighbridge lets her know how much food it is bringing back.

Another method for measuring foraging effort is a quick stomach pump for parents returning from feeding. A blow for the hardworking parent and waiting chick, but the contents confirm the penguins' dietary reliance on the smaller of the two krill species.

North of Ross Island, on the Antarctic Peninsula, Adelies favour the larger of the krill species. Decline here in Adelie and increases in chinstrap penguin colonies in recent years seem to match other indicators of regional warming. Adelies prefer to forage in the pack ice, while chinstraps compete best in open water.

Warmer temperatures have moved the ice edge further south and increased the distance between the peninsula colonies and the open areas within the pack ice favoured by Adelies. The melting pack ice has also pushed the larger of the two krill species further offshore.

This information will help to develop a global model of Adelie penguin colonies, as indicators of the health of the Southern Ocean.

Ange Davidson

Koala cull?

THE POSSIBLE official shooting of koalas is raising temperatures in South Australia. ▼

At issue is the koala population of Kangaroo Island, southwest of Adelaide.

About 5,000 koalas on the island are currently trying to survive in an area that can support around only half this number and are defoliating and killing their food trees.

Most wildlife scientists involved with the issue support a cull by shooting as the most environmentally sensitive option. They argue that a "koala lift" is not viable because the main limiting factor on the mainland is reduced available habitat after two centuries of forest clearance and because there are few areas that could support increased numbers of the marsupial with its particular dietary habits. Koalas eat some five kilograms of leaves a night primarily from a limited number of eucalypt species.

Zoologist John Wamsley points out that the koalas on the island are currently under extreme stress. "Koalas hate each other," he said. "They are solitary animals. If a koala can hear another koala nearby then it is unhappy."

The South Australian government, embarrassed by the problems posed by the koala surplus, has set up a task force to report back on best options.

JOHN CANCALOSI/BRUCE COLEMAN LTD

The natural distribution of koalas is restricted to eastern Australia. They were introduced to Kangaroo Island – Australia's largest offshore island after Tasmania – in 1928 as a conservation measure because of worries about the decline in mainland populations.

Reports on campaigns and projects by Forest and Bird branches and field officers

KEN MASON

A Dunedin KCC party in 1992 after gorse clearing and tree planting around the Tomahawk Lagoons.

▲ Tomahawk Lagoons

THE DUNEDIN Kiwi Conservation Club has come up trumps with its contribution to the restoration of a wetland on the southern side of the Otago Peninsula.

The KCC group, led by the mercurial Ken Mason, recently won an Otago Regional Council environmental award for its work over five years in helping to restore the three-hectare covenanted area around the Tomahawk Lagoons.

Close to the city, the shallow lagoons are an important area for birds such as crested grebe, white heron, shoveler, grey teal, marsh crake, spotted crake and paradise duck.

In order to protect its project from stock, the KCC initiated the fencing and covenanting of much of the lagoon's shoreline. KCC members have been planting species around the lagoon that have almost disappeared locally, such as *Pseudopanax ferox, Olearia avicenifolia,* prostate fuchsia and cabbage trees.

The project has not been without its troubles. A neighbouring farmer has a penchant for burning and in November one of five fires on his property came within metres of the covenanted area. "Another time cattle came through after a fence burned down," said Ken Mason. "They knocked out three years of regeneration."

"Children's work is often under-rated," says Ken, who has been visiting the area for more than 30 years. "At Tomahawk Lagoons it's not just revegetation, but restoration."

From vegies to native plants

EASTERN BAY of Plenty branch member Wendy Lynch has had to give up her vegetable garden to accommodate the branch's native plant ▶ shadehouse. The shadehouse project has rapidly expanded over the last year and had to be moved onto Wendy's property in August.

Plants raised in the shadehouse are used in native revegetation programmes in the Bay of Plenty region. The regional council is a major purchaser, as is the Department of Conservation. Plants are given free to schools which are keen to green their patch and to other groups at below commercial prices.

As well as being an important conservation project in its own right, the operation is also the branch's major revenue earner – especially through its annual June sale. The branch plans to soon run more frequent sales to the public, in particular to local farmers.

Wendy has recently put a funding submission to a charitable trust to develop an endangered plants component to the propagation work – especially ground cover plants and orchids.

Marine reserve proposal launched

STORMY CONDITIONS on Nelson's Boulder Bank in late March did not deter local Forest and Bird members from launching their proposal for a marine reserve.

The discussion document published by the branch proposes a reserve to the north-east of Nelson along the coastline from Boulder Bank to Pepin Island – an area of spectacular landforms and dramatic seascapes.

Forest and Bird committee member Doug Craig said the proposal was the culmination of 13 years of work to establish some sort of protection for the Nelson marine area.

The branch consulted with residents, interest groups and iwi before putting up three options for the reserve.

"Each of the options suggested in the document has high scientific and conservation value and would make a good reserve," said Craig. "All are easily accessible to the public."

The branch will monitor the response to the proposal. If there appears to be good community support for a marine reserve in the area, the branch will proceed with a formal application to the Minister of Conservation.

Branch members outside the Eastern Bay of Plenty shadehouse. From left: Shirley Burt, Helen Harrison, Charlie Llewellyn, Bruce Hamilton and visiting German, Annetta. The shadehouse now holds over 6,000 plants and the branch is always on the lookout for volunteers to help with potting and weeding.

Energy futures

FOREST AND BIRD'S Arethusa lodge is great place to stay when exploring the natural wonders of the Far North – from watching dotterels on Ninety Mile Beach to visiting Cape Reinga.

Far North branch members are also proud of the energy-saving arrangements they have incorporated into the small cottage.

Lighting for nine fluorescent lights comes from a 50-watt photovoltaic panel mounted in the roof and hot water is provided from a north-facing solar hot water unit. For additional hot water for showers there is also a wood fired chip heater. Cooking is on a gas stove. Backup kerosene lamps are available for lighting if needed.

With New Zealand increasing its carbon dioxide emissions by more than seven percent since 1990, the branch has attempted to provide an example of what can be done to cut back on fossil fuel demand.

Arethusa lodge near Pukenui on the Aupouri Peninsula is the centre of a 14-hectare wetland reserve developed over the years by branch members. The reserve supports a growing population of native birds.

A new reserve for Forest and Bird

FOREST AND BIRD has recently become the owner of a new reserve – on Waiheke Island.

The 17.5 hectares of Atawhai-Whenua extend over a kilometre from near Oneroa village to above Matiatia Bay. Its north-facing slopes and gullies were stripped of native forest long ago and became badly eroded. The area was covenanted following subdivision of the parent block and the owners, Nick and Nettie Johnstone, offered it to Forest and Bird in 1993. Revegetation by members of the Hauraki Islands branch began that year. Transfer of title has only recently been finalised.

Locally grown trees have been donated by the city council and private nurseries. The branch mostly raises its own plants in a series of small on-site nurseries in or near the many gorse patches. Plantings approximate the island's mixed coastal broadleaf and podocarp community. Pohutukawa and hardy regrowth species will feature prominently on the more exposed sites; future canopy trees are being established on more favoured sheltered sites.

Planting, watering (Waiheke's droughts can be severe), track-making and weed control are being done by volunteers – society members and supporters, school groups including the local KCC and, occasionally, community service workers and Conservation Corps groups. The ranger in charge is a full-time volunteer and he will be assisted by a part-time worker – paid by the donors – for two years.

. . . and a further Waiheke reserve

THE BUSY Hauraki Islands branch has succeeded in negotiating the purchase of another new reserve on Waiheke Island.

Known as the Kauakarau Bay Forest, the reserve dominates the skyline at Omiha and consists of old-growth northern coastal broadleaf forest on the Te Whau Peninsula. Identified as a site of ecological significance by DoC, its diverse plant life is dominated by taraire, tawa, puriri, kohekohe, kowhai and mamangi. It is the largest and oldest stand of forest in western Waiheke. Many of the canopy trees are over 150 years old, with some estimated to be up to 400 years old.

Members of the branch have been concerned about the survival of the forest since Te Whau Peninsula was sold to a property developer in 1982. The concern took on a greater urgency ten years ago, when a proposal arose to subdivide the peninsula. Though the outer parts of the forest were vested in reserve, the two central lots were put on the market.

Initial funding for the $220,000 deal that purchased the central sections of the forest was put up by the Forest Heritage Fund, followed by generous contributions from the ASB Charitable Trust, Fullers Auckland, Auckland City Council and the Auckland Regional Council. Final funding for the purchase came from the Lottery Grants Board. The branch has gifted the land to Auckland City Council in order to create a contiguous 15-hectare reserve.

Ashburton gulls

MEMBERS OF the Ashburton branch, concerned about the degradation of the unique braided river bed ecosystems in their region, have helped out with a survey of the black-billed gull.

The national survey was carried out late last year by the Ornithological Society of New Zealand. The OSNZ had been concerned that numbers of the endemic gull had been declining. The bird, often confused with the more common coastal red-billed gull, depends on braided river beds for nesting.

Three nesting colonies, comprising some 5,700 birds, were found on the Ashburton River, suggesting that the local population is maintaining its numbers.

The river – target of a number of planned irrigation schemes – is one of the most important braided river habitats for bird life in Canterbury, containing nationally and regionally important populations of a number of species.

JASON BUSCH/ASHBURTON GUARDIAN

Active branch member, Noeline Sinclair, monitors numbers of black-billed gulls in the Ashburton River bed.

The Cave Creek tragedy and its aftermath have focused public gaze on funding levels for the Department of Conservation. The Budget is only days away, and the government has been considering a "green package" for the financially strapped department. GERARD HUTCHING looks at some of the manoeuvrings in the struggle to adequately fund conservation in New Zealand.

IT IS NOT A GOOD TIME to be the Treasury manager overseeing Department of Conservation funding. Cave Creek and the attention given to the department's lack of resources highlighted the fact that DoC today receives less money from the government in real terms than it did in 1987 when the department was established.

Treasury's Michael Papesch does not appear to be the type to lose sleep over the issue, although he accepts that he and his colleagues will be viewed as among the villains in this particular drama.

"Treasury becomes the convenient whipping boy but it's ministers who make the decisions," says Papesch.

Unsurprisingly, he is not willing to answer questions that might elicit any opinion about the state of DoC funding. Instead he prefers to talk about process – about budget cycles, Appropriation Bills, supplementary estimates and select committees. In his version of the democratic process, Treasury is a minor cog in a machine. It's all about inputs and outputs, objectives and outcomes.

"Treasury is there to provide second opinions. You have the general community which is indicating to the government what it thinks the priorities should be, and then you have the department which puts up its requests," says Papesch.

Others are less sanguine about Treasury's role. DoC staffers – amused at Papesch's description of Treasury as providing only "second opinions" – point out that Treasury officials arrive at budget meetings "all guns blazing" and with a consistent ideological agenda.

Treasury, according to DoC officials, wants to reduce what it sees as the "drain" of conservation on the public revenue. Its suggestions for achieving this are a reduction in the size of the conservation estate, in other words privatisation (the less land to manage the smaller the management costs). This particular agenda has been recently revealed in a leaked letter from Treasury head Murray Horn to DoC director general Bill Mansfield urging DoC to sell land to generate additional income. "It is not clear to me," wrote Horn, "why conservation lands could not be managed under private ownership provided there were appropriate covenants to preserve the essential conservation values".

Another consistent Treasury suggestion is that DoC could contract out key functions, in particular visitor services.

WITH THE BUDGET now only a week away, officials and politicians have been crunching the numbers for many months. This time the process has had to take account of a "green package" promised by Prime Minister Jim Bolger. New information about the extent of forest collapse, Forest and Bird's campaign to boost DoC's funding, combined with the department's lack of resources revealed by the Cave Creek inquiries and the fact it is election year have prompted the National government to put more of a green gloss on its policies.

One of the little noticed recommendations of the post Cave Creek inquiry by the State Services Commission into DoC's performance, related to the department's funding – the need to develop a "zero based" costing model, to draw up a list of DoC's core functions, work out their cost and fund the department appropriately.

"Resourcing is a major issue for the department," said the report. "The department's core functions have never been costed on a zero base. The department is therefore not well placed to put forward an objective case for additional funds where its obligations increase," says the commission.

ILLUSTRATIONS BY HELEN CASEY/EYE TO EYE

Controlling *the purse strings*

Michael Papesch is not convinced that zero-based budgeting is a good idea. "It would be difficult to do that, and if it were done it would be a massive exercise. And as yet the government hasn't taken a decision on the recommendation."

While government ministers won't discuss issues relating to the Budget at this time, Labour's spokesperson on conservation, John Blincoe, believes that if the zero-based funding exercise was done, it would demonstrate that DoC was grossly under-resourced. Both Labour and Forest and Bird have done their own costings and arrived at similar conclusions: DoC's budget needs to be doubled to around $200 million.

Blincoe envisages a phased programme of five years, with most extra funding apportioned during the first three years. He says that throwing large sums of money at the problem will not solve it, at least not immediately. For a start DoC would not have the trained staff to effectively use a budget that doubled overnight – hence the phased programme.

DoC's funding history

SOURCE: TREASURY

Year	Net Crown funding (1) $m	Other revenue (2) $m	Total revenue $m	Net Crown Funding adjusted to 1987-88 $ $m	Total revenue adjusted to 1987-88 $ $m
1987-88	91	7	98	91	98
1988-89	92	13	105	88	101
1989-90	93	16	109	85	100
1990-91	95	22	117	83	102
1991-92	101	19	120	78	94
1992-93	101	19	120	77	93
1993-94	97	29	126	74	98
1994-95	95	28	123	71	94
1995-96	102	28	130	76	98
% increase/ decrease 1995-96 v 1987-88	13%		32%	-16%	0%

(1) net Crown funding excludes a capital charge introduced in 1991-92 on assets such as buildings.
(2) other revenue includes hut fees, concession fees, sponsorship, cost recoveries and revenue from employment schemes such as Task Force Green.

After adjusting for inflation, funding for the Department of Conservation has dropped heavily since the department was formed. This has been partially offset by an increase in revenue – mainly from visitor services and concessionaires – but the cost of obtaining this additional revenue is high both in dollar terms and the diversion of staff from core functions.

The Alliance is arguing for an immediate $50-million-a-year increase in DoC's budget. "There are many other conservation activities DoC should be undertaking but can't, because of extreme funding restraints," says leader Jim Anderton.

A hint of what occurs in the bargaining sessions between DoC and Treasury is found in the "Financial Review of the Department of Conservation", prepared by Parliament's Planning and Development Select Committee chaired by National's Christine Fletcher. Asked to describe the relationship between DoC and Treasury, the report quotes DoC officials as stating "that discussion between managers of the two departments has at times been quite robust, and [they] agreed that a healthy state of tension has sometimes existed".

John Blincoe translates: "Treasury has been more hardnosed about DoC funding

The US experience

NEW ZEALAND is not the only country whose natural lands administration is in crisis. In the United States the National Parks Service is having to grapple with the fact that its budget is too small for the increasing demands made of it.

Alarmed at the condition of national parks for both visitor services and resource management, Congress asked the General Accounting Office (equivalent to New Zealand's Audit Office) to investigate.

The GAO's August 1995 report makes familiar, if depressing, reading. For example, between 1985 and 1993, visitor numbers at Yosemite National Park leaped from 2.8 to 3.8 million; as a result services have had to be cut and maintenance deferred.

"The national park system is at a crossroads," says the report. "While the system continues to grow, conditions at the parks have been declining, and the dollar amount of the maintenance backlog has jumped from $1.9 billion to over $4 billion today."

The GAO outlines three choices for dealing with the crisis: increasing the financial resources going to parks

than it has with other departments. It has a lack of sympathy for the concept of public service, and we have a government that doesn't understand green issues".

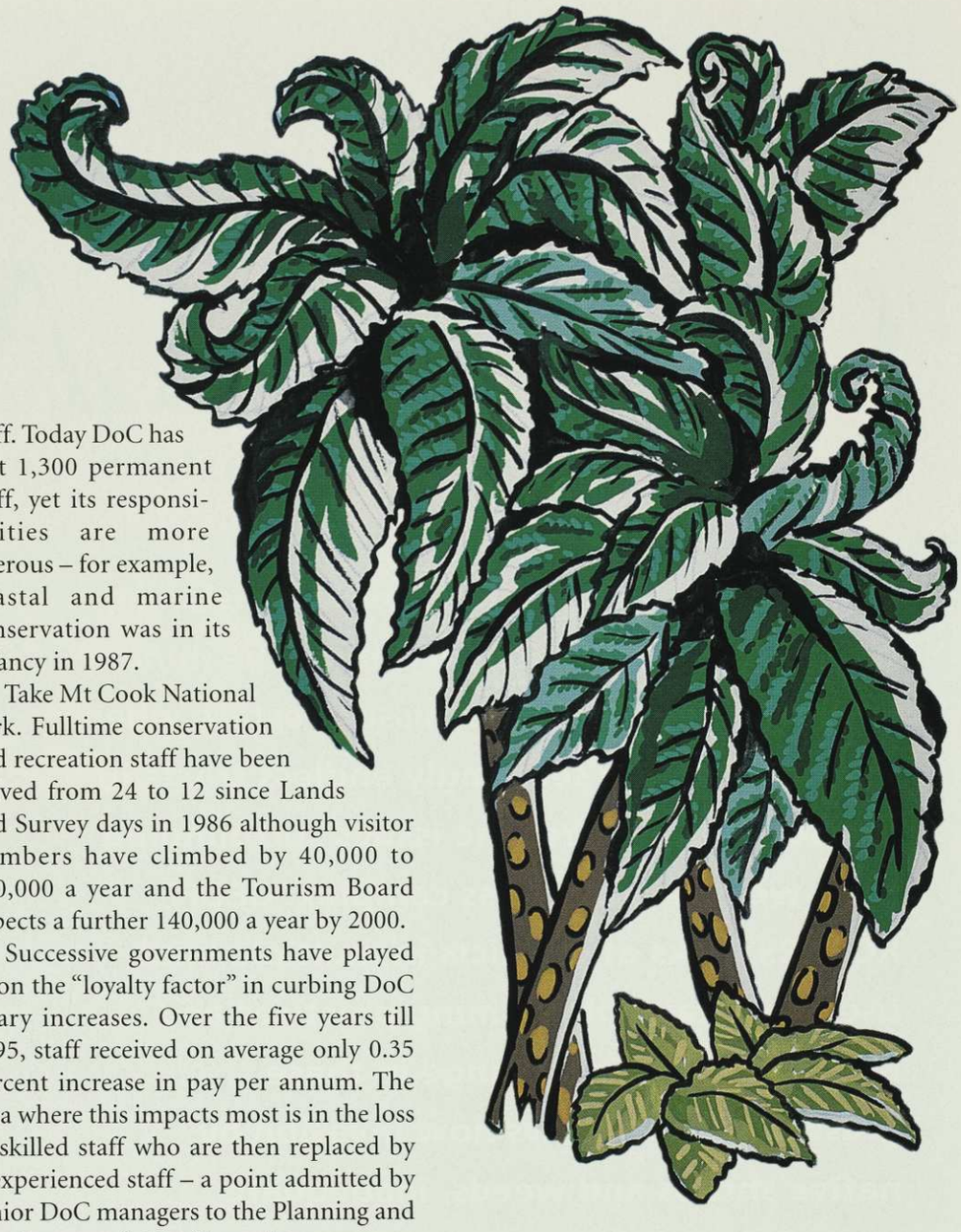
Conservation director of Forest and Bird, Kevin Smith, believes that "the extraordinary hostility" towards DoC emanates from attitudes in the Treasury and in Bill Birch's office that conservation frustrates economic activity.

"They see conservation as the green enemy, yet in their next breath they promote New Zealand's clean green image to boost tourism and exports. Treasury is doing its utmost to derail Bolger's green package at the moment," says Smith.

Not that any green package will be especially bountiful, despite Conservation Minister Denis Marshall's efforts to convince his colleagues of the need to boost DoC funding and despite a projected budget surplus of $2.9 billion in 1995-96, followed by $3.3 billion in 1996-97.

A DoC head office staffer who knows the rough details of the package, described the increase as "useful" rather than generous. Most of the extra funds, if they eventuate, will go towards deferred maintenance. In the wake of Cave Creek the government is anxious to ensure the tragedy is not repeated.

THE SIGNS of financial stringency were apparent from the time of DoC's creation in 1987, when its budget was set at $30 million less than the agencies from which it was formed. Since then there have been two major staff reductions, with the loss of more than 700 staff. Today DoC has just 1,300 permanent staff, yet its responsibilities are more onerous – for example, coastal and marine conservation was in its infancy in 1987.



Take Mt Cook National Park. Fulltime conservation and recreation staff have been halved from 24 to 12 since Lands and Survey days in 1986 although visitor numbers have climbed by 40,000 to 240,000 a year and the Tourism Board expects a further 140,000 a year by 2000.

Successive governments have played upon the "loyalty factor" in curbing DoC salary increases. Over the five years till 1995, staff received on average only 0.35 percent increase in pay per annum. The area where this impacts most is in the loss of skilled staff who are then replaced by inexperienced staff – a point admitted by senior DoC managers to the Planning and Development Select Committee.

PSA advocate Agnes McGee says a planner working for DoC can move to a similar job with a regional or local council and earn between $10,000 and $13,000 more. The Fire Service, itself supposedly under funding strictures, pays $10,000 more and throws in a car as well. A senior ranger with the Auckland Regional Council earns $62,000; the equivalent officer in DoC is on $47,000.

McGee's colleague Gary Waghorn says that his position provides him with a broad overview of government departments. DoC staff, he says, are being "ripped off".

"They have been taken advantage of because they are loyal. But also in regard to terms and conditions – DoC takes on a lot of temporaries and casuals which is rare among other departments".

Conservation officer and PSA delegate Bruce McKinlay says that the trend is that after three or four years with DoC, planners can move into much higher paid jobs. It is a situation that "can't be controlled at Head Office".

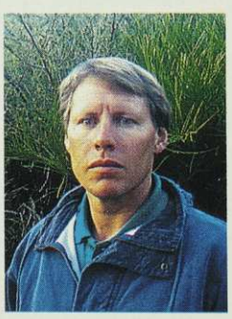
McKinlay says that while DoC staff support more spending on conservation programmes, they would prefer to see across-the-board investment in all areas, including staff.

An indication of how seriously some politicians view DoC's funding woes appears in the final page of the Planning and Development Committee's Financial Review: "We recommend that the House note with considerable concern that the Department of Conservation is unable to undertake adequately the range of functions which are entrusted to it. We reiterate our previous view that the department is under-resourced, and we therefore continue to express our serious concern over the level of funding for Vote Conservation." ◆

(through more government funding, higher user-fees); limiting or reducing the park system; reducing the level of visitor services.

Of the three choices, the latter two are considered as bandaid solutions. For example, substantial cost savings would occur only if a large park such as Yosemite were closed, and that is unlikely.

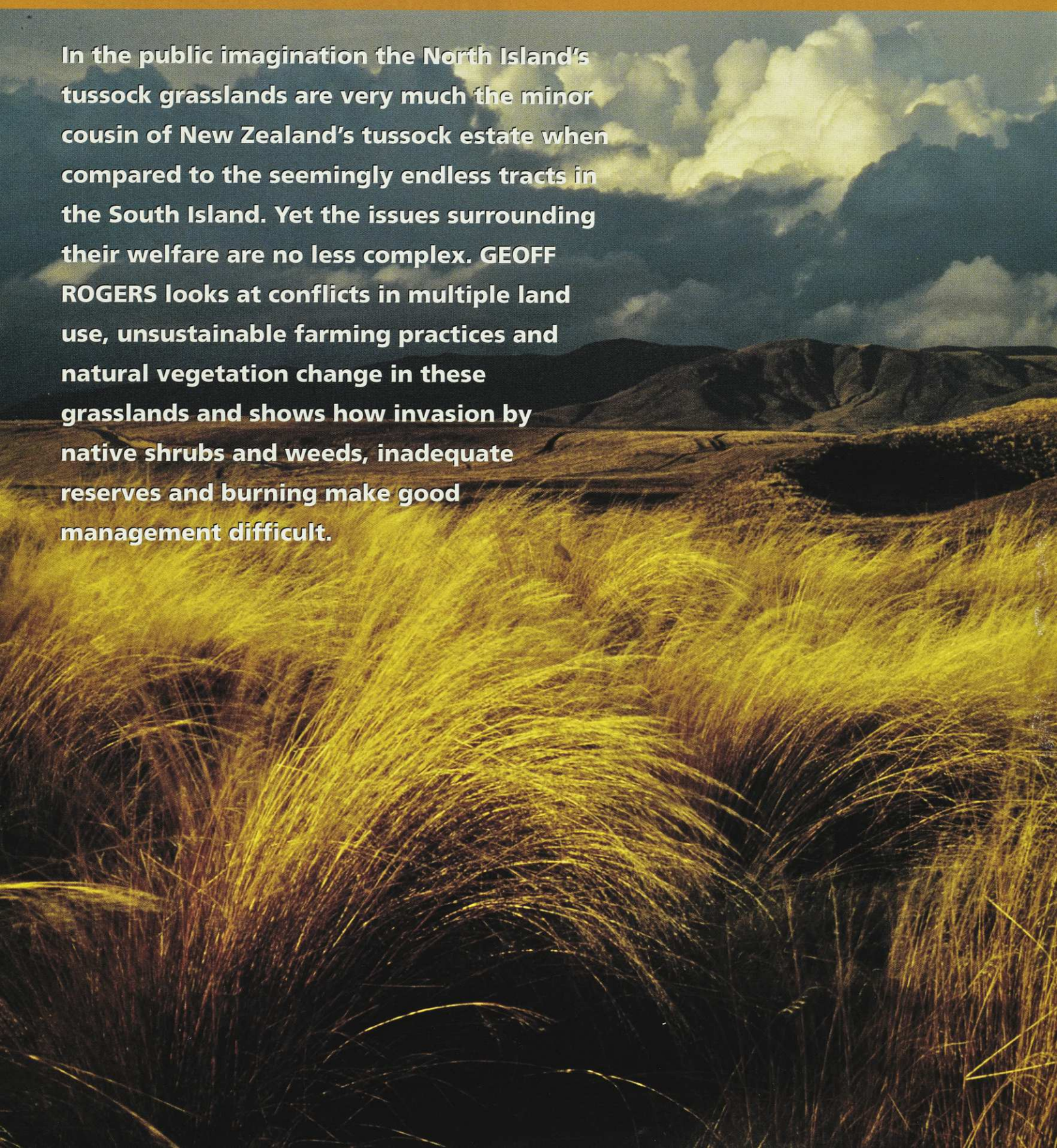
But the GAO is pessimistic about the prospects of increased government funding: "While increased appropriations are one source of dollars, they are unlikely in today's tight fiscal climate."



GERARD HUTCHING *is a former editor of* Forest & Bird. *He is now a Wellington freelance journalist.*

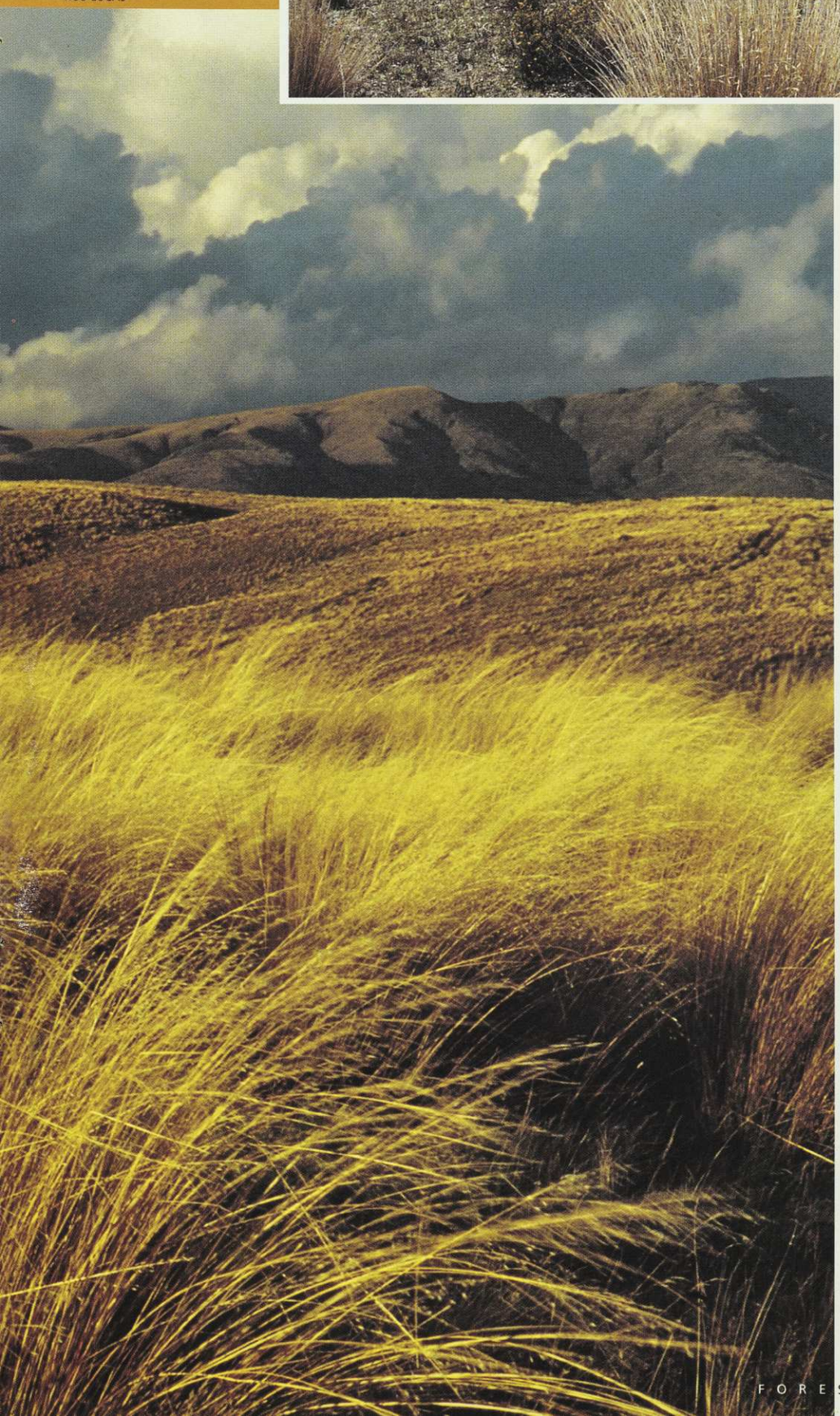
Forgotten GRASSLANDS

Ebb and flow in the North Island tussock country



In the public imagination the North Island's tussock grasslands are very much the minor cousin of New Zealand's tussock estate when compared to the seemingly endless tracts in the South Island. Yet the issues surrounding their welfare are no less complex. GEOFF ROGERS looks at conflicts in multiple land use, unsustainable farming practices and natural vegetation change in these grasslands and shows how invasion by native shrubs and weeds, inadequate reserves and burning make good management difficult.

ROB LUCAS



GEOFF ROGERS

The tussock grasslands contain a wide variety of rare plant ecosystems. This highly fertile flush zone in the northern Army country is the site of two rare plants – Carex berggrenii *and* Ranunculus recens *(var). The site has been heavily degraded by horse trampling since this picture was taken in 1989, but is part of an area from which horses will hopefully be removed under the Wild Horse Management Plan.*

ON THE eastern slopes of the Tongariro volcanoes below the treeline and on the high plateau immediately to the south-east, lies the last stronghold of the North Island's tussock grasslands, a tussock estate that once stretched north as far as the lakelands of Rotorua.

Travellers on the Desert Road, about Waiouru and in the Rangipo depression, get a good feel for these grasslands that today are very much the junior relation of the 3.4 million hectares of pastoral high country in the central and eastern South Island.

However, even a casual glance from the car window along the Desert Road will suggest dramatic variations in their condition. Dense stands of tall tussock contrast with areas where introduced pasture grasses have almost entirely replaced the tussocks, and other areas where thickets of native shrubs and trees, such as monoao, manuka, and kanuka, have replaced the previous tussock communities.

The changing status of North Island tussock grasslands has spurred quite a body of recent research that has unravelled insights into their origins, land use history, natural values and threats to their condition. It is a story of changing fortunes, mostly declining, but not all the result of insensitive, exploitative land use.

Weeds and tussocks

GEOFF ROGERS

Pinus contorta *or lodgepole pine, has become a major pest of the tussock country. Originally seeded from the Karioi pine plantation at Tangiwai, contorta readily colonised the Waiouru grasslands. Crushing and burning were the main techniques to contain it 20 years ago, but the folly of that approach was immediately evident in even denser wilding stands. A major programme on Army land of cutting trees back before they can seed is having some success.*

THEIR GROWTH form and occupation of dry soils have rendered tussocks below the treeline quite vulnerable to invasion by other plants. When one adds the stress caused by burning and the loss of foliage from stock grazing between burns, it is little wonder that nutrient depletion is primarily driving the tall tussock system toward mat vegetation.

As an analogy, imagine the dramatic rundown of a native forest ecosystem if it was burnt every 10 to 20 years and selectively cropped in between. Many introduced plants such as *Hieracium* and introduced grasses have a superior capacity to capture resources as tussock soils become drier and depleted of their nutrients. Furthermore, many weeds such as heather, broom, and gorse can grow taller, capturing most of the available light.

The spread of heather since 1912 through mostly red tussock grassland in northern Tongariro National Park is well documented (see *Forest & Bird* May 1994). Its spread there is a portent of its likely performance in the tussock grasslands of the Army holding at Waiouru.

Already dominating 140 hectares on the eastern side of the Desert Road, heather has also established numerous vigorous outliers in the Army country up to 27 kilometres away. Patches of it, some up to 100 metres across, dot the open vegetation of the Rangipo depression. The weed is performing best in those open tussock grasslands where native shrubs have disappeared after a long history of burning.

Hopefully the recent release of the heather beetle as a biological control will reduce the vigour and dominance of the weed.

Another huge weed problem for the Army with a similar smothering capacity to heather, is *Pinus contorta* or lodgepole pine. The last decade has seen a systematic and labour intensive scheme to eradicate it from the Army country and from the slopes of Ruapehu. Individual stands are cut at intervals less than the four to five years required for this pine to seed. The approach has had considerable success but, while seed sources remain in the nearby plantations, infestation will continue.

GEOFF ROGERS

The frosty upper Waipakihi basin in the Kaimanawa mountains. Seven hundred years ago tussocks were restricted to valleys such as this, where trees were excluded by intense frost inversions, or by waterlogged and acidic soils, and by frequent soil disturbance. The advent of extensive burning by Maori created the conditions for the tussocks to colonise the areas of burnt forest.

Before humans arrived, there were virtually no extensive tussock grasslands below the treeline in the North Island, save for small areas of tussocks mixed with shrubs in natural non-forest sites. These areas were restricted mostly to the floors of deep river valleys and basins, to peat bogs, to cliffs and to outwash fans on the lahar ringplains of the Tongariro volcanoes. The total area of these sites was very small among the virtually unbroken tracts of forest below the treeline.

Bristle tussock *(Rytidosperma setifolium)*, silver tussock *(Poa cita)*, hard tussock *(Festuca novae-zelandiae)* and red tussock *(Chionochloa rubra)* all had their special habitats in these clearings. Only in the Moawhango River headwaters in the southern Kaimanawa Mountains had volcanic eruptions or natural lightning-induced fires led to some long-term forest clearance and its replacement with tussock grasses and shrubs. We now know this from the record of vegetation history preserved in charcoal and fossil pollen in peat bogs. This record indicates that small

areas in the region – a region subject to very dry summers – were deforested by lightning-strike fires about 3,000 years ago. Subsequent fires maintained a secondary vegetation of tussocks and shrubs.

THE ARRIVAL OF early Maori in the central North Island resulted in widespread removal of forest by burning. Between 430 and 700 years ago, almost all the forest surrounding Lake Taupo and that on the extensive ignimbrite plateau to the east (Kaingaroa), much of the forest on the northern and eastern flanks of the Tongariro volcanoes and the extensive kaikawaka and beech forests on the high plateaux east of Tongariro disappeared. Tussocks and shrubs spread to occupy the burnt out areas and continued periodic burning of this vegetation by Maori progressively selected tussocks ahead of shrubs.

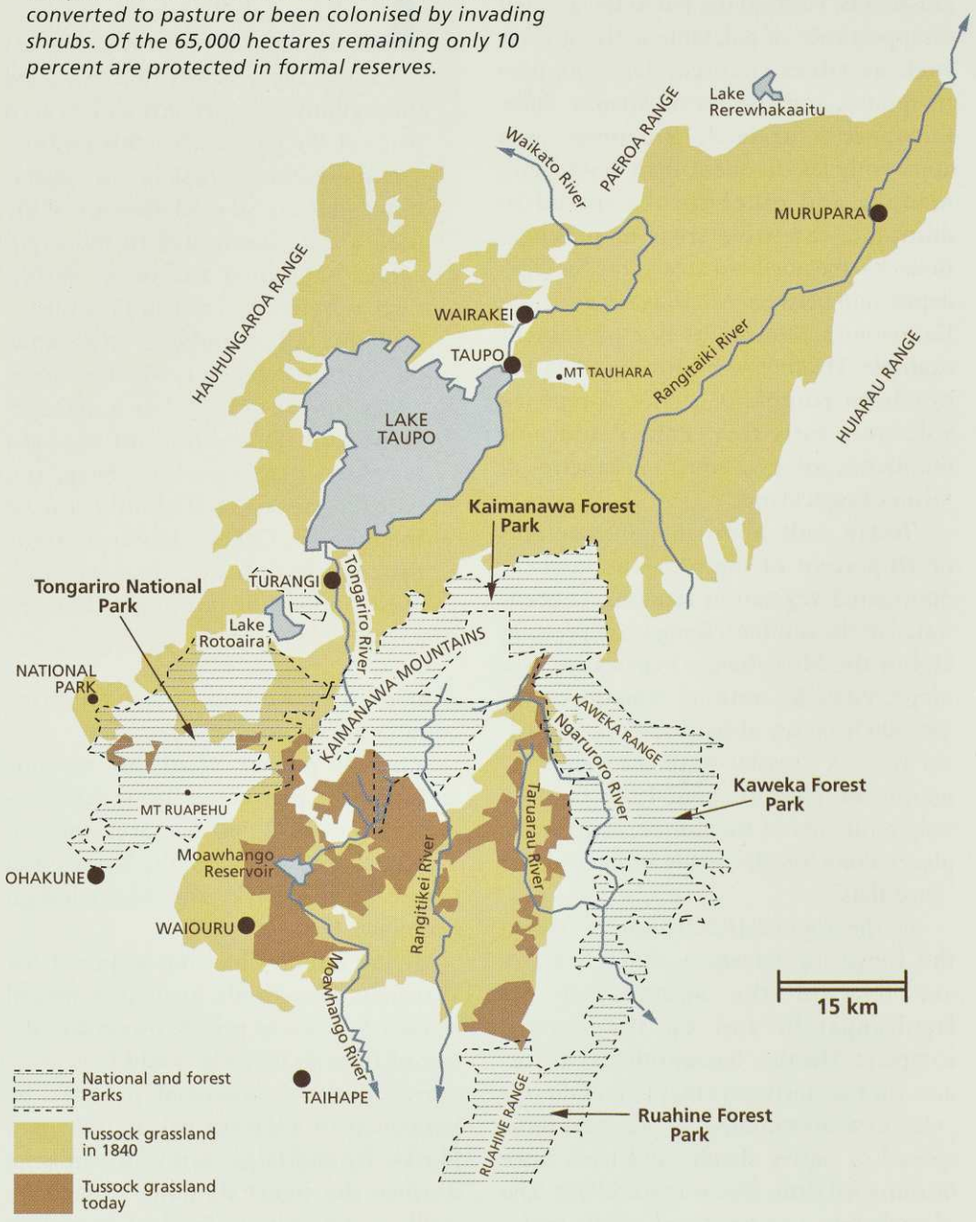
Silver tussock and hard tussock spread to create extensive short tussock grasslands on the ignimbrite plateau around Lake Taupo, which if not repeatedly burnt, were progressively invaded by bracken fern, monoao, and manuka. On the wetter, colder and more leached soils of the Tongariro ringplain and the Moawhango headwaters red tussock colonised the previous forest soils.

So when Europeans arrived in the central North Island they were greeted with extensive areas of tussock-dominated open vegetation. There was so little forest that Charles Bidwill on his 1839 exploratory trip from the Rotorua lakes to Lake Taupo had trouble finding enough wood among the tussocks on the Kaingaroa Plains to boil his billy. Nevertheless, the 660,000 hectares of tussock grasslands stretching from Waiotapu near Rotorua in the north to the northwest Ruahine Range in the south appeared to be ideal sheep pasture, and by 1880 large run holdings had commandeered most of them.

The farming fortunes of the runs varied. By 1917 the large run covering the northern Desert Road area had been abandoned entirely, due to stock losses from wild dogs, few fences, harsh winters, and from shrub invasion of the previous tussock grassland. Likewise the large run covering the country about and north of Waiouru was mostly unprofitable for a succession of owners and was progressively acquired by the Army for a training ground from 1939. Areas, such as Karioi on the southeast slopes of Mt Ruapehu, the plateaux surrounding Lake Taupo and the Kaingaroa Plain were planted with pines, while farmers, spurred on by Land Development Encouragement Loans,

North Island tussock grasslands

Tussocklands remaining in the central North Island compared with 1840. Over 90 percent has been converted to pasture or been colonised by invading shrubs. Of the 65,000 hectares remaining only 10 percent are protected in formal reserves.



GEOFF ROGERS

The Waiouru military reserve contains the last sizeable areas of tussock that once stretched from Rotorua to the Ruahine mountains. This is a good example of remnant red tussock grassland although shrubs are starting the natural process of invasion. The area was heavily overgrazed until the leases were recently cancelled by the Army.

converted other large areas to improved pasture.

There were also subtle and dramatic shifts in the composition of the surviving grasslands. Pastoral use led to the gradual disappearance of palatable native grasses such as silver tussock, *Deschampsia caespitosa,* and species of *Elymus.* After Europeans arrived, burning was apparently less frequent than before, and manuka and other shrubs spread to dominate extensive areas of previous tussock – the northern area of the Rangipo depression between Mt Tongariro and the Kaimanawa Mountains is a prominent example. Heather was introduced to the northern ringplain of the Tongariro volcanoes early this century and now dominates some 52 square kilometres of former tussockland.

Today, only about 65,000 hectares or 10 percent of the previous tussock-dominated vegetation remains, concentrated in the southern Rangipo depression and in the Moawhango headwaters (see map). Virtually nothing remains of the 440,000 hectares of hard tussock and silver tussock grasslands that covered the ignimbrite plateau about Lake Taupo – only remnants of the flora exist in waste places along forestry roads and in isolated "frost flats".

Of the original 41,000 hectares around the Tongariro volcanoes, 2,500 hectares are left on the summit of Mt Hauhungatahi and on the eastern ringplain. Heather has smothered a large area on the northern ringplain and large areas have succumbed to the inexorable spread of native shrubs and trees once burning fell from favour in the 1950s. The Moawhango area has fared a little better – of the original 166,000 hectares, 57,000 remains, the great bulk of it in the Army country at Waiouru.

Only 10 percent of all that remains is formally protected in reserves – approximately 2,000 hectares each in Tongariro National Park, the Kaimanawa Conservation Park, and Moawhango Ecological District.

If the military had not acquired the Waiouru grasslands even less would remain, because in private ownership the fate of these grasslands would have been conversion to improved pasture, as happened in adjacent privately owned blocks. By and large, Army stewardship, despite the overt damage caused by artillery and armour, has had important conservation spinoffs not only on their grasslands, but also their shrublands and forests. Several land management policies target tussock welfare or rehabilitation. Their weed and pest control budget – mainly removal of *Pinus contorta* and rabbit poisoning – often extends to $500,000 a year (far more than DoC could afford to spend in a similar area). Several grazing leases over its tussock grasslands have recently been cancelled to encourage tussock recovery. The Army has also actively supported moves to eliminate feral horses from areas of high natural values in the north, and to containing numbers elsewhere on their land to levels compatible with improving grassland condition.

Some of the higher altitude red tussock grasslands in the southern Kaimanawa Mountains and the northwest Ruahine Range are in Maori ownership. The individual blocks earn little revenue for their numerous owners, but they all represent valuable assets for nature conservation. Interminably long negotiations between the Awarua-Aorangi Trust Board and the Department of Conservation to secure some form of formal protection for the Mangaohane plateau grasslands (including Reporoa Bog and Makirikiri Tarns) appear to have recently stalled.

ALTHOUGH the days of periodic deliberate burning are over, accidental burning is very much an issue. About 18,000 hectares of tussock and scrub were burnt in one wildfire in the southern Kaimanawa Mountains in 1983. Explosions in rabbit populations

To burn or not to burn

LAND MANAGERS of Tongariro National Park now face the dilemma of preserving the last red tussock grasslands that extended throughout the northern and eastern parts of the park earlier this century. The representativeness of the vegetation and the ecological diversity of the park are declining due to the rapid spread of heather and native shrubs such as monoao, inaka and manuka.

Differing attitudes to grasslands flavour the debate on whether fire is either proper or useful as a management tool. One school of thought maintains that vegetation change is a natural process and should not be interrupted. Others, however, argue that secondary tussock grasslands are mostly caused by burning by humans in the first place and intervention is therefore justified. Yet there is no provision in conservation legislation for the deliberate burning of tussock grassland and shrubland in protected areas.

Protocols and methods for the use of fire as a management tool in tussock grasslands will need to be developed. Perhaps a lack of these and lack of a full appreciation of the dynamics of these grasslands prevent reserve managers, as well as the Army at Waiouru, from using fire to contain the spread of shrubs and trees. Deliberate burning has ongoing costs and potential problems, not only with controlling burn patterns but because of uncertainties with weed behaviour, possible ecosystem degradation and vulnerability of the recovering vegetation to weed infestation.

GEOFF ROGERS

Myosotis pygmaea *var.* glauca, *is known from only four plants in the area grazed by feral horses on Army land. It is also found in the South Island although there are few recent records.*

and the proliferation of *Hieracium* or hawkweed partly reflect subsequent insensitive land use. Another fire burnt tussock grassland from the Desert Road up onto the flanks of Mt Ruapehu in the Waihohonu area of Tongariro National Park in 1988. And about 30 to 100 hectares are accidentally burnt each year in the Army country from artillery practice.

As occurred in the period of Maori burning, each fire interrupts the progressive invasion of tussock grasslands by native shrubs and trees by selecting tussocks, which survive burning better, ahead of non-adapted shrubs and trees. But today the big difference is that fire also leads to a proliferation of weeds, especially introduced grasses. The "invadibility" of grasslands reflects what is essentially a wet forest climate throughout the central North Island and the abundant seed sources for shrubs and trees in gullies and on humid southern aspects where they were naturally protected from fires. Inaka and mountain toatoa invade the higher altitude and wetter grasslands and monoao, manuka and kanuka the lower altitude and somewhat drier areas.

With burning removed, shrubs exceed the cover of tussocks some 25 to 55 years after the last fire. There is no better example of the profound changes that occur after the end of burning than in the northern area of the Desert Road. When this area was abandoned as a sheep station 75 years ago the vegetation was tussock grassland and shrubland, but today scrub or low forest of manuka and kanuka with scattered young beech trees dominate. Two to three centuries of uninterrupted change will see a reconstitution of the original beech forest in most areas. The tussock grassland flora will be reduced to wetlands and frosty valleys, and to natural non-forest sites above the regional treeline. The diversity of present plant community and landscapes will be lost, at least locally, along with those species that depend on some degree of disturbance.

But what happens if a too-frequent fire

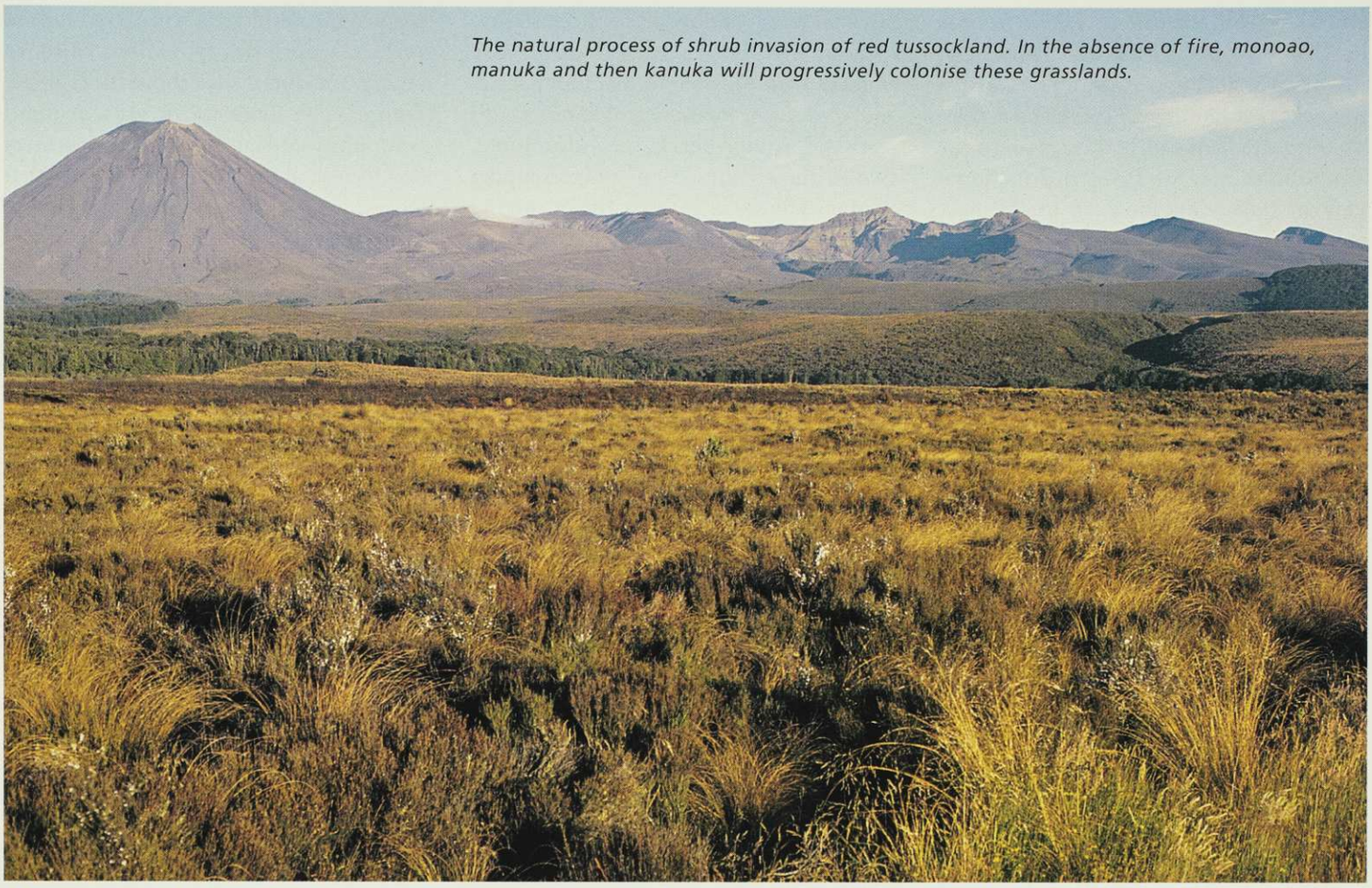
GEOFF ROGERS

A block burnt in the southern Kaimanawa Mountains in 1983. About 18,000 hectares of tussock and scrub were burnt in this wildfire. Although the days of regular deliberate burning are over, accidental burning is still common.

Mounganui station north of Hihitahi showing the conversion of the tussock grasses on private land around the Army reserve into pasture such as clover and ryegrass. The tussocks were usually mulched into the ground over three or four discings with fertility raised by heavy doses of superphosphate. ▼

GEOFF ROGERS

GEOFF ROGERS



The natural process of shrub invasion of red tussockland. In the absence of fire, monoao, manuka and then kanuka will progressively colonise these grasslands.

regime continues? When you also have grazing animals and associated nutrient depletion, and a suite of weeds (*Hieracium*, exotic grasses, heather and *Pinus contorta*) brought to the area by Europeans, the system degrades from tall tussocks to short tussocks to a mat vegetation of introduced grasses and *Hieracium*. Examples of this trend are far less numerous in North Island tussocks than in the South Island, yet there are prominent examples.

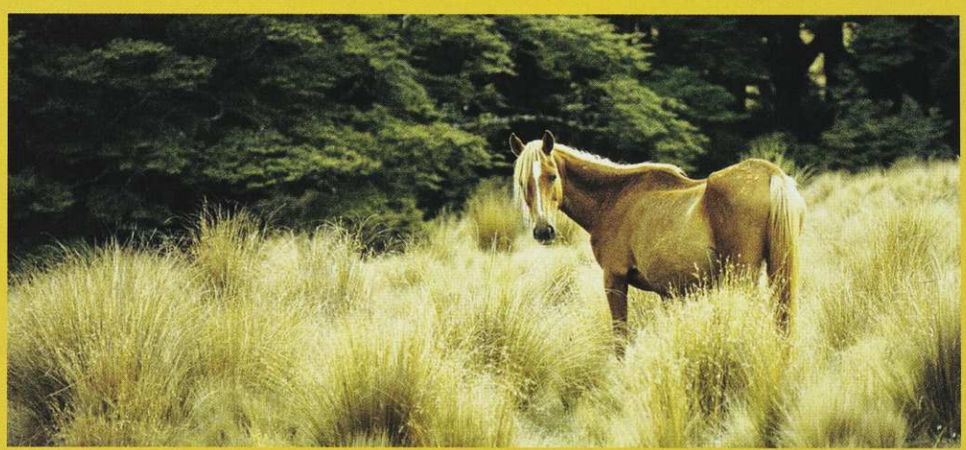
Herein lies a management dilemma. While the tussock grasslands owe their origins and early maintenance to human-induced fire, the unsustainability of the practice in combination with grazing animals and the likely invasion of weeds makes it an unacceptable management practice today (see box page 22). There are a few areas where stock still use unimproved tussock grassland, and all display typical decay symptoms – progressive loss of tussocks and spread of exotic grasses and *Hieracium*.

Update on feral horses

FOR MANY YEARS, few conservation issues seemed as intractable as the problem of the introduced "wild" horses of the southern Kaimanawa and their impacts on the vulnerable tussocklands of the central North Island.

Conservationists despaired at the damage being done to the natural value of these important grasslands while horse lovers staunchly defended the rights of the herd to multiply and roam free. But in 1993 came a breakthrough.

Using recent research by Geoff Rogers that documented the severe impacts of the horses on rare and vulnerable plants and fragile ecosystems, Forest and Bird prompted DoC to convene a working party of interested groups to find an enduring solution to the horse problem. Last December, after two years of inquiry, negotiations and 4,800 submissions, a final Wild Horse Management Plan was produced and sent to the Minister of Conservation for his consideration.



Descendants of domestic stock released last century, the Kaimanawa horses were granted full protection in 1981 under the Wildlife Act – a strange protection for introduced animals. Over the next 13 years they multiplied nine-fold on the tussocklands in the Army reserve east of the Desert Road and their heavy grazing and trampling has severely damaged rare and important tussockland plant communities.

Forest and Bird supports the draft plan which removes the herd from the important ecological and wilderness areas, but takes into account the future welfare of the horses by trialing the retention of a smaller herd in the southern area and relocating a herd to nearby heavily modified paddocks. (see *Conservation News* July 1995).

At the time of writing, Mr Marshall had not yet approved the plan.

Ian Close

GEOFF ROGERS

The results of excessive horse grazing. Tall tussocks are replaced by short tussocks and a mat of Hieracium *takes over. This area in the Awapatu basin in the northern Army area is the last bastion of hard tussock grassland and has the resilience to recover if grazing pressure is removed.*

DESPITE THEIR RELICT status, the remaining tussock grasslands still contain wide ecological diversity, camouflaged perhaps by the apparent sameness of rolling tawny landscapes. They occur in an area with a wide span of rainfall (900 to 2200 mm a year), altitude (800 to 1250 metres), landforms and geology (volcanic and greywacke to soft sediment), and occupy soils from fertile limestone to highly acidic peat bogs. This has produced a number of very different plant communities. Often concealed within the grasslands are special ecosystems with associated rare plants – flush zones fed by nutrient-rich seepage from limestone outcrops, tarns in peat bogs, gravel levees alongside meandering streams, and ephemeral wetlands. Most of these rare plants, while also found in parts of the South Island, are restricted in the North Island to small sites within the tussock grasslands. A few are endemic to the North Island tussocklands only. One bidibidi *(Acaena rorida)* is restricted to one small basin within the grasslands of the Mangaohane Plateau.

Rare plant habitats are intimately linked with the grasslands through hydrology, sedimentation and microclimate. Many of these important ecosystems remain outside the reserves network although both the Army country and unfarmed Maori land have de facto protection. Future changes in attitudes to and the economics of tussock use, however, could change this.

But given the inevitability of shrub invasion and a reluctance by land managers to deliberately burn open vegetation, another 150 years could see tussock grasslands a very minor component of central North Island landscapes. ◆

DR GEOFF ROGERS, *formerly with Landcare Research, is now based in Dunedin, studying plant rarity and biodiversity for the Department of Conservation.*

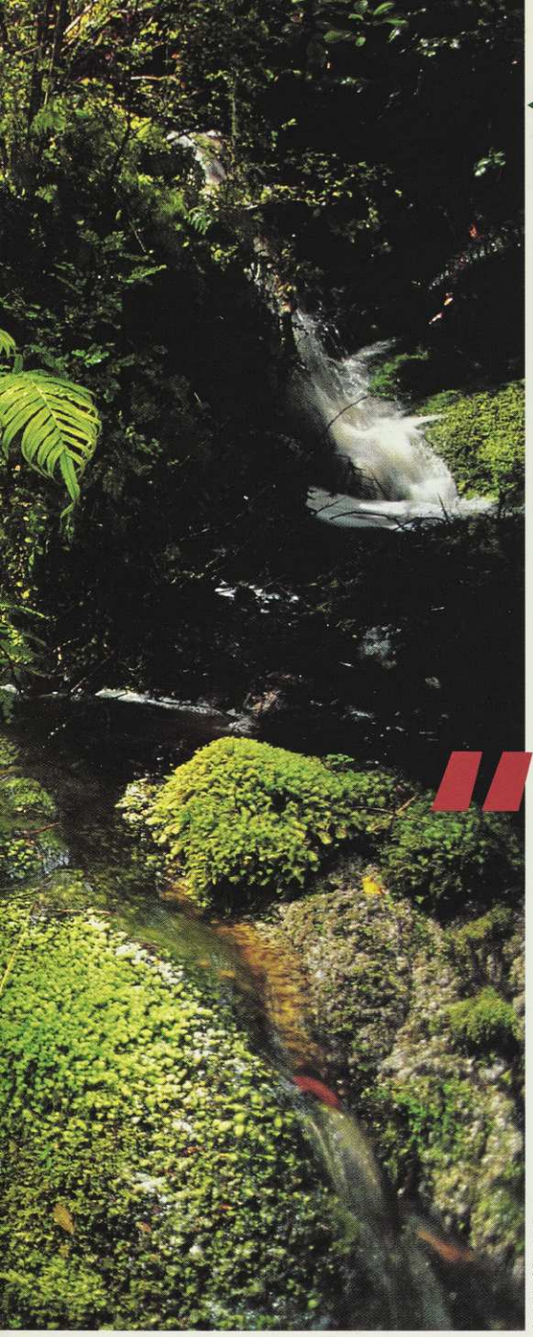
Waitutu

the ultimate forest protected at last

KEITH SWENSON

Southern rata is one of the dominant trees, along with kamahi and broadleaf, in Waitutu's coastal forest. Pure rata stands – the large trees beautifully curved and leaning with the prevailing wind – can be found in areas such as the mouth of Angus Burn.

The ancient forest of Waitutu, for many years a touchstone in the battle to conserve New Zealand's remaining lowland forest, has been saved from the threat of logging and will be given formal protection. SABINE SCHMIDT and KEITH SWENSON pay homage to a special place that preserves a window into primeval New Zealand.



SABINE SCHMIDT

Forest streams cascading over moss-covered rocks – a typical feature of the rainforest in the west of Waitutu bordering Fiordland.

"... here lies the greatest stretch of indigenous lowland forest in New Zealand that has been least directly affected by man's activities, a forest wilderness that is fascinatingly varied, contained within a splendid setting of mountains, superbly beautiful lakes and a rugged sea coast."

J.L. NICHOLLS, 1976

"WOKE UP to the loud, melodic song of a kaka in a nearby tree. Sights and sounds of kaka in the high canopy throughout the day. At nightfall, a morepork above our campsite."

So reads the journal entry from one of our excursions into the Waitutu Forest.

Waitutu is the largest remaining relatively unchanged lowland forest in New Zealand.

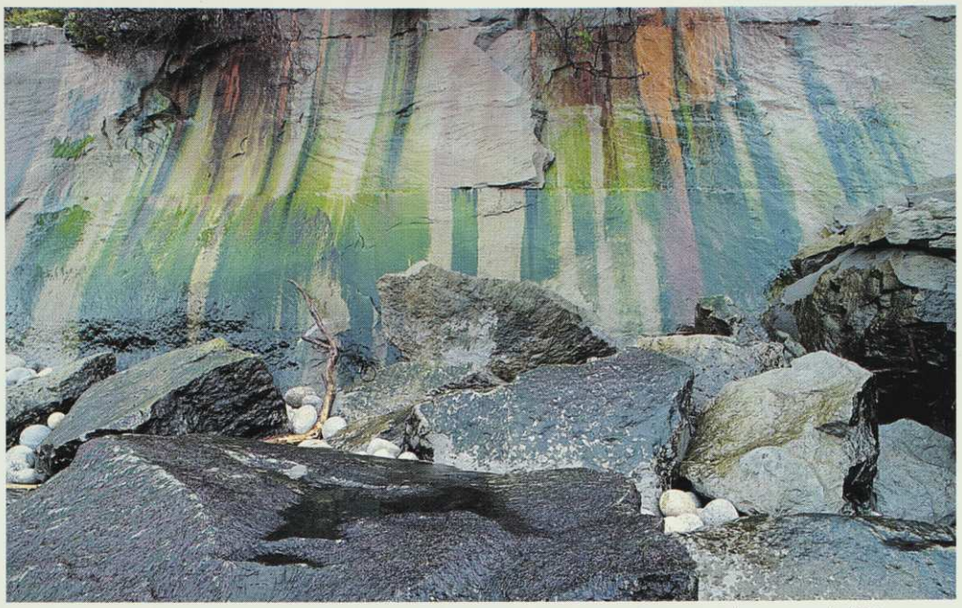
It is not entirely pristine; the southeast corner has been logged, the understorey has been subject to deer and pigs, and rats and stoats kill native wildlife. But possum numbers are still relatively low and the forest retains a wealth of native birdlife, particularly rare species such as kaka, yellowhead, yellow-crowned parakeet and robin. With its many southern rata, mistletoe, fuchsia and podocarps, including stands of almost pure rimu, the forest provides a rich food source for these and other birds such as bellbirds, tui and tomtits.

It's the birds that stay in your mind, in particular their abundance. Kaka, more common in Waitutu than anywhere else on the mainland, seem ever-present. In the mornings and evenings their calls merge with the those of kea from nearby ridges, as if kaka and kea were engaged in some vocal duel. In winter it is the heavy wingbeat of kereru, or the common sight of tui – up to seven in a single tree – that

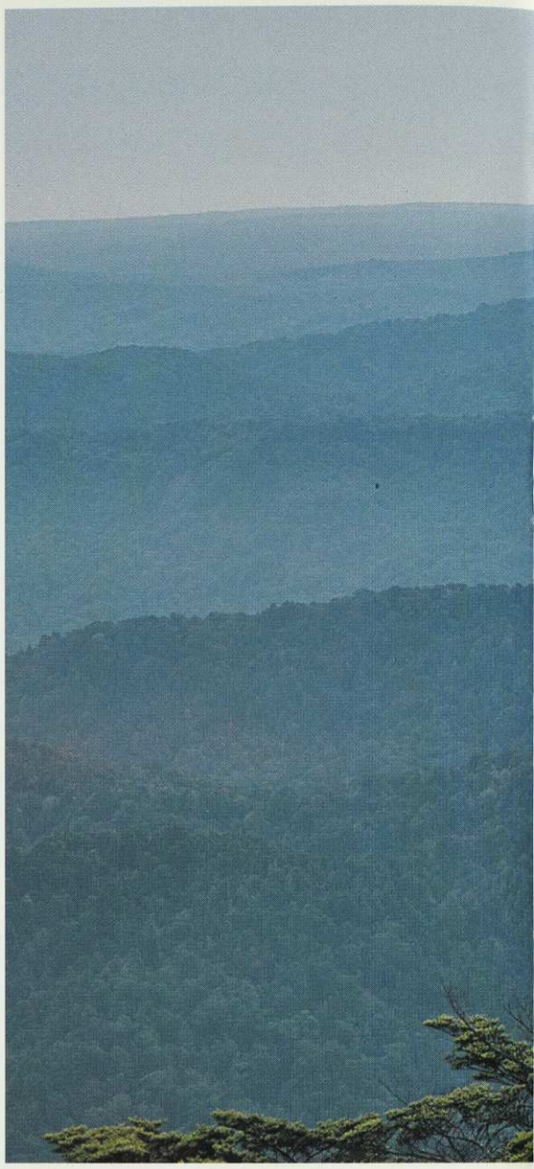
KEITH SWENSON

Mixed silver beech and podocarp forest. As you travel inland, the proportion of beech increases. This group of moss-covered silver beech trees stands in the broad valley of the lower Wairaurahiri River – New Zealand's longest lowland river left in its natural state.

KEITH SWENSON



Erosion still shapes the youngest marine platform, constantly changing the coastal cliffs. Algae and iron oxide solutions from within the sediment colour the large sculpture-like blocks of soft mudstone near the mouth of the Francis Burn.



you remember. Or in summer: robins and parakeets, the latter rarely seen up close but often heard.

Trying to make out birds in the canopy, one realises the great height of the trees. Standing next to the wide base of a centuries-old rimu, we are dwarfed by the enormity of the trunk. It's hard not to feel respect in the presence of the giants.

In many areas the forest is quite open due to the effects of deer grazing, but in other parts making your way is slow and arduous. Like in any old-growth forest, huge trunks of fallen trees, moss-covered and carrying young seedlings, form green barriers; swamps need to be skirted and stream gullies crossed.

And often you want to pause to look at the details – sunlight shining through the thin fronds of kidney ferns, the beautiful patterns of podocarp barks, or a climbing rata on the dark stem of a tree fern. Even more so in summer time, when the many shades of green are supplemented by the colours of flowering plants and young ferns.

Waitutu: the agreement

WAITUTU is tucked away in the one of the lesser known corners of New Zealand, in southwest Southland, bordered on the west and north by Fiordland National Park, and 32 kilometres from the nearest roadend.

The bulk of the forest is contained in the former Waitutu State Forest (see map). From the early 70s this area was the subject of controversial beech logging proposals by the Forest Service. The former National Parks and Reserves Authority recommended its addition to Fiordland National Park but its protection was only ensured when it was allocated to DoC in the carve up of Crown lands in 1987. Forest and Bird has continued to argue for its addition to the national park.

Most of the coastal land is owned freehold by the Waitutu Incorporation (today made up of 800 members) and was given to Maori in 1906 as supposed compensation for their dispossession of the Southland Plains. It contains the most recent and most fertile of Waitutu's distinctive marine terraces and thus the most impressive tall podocarp forests. That is why its significance is greater than its area (2,170 hectares) would suggest – and also why, despite its problems of remoteness and poor access, it has been particularly sought after by loggers in recent decades.

When the Maori incorporation sold the cutting rights of their land to Feltex Ltd in 1981, Forest and Bird and other conservation groups mounted a major campaign to protect the forest. Under pressure Feltex finally withdrew from the scheme, and inconclusive stop-start negotiations between the government and the owners over long-term protection continued through the 1980s.

In 1993 the incorporation again sold the cutting rights – this time to Paynter Timber. Again Forest and Bird launched a major appeal to protect the forest. Two and half years later protection has finally been achieved – possibly the most important gain in forest conservation this decade and a tribute to all those Forest and Bird members who worked so hard to save this icon.

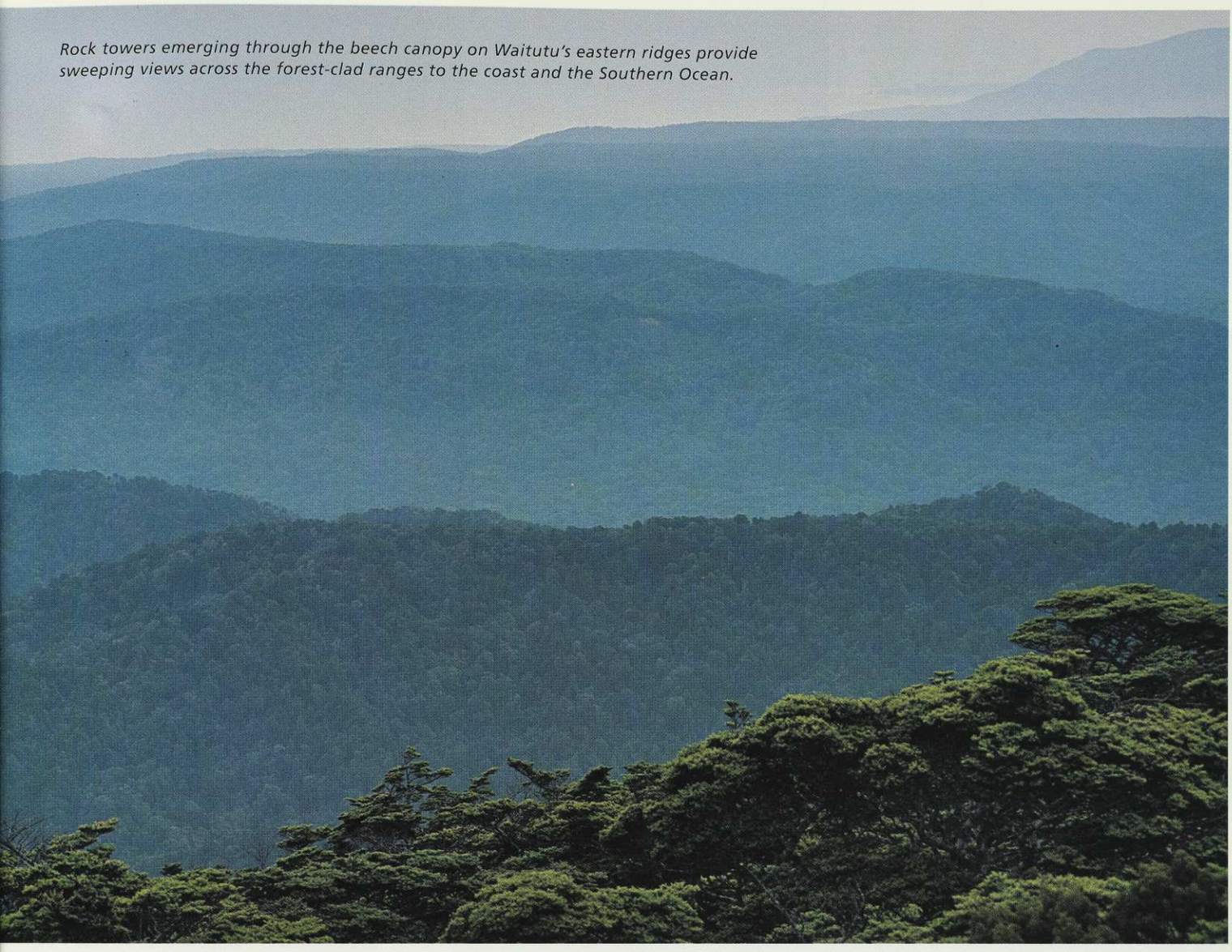
The agreement, signed by the incorporation and Conservation Minister Denis Marshall in March, protects the forest in perpetuity.

Special legislation will be passed to enshrine the agreement and allow DoC to manage the land as if it were a national park. The incorporation will be given $13.5 million and will retain title.

The conservation downside of the agreement is that cutting rights to 11,582 hectares of Crown beech forest in the Longwoods, Rowallan and Woodlaw forests in western Southland have been assigned to the incorporation. The incorporation has on-sold its rights to Paynter Timber for 80 years. Logging will need to be under a sustained yield management plan.

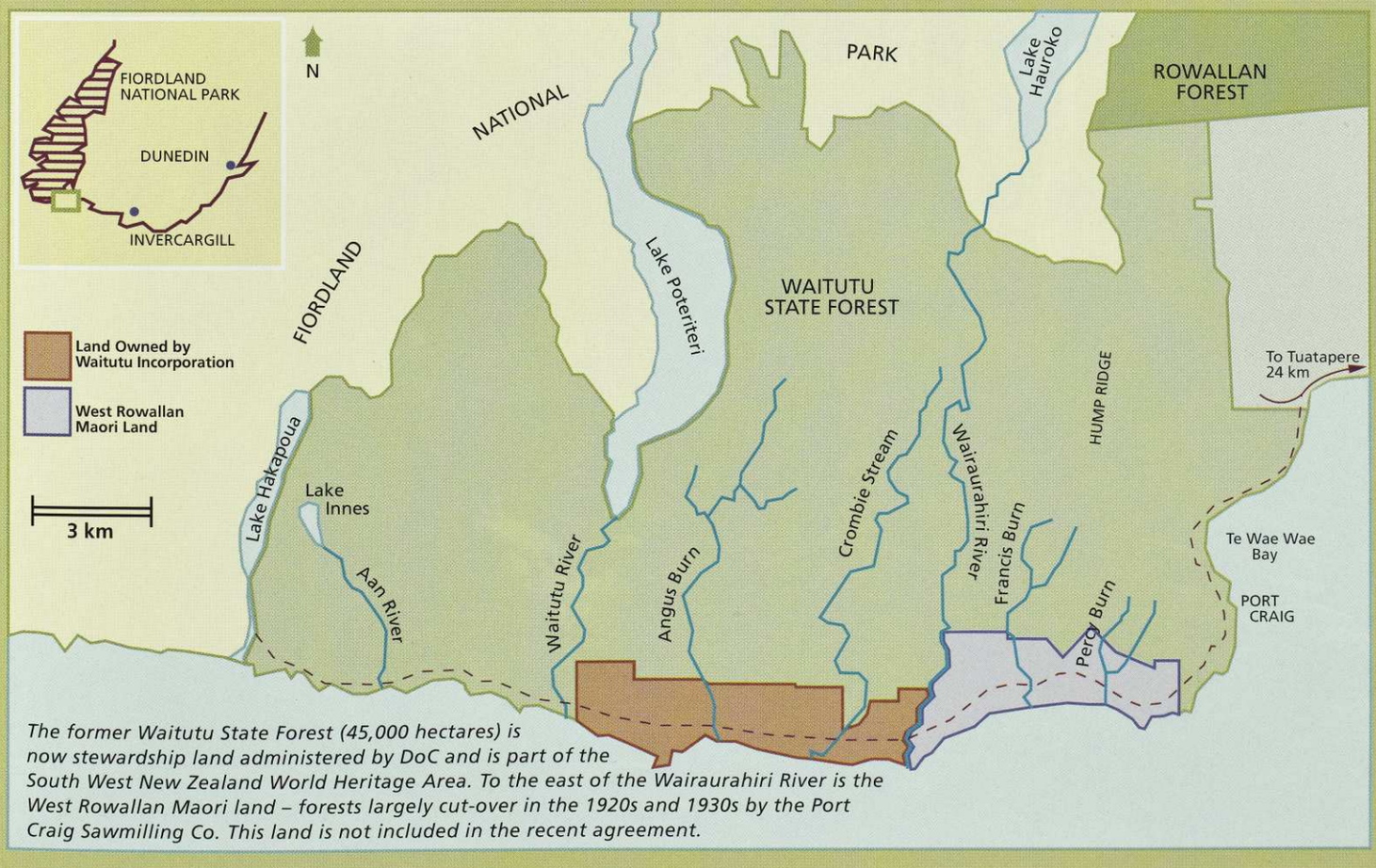
Forest and Bird will continue to work for the protection of these beech forests.

Ian Close

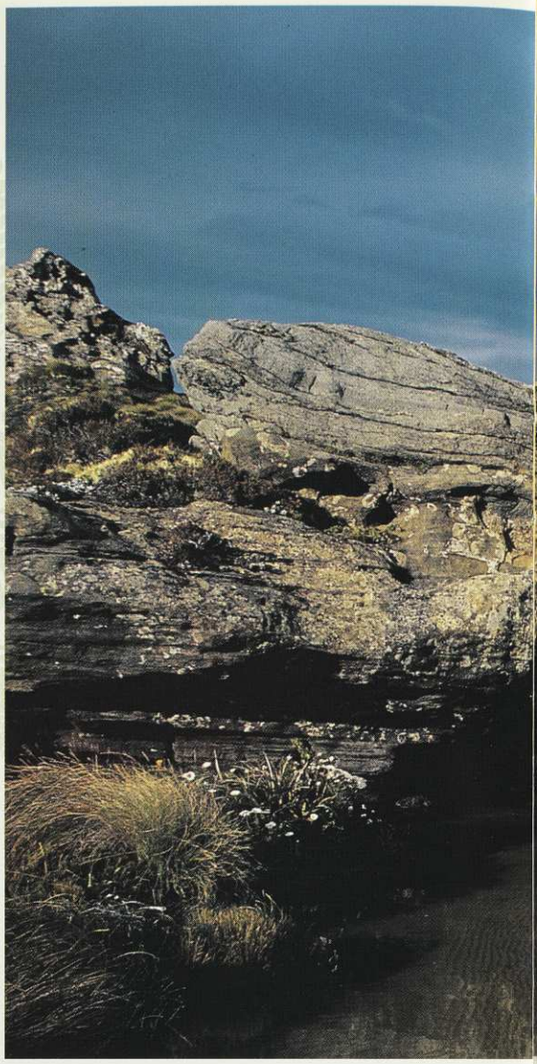


Rock towers emerging through the beech canopy on Waitutu's eastern ridges provide sweeping views across the forest-clad ranges to the coast and the Southern Ocean.

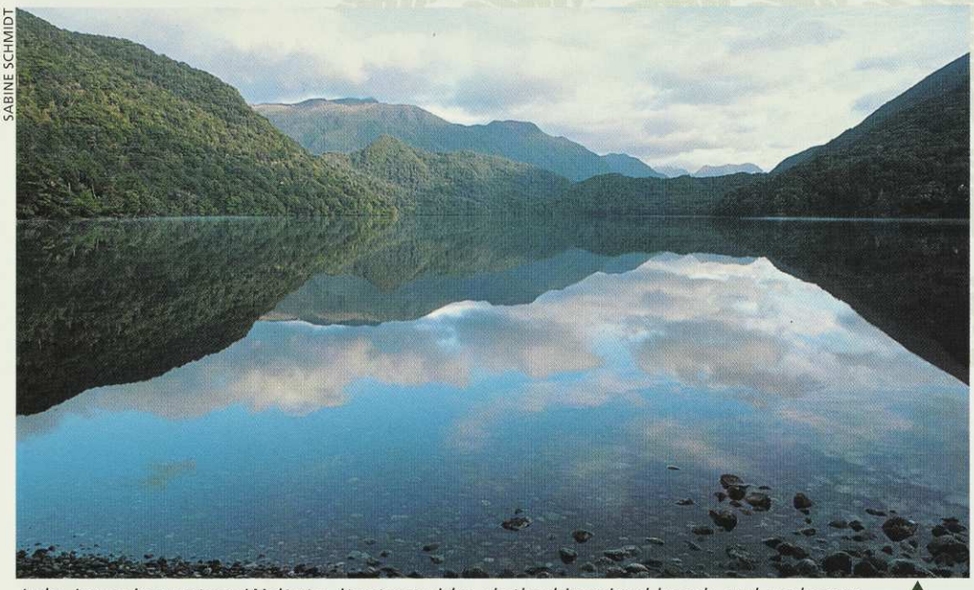
SABINE SCHMIDT



The former Waitutu State Forest (45,000 hectares) is now stewardship land administered by DoC and is part of the South West New Zealand World Heritage Area. To the east of the Wairaurahiri River is the West Rowallan Maori land – forests largely cut-over in the 1920s and 1930s by the Port Craig Sawmilling Co. This land is not included in the recent agreement.



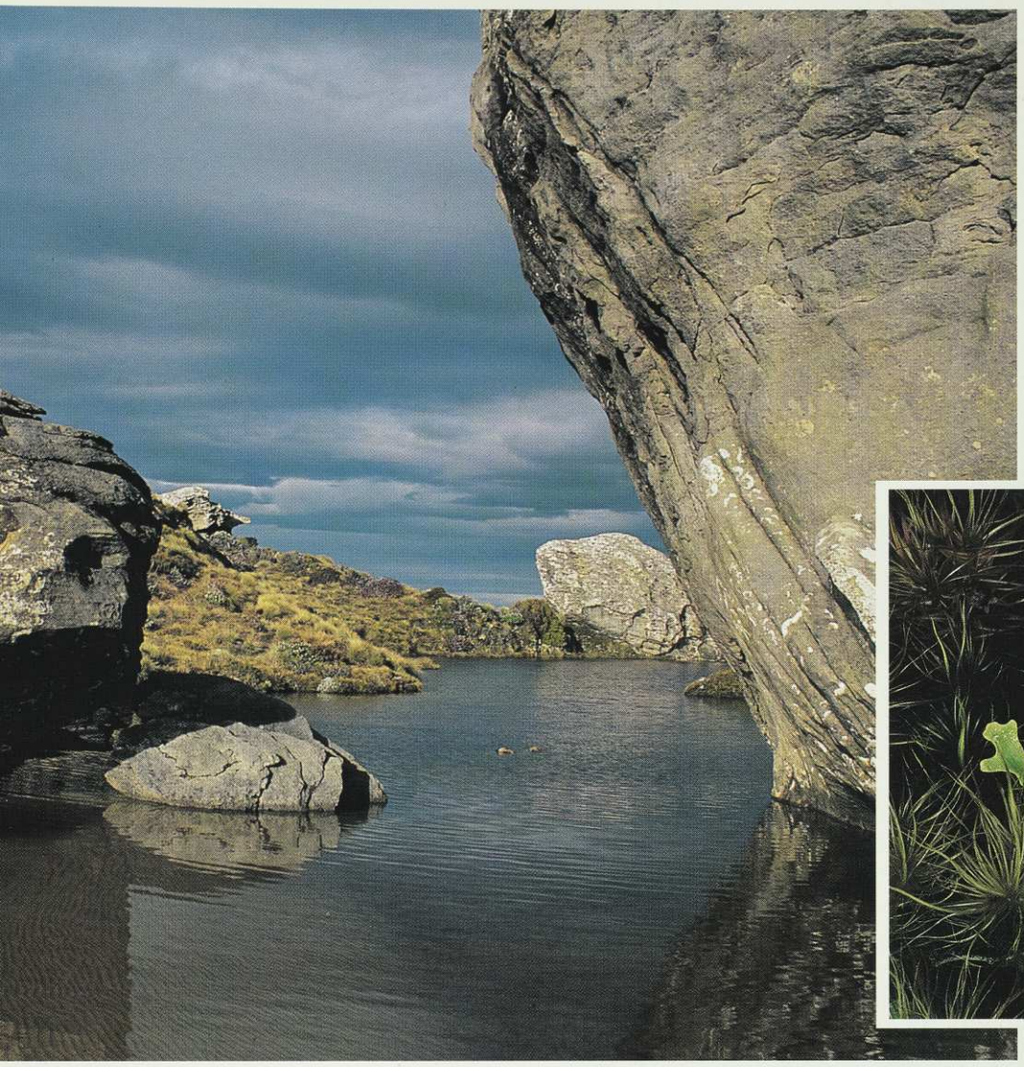
Waitutu's high country, such as here on the southern end of the Hump Ridge, features fragile areas of alpine tarns and bogs, surrounded by cushion plants and fields of sundew.



SABINE SCHMIDT

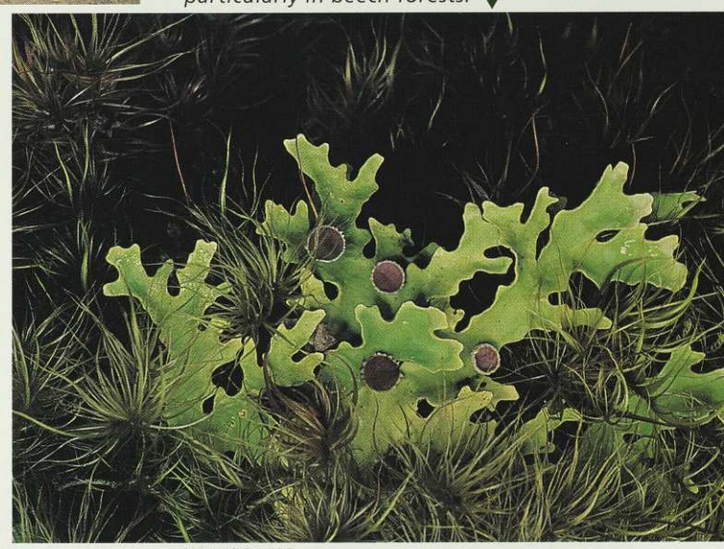
Lake Innes in western Waitutu, its steep sides clothed in mixed beech and podocarp forest, and with the mountains of Fiordland as a backdrop. The fast clear rivers of Waitutu are fed by the region's deep glacial lakes.

SABINE SCHMIDT



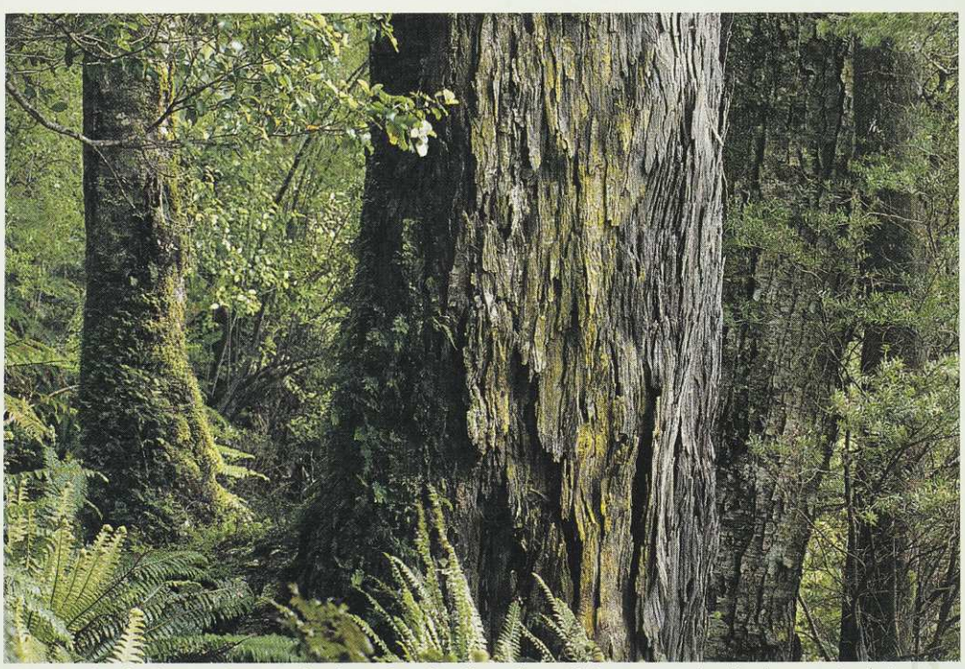
KEITH SWENSON

Pseudocyphellaria homoeophylla *is one of the most common New Zealand lichens, particularly in beech forests.* ▼



SABINE SCHMIDT

KEITH SWENSON



The trunk of a large rimu. Its bark, stained yellow from lichen growth, displays typical rimu peeling in long, thick flakes.

◀ *On the coastal terrace, the tramping track along the old telephone line into Fiordland leads through tall stands of rimu-dominated podocarp forest.* Dicksonia squarrosa *tree ferns, kamahi and broadleaf form the sub-canopy with crown fern and hard fern carpeting the forest floor. The understorey is quite open, probably due to deer grazing.*

There are patches of red on the forest floor, from the fine stamens and petals of southern rata. Above, their blooms are like red clouds in the green canopy. Mistletoe is also in flower; often, in tall forest, you are only alerted to its presence by the fallen flowers, their red standing out against the ground or dark bark at the base of a beech tree.

Geological uplift has led to a remarkable "staircase in time"– a half-million-year-old flight of marine terraces chiselled by the sea out of soft mudstones. On these terraces, as they have been raised from the sea, the forest has grown in a great patchwork quilt. The terraces are the best surviving examples of a once-widespread and significant component of the New Zealand natural landscape. The youngest terrace is still forming today as the waves wear back the 30-metre cliffs and a rock platform extends hundreds of metres off-shore.

A journey through this sequence is as hard-going as it is rewarding. After crossing the coastal terrace, we ascend through mixed silver beech-podocarp forest. In the lower regions, a dense carpet of crown fern makes progress slow. On higher terraces or ridges, yellow-silver pine, pink pine and mountain beech form dense, almost-impenetrable, scrub. The low canopy here allows for the first views back onto the Southern Ocean – a silver sea merging with the sky, Solander Island seemingly suspended in the mist, and Stewart Island in the distance to the southeast.

On reaching the higher beech forest, the climb becomes easier. The forest is open and the floor covered in thick moss.

The Aan River near its origin at Lake Innes. In its upper reaches, the river meanders through swamps and a wide, glacial valley. Nearing the coast, it has cut a deep gorge into the lowland forest.

SABINE SCHMIDT

Higher-altitude beech forest at around 600 metres. The trees and forest floor are covered in moss and lichens.

Higher still, the beech trees are stunted and heavy with moss and lichens. East of the marine terraces on Hump Ridge, the treeline region is an open, park-like landscape, with flax and tussock grasses and yellow spots of *Bulbinella* among lichen-covered beech. Finally the last trees give way to open country with subalpine *Dracophyllum*, to bogs with cushion plants and small fields of sundew, and to alpine tarns and picturesque rock formations.

From the Hump Ridge tussocklands we look down over rugged ridges to the wide expanse of the lowland bush and to the coast of western Southland. At high tide, the distant thunder of the sea can be heard; at low water, the wide tidal flats reach far seawards off the steep headlands.

The large, distinctive rivers of the Wairaurahiri and Waitutu flow fast and clear to the sea from deep Fiordland lakes. Along the steep gravel river banks, forest reaches to the water's edge.

The smaller lowland streams cut deep gullies into the mudstone as they near the coast. A typical sight from the viaducts and swing-bridges is that of tea coloured water deep below in pools and potholes carved from the grey stone.

With the restoration of the historic viaducts along its hundred-year-old coastal trail, Waitutu forest is becoming more popular with trampers wishing to experience this ancient lowland wilderness – one of the most inspiringly beautiful places in New Zealand if not the world. ◆

SABINE SCHMIDT *and* KEITH SWENSON *are members of the New Zealand Nature Institute, a non-profit environmental education trust.* *They carried out a photo-documentation of the Waitutu region to raise awareness of this unique area and the threats to it.* *The project was funded by the New Zealand Lottery Grants Board and the Environmental Grants scheme of the Ministry for the Environment. MacPac Wilderness Equipment provided a tent.*

An exhibition of Sabine and Keith's Waitutu images was held at the Southland Museum and Art Gallery in March. Further locations for the exhibition are being organised around the country.

The "Tui" is disappearing fast.

Don't worry, the tui is not about to become an endangered species. Instead, this much loved native bird of New Zealand has been preserved for good, by being superbly represented on the feature coin of The Reserve Bank of New Zealand's Annual Collectors' Coin Issue.

The tui is a frequent visitor to our gardens, its sleek beauty and resonant song is a source of delight for all who are blessed by its visitations. Now you can acquire a permanent reminder of the tui, with this limited edition coin issue.

Renowned coin designer, the late Maurice Conly MBE, has beautifully captured the tui, featured on our crown size $5 coin, against a backdrop of native flax flowers.

Exquisitely crafted in sterling silver, as well as a base metal version, these elegant coins have been minted in the UK by the British Royal Mint.

The "Tui" Coin Issue contains four individual products. **Proof Coin:** a $5 sterling silver "Tui" coin presented in a plush velvet case. Only $60.00. **Proof Coin Set:** contains a highly polished, complete New Zealand coinage set, including the $5 sterling silver "Tui" coin, in a handsome genuine leather presentation case. Only $85.00. **Base Metal Coin:** identical looking to the $5 sterling silver "Tui" coin, presented in a quality case. Only $16.00. **Base Metal Coin Set:** same set of coins as the Proof Coin Set, presented in a superbly printed folder. Only $25.00.

While numbers of the actual tui are plentiful, this magnificent "Tui" Collectors' Coin Issue is strictly a limited edition, and numbers are diminishing rapidly. To ensure you don't miss out return the completed coupon today.

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Should Felix take the rap?

ROD MORRIS

We all know that cats will hunt native wildlife. But are they the major conservation problem in mainland areas we have been led to believe? KEN CATT looks at some of the ecological dilemmas of cat control.

"FERAL CATS kill New Zealand dotterel," reads the headline. But the fact is that the role of cats as predators of native birds and other animals in most New Zealand habitats is not well understood and little is known about what would happen if cats were removed from these ecosystems.

Unfortunately predator research to date has been largely focussed on a single species of predator or prey. What is needed is more research into predator balance and the prey switching that may occur if a species is removed.

The cat problem can be broken into three categories: domestic, stray and feral. The effects of each category of cat on native wildlife vary, as do the control issues.

The most "difficult" category, politically, is the well-cared-for domestic pet as there is an acknowledged social role for the companion cat. But cats vary in temperament and many well-fed cats are still aggressive hunters. Can conservationists accept that cats should roam free to kill native wildlife? Many people organise their gardens to attract birds, obtain much enjoyment from watching them and view such birdlife as their "companions" with certainly as much right to life as a domestic pet.

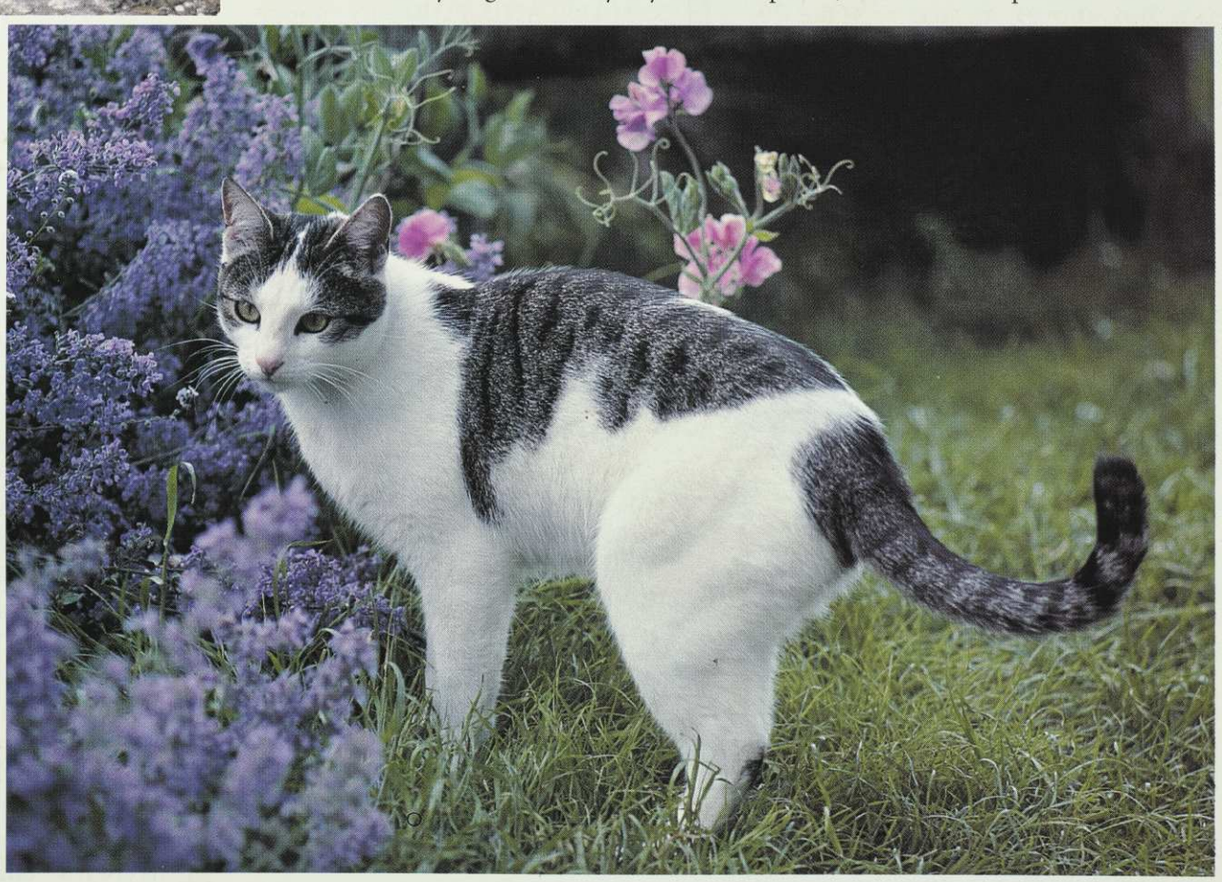
It is hard to get a handle on the size of the domestic cat population since with no requirement to register cats, the figures are estimates only. Cat ownership in New Zealand is high, with around four domestic cats for every dog. A "survey" by a cat food manufacturer put the total number of domestic cats at 830,000.

Figures on birds (both native and introduced) killed by domestic cats are contradictory but most estimates put it in the tens of millions a year. I have personally seen kingfishers, silvereyes, thrushes and blackbirds killed by cats. Another Forest and Bird member noted 25 deaths in one year including two kereru.

The second category of cat is the abandoned domestic pet. These are "street" cats and are not truly feral. They are often undernourished and inbred, and rarely survive more than three years. Generally not able to live in the wild they depend upon domestic scraps, garden birds and wildlife. Their offspring become wilder, more difficult to domesticate and more reliant on wildlife kills for food.

Stray cats may migrate to add to the population of the third category – truly feral cats. These animals live away from human habitation and are wholly reliant upon wildlife kills.

It is on islands where feral cats are the main threat to native animals. In these simpler ecosystems birds will often make up more than half of the diet of feral cats. Cats are, or have been, present on at least 25 New Zealand islands larger than 100 hectares including large, biologically important sanctuaries such as Raoul, Auckland and Campbell Islands. They are thought to have been implicated in the extermination of at least five endemic species, such as the Stephens Island wren



ROD MORRIS

A well-cared-for domestic cat – one of over 800,000 in New Zealand. But even a well-fed moggy will hunt native wildlife and it is not only birds that are at risk but also reptiles and insects. In one day's hunting a domestic cat has been seen to kill as many as twenty native skinks and geckos.

The lighthouse keeper's cat

PAUL MARTINSON

The Stephens Island wren was reported by David Lyall, the only European to ever see it alive, as running about like a mouse. We now know from subfossil remains on both the North and South Islands, that the flightless wren was a relict population of a formerly more widespread species. Two out of four species of the endemic New Zealand wren family have become extinct since European settlement.

THE STORY OF THE Stephens Island wren provides a tragic example of the danger of cats as predators of native wildlife in the relatively simplified ecosystems of small islands.

This remarkable wren – the only flightless perching bird (passerine) known – has the unenviable distinction of being possibly the only bird to be discovered and exterminated in the same year. A domestic cat was responsible for both events. The lighthouse keeper on this northern Marlborough Sounds island, David Lyall, reported that in late 1894 his cat brought him around 17 specimens of an unusual wren-like bird.

The following item appeared in the Christchurch *Press* in 1895:

"At a recent meeting of the Ornithologists' Club in London, the Hon W. Rothschild, the well-known collector, described this veritable *rara avis*, specimens of which he had obtained from Mr Henry Travers of Wellington, who, we understand, got them from the lighthouse keeper at Stephens Island, who in his turn is reported to have been indebted to his cat for this remarkable ornithological 'find'.

"As to how many specimens Mr Travers, the lighthouse keeper and the cat managed to secure between them we have no information, but there is very good reason to believe that the bird is no longer to be found on the island, and as it is not known to exist anywhere else, it has apparently become quite extinct. This is probably a record performance in the way of extermination. The English scientific world will hear almost simultaneously of its discovery and of its disappearance, before anything is known of its life-history or its habits."

(see box above), as well as some 70 local extinctions.

It is in retrospect, when cats are removed from an island, that their full impacts can best be seen. On Little Barrier Island and Tiritiri Matangi, for example, once cats were eradicated, native wildlife recovered and other native species were successfully reintroduced.

IN MAINLAND FORESTS, mice, young rats, rabbits, native insects, skinks and geckos are more important components of cat diet than birds. Needing to eat 100 weta a day to substitute for other dietary items, feral cats in some areas may significantly reduce the population of native insects and reptiles.

DEPARTMENT OF CONSERVATION

A feral cat caught on Little Barrier Island. After an intensive and successful campaign to eradicate cats from the island in 1978-80, the numbers of stichbirds multiplied sixfold and the robin and parakeet populations also increased markedly. Saddlebacks, earlier eliminated by cats, were successfully re-established on the island.

The role of feral cats in reducing the juvenile population of other predator species is significant. A study by B.M. Fitzgerald and B.J. Karl in the Orongorongo Valley near Wellington showed that rats provided the staple diet of cats – up to 43 percent by weight. The study suggested that cats ate up to twice the "standing crop" of rats and imposed a major check on rat numbers. When cats became scarce (probably as a result of intensified possum trapping) the rat population quadrupled.

Rabbits and possums were also significant prey items for cats in the Orongorongo study, although it is likely that possums might be an anomaly here as they have not been detected as a significant part of cat diet in other mainland studies. Stoats, which are significant bird predators, were also included in small numbers in the feline diet.

Ground feeding birds in the Orongorongo made up less than five percent of cat diet by weight. These were mainly blackbirds and thrushes, followed by silvereyes, chaffinches, fantails,

hedgesparrows and native pigeons. But rare and threatened birds – because of their very rarity – are unlikely to show up in studies of predator diets even while the predator may still have a damaging impact on the threatened population. This is the case with ground birds such as young kiwi and New Zealand dotterel. Although they are not a significant component of cat diets, their populations are thought to be seriously affected by cats.

In areas with large rabbit populations these animals form the main diet for ferrets and feral cats. Where rabbit numbers declined, the predators switched more to lizards, insects, hedgehogs and ground dwelling birds. A study by Richard Heyward and Grant Norbury in Central Otago, found that the switch to birds was quite significant.

The little research information that is available thus suggests that the removal of feral cats from mainland forest areas will not necessarily result in an increase in the native bird or reptile population. A study in the Mackenzie Basin by DoC scientist Ray Pierce suggested that a decline in ferrets and cats may lead to an increase in the stoat population. Feral cats may thus possibly have a net beneficial effect by killing stoats and young rats, and these two other predators are likely to increase in numbers if cats are removed.

DEPARTMENT OF CONSERVATION

The remains of 44 black-winged petrels killed by feral cats on Raoul Island in the Kermadecs. Cats are a major pest on Raoul and were responsible for the severe depletion of the formerly teeming seabird colonies on the island. Fortunately, most of these birds, including the black-winged petrel, have substantial breeding colonies on other, pest-free, islands in the Kermadec group.

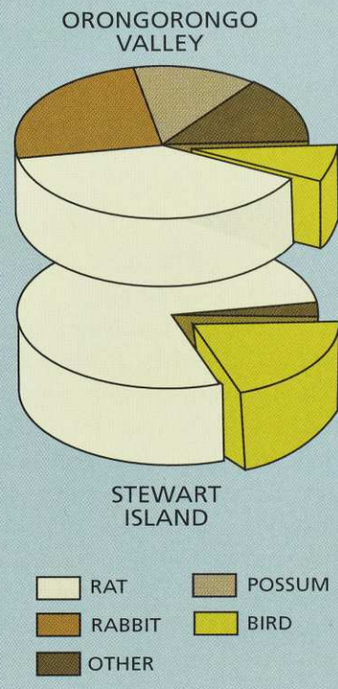
In sensitive environmental areas, however, where cats are known to be the main predator of a particular species, such as in the black stilt habitat of the Mackenzie Basin or the New Zealand dotterel breeding grounds of Stewart Island, there is good reason for local cat-specific control or eradication.

IN AUSTRALIA, where cats eat small native mammals, they are probably a bigger problem than here. The Australian National Parks and Wildlife Service estimates that each domestic cat kills eight birds, eight reptiles, and sixteen mammals a year. At a recent cat control conference in Sydney the suggestion was

ROD MORRIS

A stuffed cat used in "predator training" of endangered black stilts. Feral cats – common in the main area still supporting a stilt population, the Mackenzie Basin – are one of the main threats to the stilt and will prey on eggs, young and adults. Before the arrival of introduced animals, black stilts only had to contend with a few avian predators such as weka, harriers and pukeko and would have developed little in the way of anti-predator defence behaviour.

Cat diets



SOURCE: A LIVING NEW ZEALAND FOREST, ED. BROCKIE, 1991

The diets of feral cats in the Orongorongo Valley near Wellington and on Stewart Island. Rats provided the great bulk of food in both cases. Of the birds eaten, the Orongorongo cats ate mainly blackbirds, thrushes and silvereyes, while the Stewart Island cats ate mainly parakeets and muttonbirds. Other mainland cat diet studies have shown a different mix of prey.

ROD MORRIS

A feral cat scavenging on the sea shore. On the mainland, rabbits, mice and young rats and possums are more important components of cat diets than birds. Although cats will generally only attack smaller rats such as kiore and the young of other rats under half adult weight, cats play a small but significant part in controlling rodent populations.

made that, as a night time curfew was not sufficient protection, domestic cats be confined indoors 24 hours a day to protect native wildlife.

In Victoria much work has been done on encouraging responsible ownership. The Domestic (Feral and Nuisance) Animals Act 1994 empowers councils to control both dogs and cats to protect the community and the environment. Registration is required for each animal, with owners being issued an identification marker. If you request a pet owner to prevent his or her dogs or cats entering your property the owner will be guilty of an offence if the pets then enter or remain on your property.

It is an offence if dogs are found at large outside an owner's property between sunrise and sunset or, for cats, between hours specified by the local council.

In environmentally sensitive areas, at a distance estimated to be beyond the normal range of domestic cats, all cats are regarded as vermin and park rangers are empowered to shoot them on sight.

Councils may also prohibit dogs and cats from certain public areas or impose conditions as to times or required restraint. Such animals found in conservation zones may be destroyed, as may those which do not bear an identification mark and which are wild, uncontrollable or diseased.

WHAT CAN WE DO in this country? Our objective should be to reduce the predation by cats of native birds and reptiles in urban areas and to reduce recruitment to the feral cat population.

In the absence of any national legislation on cats, control measures are currently the responsibility of either regional or local councils. Councils should develop policies which encourage responsible ownership, lead to a reduction in the cat population by controlling breeding, and remove abandoned, stray or unwanted cats by humane methods that meet the concerns of animal welfare agencies.

Some councils, however, see the issue as too much of a hot potato, are unwilling to consider the problem, and claim that they have no powers to act unless there is national legislation.

Other councils already have bylaws which cover cats under their "animal control" activities. Government auditors have approved such council expenditure thus confirming that all councils do have the necessary powers.

The issue of cat control and cat registration is fraught with emotion. Would registration necessarily decrease the number of cats, or the impacts on native wildlife? Stephen Layton, chief inspector of the Wellington SPCA argues that registration would help reduce the large number of stray cats which feed into the feral population. While the SPCA is generally supportive of the idea of registration as a basis for promoting responsible ownership and a way of linking predatory animals with their owners, it feels that while dog control is given so little priority by local government, cat control is probably at present a non-starter. Policing of cat registration would also be more difficult than for dogs which are generally more obvious and less secretive.

Another form of control is to limit the number of cats per household. This is already the case in North Shore city which has a generous five-cat limit (kittens under three months excepted).

Other possibilities are that only registered breeders of cats should be permitted to own cats which have not been desexed, and to include in council

Cats, rabbits and RCD

CATS, ALONG WITH stoats and ferrets and harriers, are the main predators of rabbits.

Any introduction to New Zealand of the Rabbit Calicivirus Disease (RCD), currently decimating rabbit populations in Australia, is likely to kill lots of rabbits. Once the rabbits die, their predators will probably start switching to native species. It is possible also that the decline in a rabbit population will lead to reductions in feral cat numbers. This would result in higher numbers of rodents which are major diet items for stoats. More rats and stoats will likewise have a greater impact on native species.

The permutations are complex but DoC estimates that there are about 20 native species in rabbit areas at risk from "prey switching" by predators. These include tussock grassland and river bed species such as the grand skink, Otago skink, scree skink, black stilt, wrybill, banded dotterel, black-fronted tern, and Caspian tern; coastal species such as yellow-eyed penguin, New Zealand dotterel and New Zealand fairy tern; forest species such as yellowhead and kaka, North Island weka, brown kiwi and kereru; and wetland species such as brown teal, southern crested grebe and scaup.

Some of these animals are already severely threatened, and any increased predation in key areas may be catastrophic. Protection of them will require a massive predator trapping programme requiring considerable extra funding.

There will be a public consultation process once the group applying for the introduction of the virus has lodged its application, which is expected within the next month or so.

Ian Close

bylaws the requirement that animals may be kept as pets "providing that they do not create a nuisance".

In environmentally sensitive urban areas, such as near bush reserves, wetlands or parks with a native animal population, the ownership of cats could be prohibited by councils unless they are confined indoors or in a totally enclosed pen. In less sensitive but still important wildlife areas a night curfew could be imposed by councils.

For feral cats, there is still insufficient research information to be sure of the effects of their removal. Until better information is available on feral cats we should consider, where achievable, eradicating cats on islands that have significant conservation values.

Larger islands and mainland areas are more difficult, but, in suitable high value conservation areas, cat-free zones could be established where residents cannot introduce new cats and any existing residents with cats would be required to have them desexed and not replace them upon the cat's death. This was a voluntary restriction successfully developed by the residents of Australia's Lord Howe Island to protect the island's rare native woodhen. It has also been promoted by Forest and Bird as part of a "pest-free" covenant on titles for new subdivisions in ecologically sensitive areas (see February *Forest & Bird* page 12).

Generally the removal of feral cat populations should be part of a planned timetable and programme to remove all introduced predators in a given area. Consideration must be given to the effects of changes in predator balance on remaining predators and the wildlife which makes up their diet. ◆

Ken Catt is a member of Forest and Bird's national executive.

Whirinaki

CRAIG POTTON

Dinosaur forest, David Bellamy called it. One of the most faithful representations of a Mesozoic plant community remaining on earth, said John Morton. But it wasn't until 1984 that the stupendous podocarp trees of Whirinaki Forest east of Lake Taupo were finally granted full protection after a major campaign by conservationists. IAN CLOSE looks at Whirinaki today, 12 years after the logging stopped.

MY APPROACH TO Whirinaki Forest is not inspiring. For over 30 kilometres the Rotorua-Wairoa road runs through pine forests – large sprawling human artefacts such as Kaingaroa, the largest planted forest in the southern hemisphere.

Whirinaki today is the 60,000 hectares that were left of a much greater forest when the chainsaws finally ceased in 1984. The last five percent of the dense tall-stemmed podocarp forest left on earth.

Rimu, totara, matai, miro and kahikatea – the ancient giants of New Zealand's podocarp species – achieve some of their greatest glory in the

Ki revisited

IAN CLOSE

All that remains of Minginui timber mill. With the end of indigenous forest logging in Whirinaki in 1984, the mill converted wholly to processing exotic timber from the nearby plantations. But the withdrawal of subsidies led to its closure in 1988.

western valleys of Whirinaki, on the deep ash and pumice beds thrown out by the Taupo eruption 1,800 years ago.

Remote, bush-sick and with a harsh winter making the land unwanted for the farm clearance that claimed most of New Zealand's other lowland forest, Whirinaki remained undisturbed by European settlers until about 1930 when the timber value of the large podocarps saw the beginning of forest clearance.

A number of outrageous incidents, embarrassing even to the Forest Service, occurred in the sorry saga of the depletion of this forest. One of these was the clearfelling of the magnificent, almost pure totara, forests of the Mangawiri basin on the specious grounds that the trees were dying. Subsequent experience suggested that the poor health of the trees was most likely caused by high levels of possum browsing. Remnants that escaped the logging are now in good condition.

By the late 1970s, with growing environmental concern over the loss of native vegetation, clearfelling gave way to the supposedly more "enlightened" era of selection logging. But voices, such as those of the Native Forests Action Council and Forest and Bird, continued to be raised in opposition to the continuing destruction of this great forest and to the felling of trees from old-growth podocarp stands.

The growing protests were met with resistance not only from the government and Forest Service but also from residents of the small forestry community of Minginui, who controlled the main road access into the forest. A highly publicised blockade stopped conservationists entering the forest, and at one stage timber workers from Minginui took over Forest and Bird's Rotorua branch. The National Parks and Reserves Authority considered a proposal to add southern Whirinaki to the Urewera National Park, but the government continued to log the forest, albeit at a scaled-down rate.

By 1984 the battle was over. The election of Labour in that year, committed to an end to the logging of the forest, finally ensured its long-term protection. Whirinaki is now a conservation park managed by DoC.

WHAT HAS HAPPENED in the 12 years since? The giant podocarps, of course, still tower over the forest as they have done for more than 1,000 years. Areas such as the Tauranga Stream Basin with its unique stands of matai and totara remain great showpieces of New Zealand's rainforest.

John Sutton, manager of DoC's field centre at Murupara, says that while no formal monitoring of the forest's condition has been done for a decade, Whirinaki faces pest problems similar to other podocarp and mixed podocarp-hardwood forests in the country. Rata is declining due to possum browsing and is likely to be largely gone within a few years; goats are colonising the southern end of the park; and *Pinus contorta* wilding spread from the adjacent pine forests is an increasing worry.

Kakaman

WHEN BRENT Bevan arrives on his motorbike in Minginui, the local kids call out "Kakaman!" The University of Waikato masters student has been studying the large threatened parrot of Whirinaki since August 1994. The project was instigated and largely funded by the Forestry Corporation which was concerned about what appeared to be kaka-induced dieback of the corporation's trees in the adjacent pine forests.

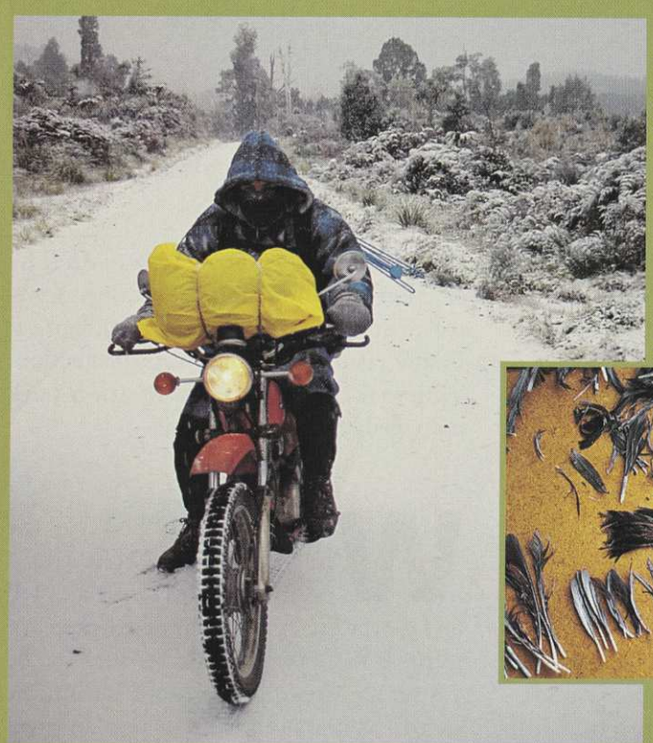
Most of the research into kaka has to date been carried out on the South Island subspecies and birds on offshore islands. Whirinaki and Pureora are the only kaka strongholds – in fact the only breeding populations – remaining of the North Island birds.

Bevan studied kaka diet and home range size, following the birds with transmitters. The birds feed on the fruit only of podocarps and almost exclusively from the big, ancient emergent trees. They also take insects from under the bark of the dead and rotting trees. Both of these dietary requirements depend on the existence of old-growth forest. The birds also feed on honeydew from beech, and sap from tawa (and now pine) trees by stripping the bark and tapping holes into the cambium – hence the pine damage.

Bevan has found that the pine damage is less than was first thought. And, as a consequence of having a pine forest alongside a natural forest, not much can be done about it anyway.

He also found that nesting success in the population he was following was poor, and that the only two birds that fledged, died – probably while feeding on the ground – the victims of rats, stoats, cats or dogs.

Bevan's observations only reinforce the predictions of other kaka researchers that habitat loss, competition and predation from introduced pests have put mainland kaka on a downhill slide to extinction.



Brent Bevan on the winter road into Whirinaki and, below, the remains of a juvenile kaka being tracked by Bevan that was killed, probably by a stoat, cat or rat, while feeding on the ground.

BRENT BEVAN

Whirinaki tourism

NEW ZEALAND HERALD

Potton feels that, in its interpretation through signs and brochures and in its management strategies, DoC doesn't acknowledge some of the politics behind the existence of a forest such as Whirinaki. "It's important not to forget the past. Some of our forests resonate with a special human history – the battle to save them from the chainsaw. Whirinaki is as much a historical resource as an ecological one."

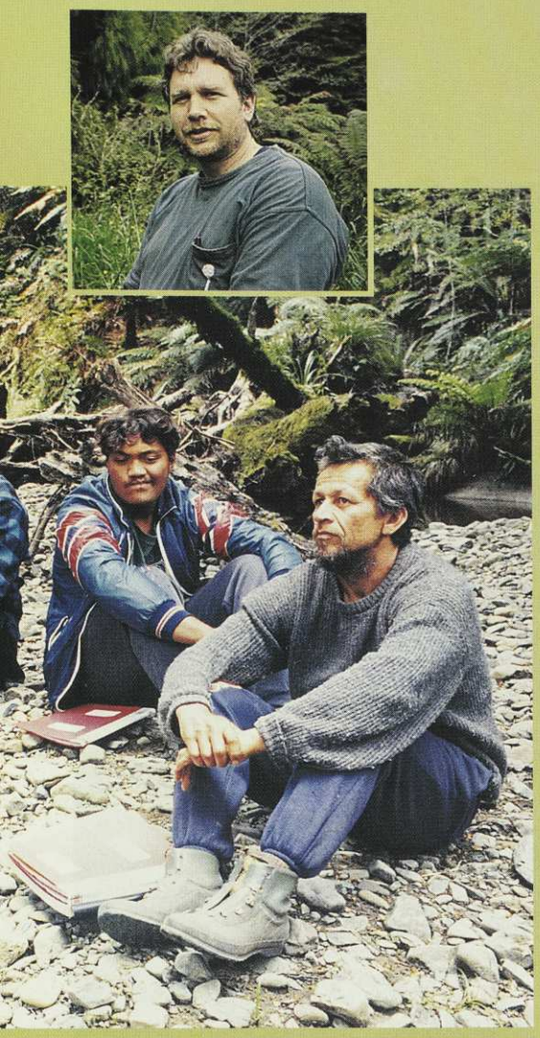
As I walk in the soft rain past the huge rimu, kahikatea and matai trees in the Whirinaki Sanctuary, their great venerable columns of wood disappearing through the lower canopy of tawa, this primeval place fills me with awe and inspiration. It is a national icon as special as the renowned kauri forest of Waipoua, and, as John Morton wrote, "one of the grandest sights in the world". The work of those who ensured the protection of this forest should be celebrated. ◆

IAN CLOSE *is the editor of Forest and Bird.*

The promises of eco-tourism, suggested at the time as an answer to the loss of income from indigenous forestry, have borne little fruit. For many people in nearby Rotorua and Taupo, the name Whirinaki rings a faint bell, but they have no idea where it is. It is almost as if a forest saga that made national headlines over a period of five years, never happened.

John Sutton says that visitor levels have stayed relatively low. Although one operator has a concession to run a guided trekking business in the park (see box on opposite page) and a couple of other small concessions are in the pipeline, Sutton estimates that only 5,000 people use the tracks in the park each year.

Many conservationists, such as Craig Potton, photographer and member of the New Zealand Conservation Authority, are happy with it that way. "I love to know it is there but I certainly don't feel it has to be full of visitors to justify its existence."



FORMER JOURNALIST Chris Birt started in the ecotourism business with rafting tours down the Mohaka River in the early-1980s. But a long-term fascination with Whirinaki Forest and the local Tuhoe people of the Urewera, led to an application to run a commercial trekking operation using a base camp in the little-visited Okahu valley on the eastern side of the forest park.

Despite some opposition to the application, he obtained a concession with the help of eminent biologist and conservationist Professor John Morton who was then on the park advisory committee. Most of Birt's publicity is now directed overseas, and he is not expecting good returns for some three years.

Birt sees his particular trade niche as providing a forest experience combined with a Maori cultural one – a combination that's hard to get in the South Island. The two-day treks end with a hangi at the Murumurunga marae but it is no mere tack-on Maori experience for tourists. Birt has also put considerable effort into training members of the local Ngati Whare as guides for the tour operation so that visitors can be introduced to the forest by its tangata whenua.

"If ever a Maori community is still interacting with nature it is the Ngati Whare people of Whirinaki," says Birt who has been assiduous in cultivating a good relationship with the people of this hapu of the Tuhoe tribe.

Minginui (population less than 300) is essentially an enclave in the park. With the final closure of its mill in 1988, and the relocation of the DoC field centre up the road to Murupara, more than 90 percent of the village workforce are unemployed.

Keen that tourist operations within the park are "more than just tour buses from Rotorua with passengers not even knowing that people live here," Birt has put his guides through pre-employment, first aid and Kiwi Host courses as well as training in the ecology of the forest and the business of managing people in the bush.

Timoti McManus (left) has swapped his classroom for the bush. The Tuhoe secondary school teacher works with Chris Birt's Whirinaki Tours in training Ngati Whare guides for the forest trekking operation. For McManus it is important that traditional lore is instilled in the trainees along with their existing bush skills. Inset: Chris Birt.

YOUNG & green

EUGENIE SAGE meets three lively Christchurch students whose initiatives have provided useful information about nature's processes and who have tried to inspire more careful treatment of their local Avon-Heathcote river system.

NOW 15, **Bryn Fenwick** can't remember when he first became interested in natural history although he recalls often carrying buckets and collecting sandhoppers as a young child during seaside field trips with his parents.

As a third former Bryn was curious about the effects of rubbish such as paper and plastic on crabs, snails and other inhabitants of the Avon-Heathcote estuary. As part of a project for the Canterbury secondary school science fair he surveyed the types and amounts of natural and urban detritus found around the estuary.

Drift kelp, weed, feathers and shells were the most common natural debris at his 12 survey sites, with plastic, paper, glass and wire the main types of human rubbish. Plastic products accounted for over a third of the rubbish at some sites.

In two experiments, one in controlled conditions and the other in the field, he investigated whether seashore animals such as crabs and an amphipod (common beach flea) ate and helped break down the rubbish and clean up the estuary.

He concluded that paper products such as brown paper bags, paper towels, and magazine pages were eaten by these species. As expected, none of the animals fed on plastic. Bryn calculated that with the help of amphipods, a brown paper bag which would normally take about five years to decompose would be broken down in about 64 days.

During his debris survey Bryn often found takeaway food wrappings and packaging and drink cans among the sea's leavings on the strand line, especially in areas close to picnic sites and carparks. Turning his research findings into conservation advocacy he designed posters for distribution around local fast food outlets with the message, "Hemi the crab says, 'Keep your rubbish to yourself. We can only process paper, not plastic,'" and "There are over 60 different types of animals and plants on the beach. Let's keep it that way by recycling our rubbish."

Bryn's estuary work has convinced him that changing the "big picture" through national policies is more important than individual action in reducing plastic pollution.

"Plastic products are a curse – they strangle seals, suffocate whales and they take ages to biodegrade. But even if I avoid using things with plastic, that's not going to affect the manufacturers one bit. It would be really good if there was a system like in Japan where before any new product came onto the market the manufacturer had to have a complete system

worked out of how that product was going to be recycled and reused. It couldn't just be used and thrown away."

A trip into the Lake Sumner Forest Park with DoC staff, as part of a Young Conservator prize for his research, helped expand his horizons from the coast to the forest. It led to Bryn spending a week helping DoC by listening for great spotted kiwi in the beech forests around the Lewis Pass on one of DoC's Conservation Volunteer projects.

"It's good being out in the bush, doing something different but feeling you're doing something worthwhile while you're tramping."

BRYN HAS inspired his younger brother, 13-year-old **Celyn,** to pursue similar environmental projects. Like Bryn's "Cleaning Up the Estuary" project, Celyn's "Mud Crabs on the Move" research has picked up awards at the regional science fair, ECNZ's national science fair and the Canterbury Regional Council's Resource Management Award.

Celyn's work centred on the Woolston Cut built a decade ago to shortcut one of the loops in the Heathcote River and allow flood flows to move downriver more quickly.

At the time of construction little thought was given to the effects of seawater travelling further back up the river on each high tide. With the increased salinity, however, riverbank trees died and mud crabs moved upstream, their burrowing contributing to riverbank collapse. The ensuing "corrective" engineering resulted in a barrage that closes the short-cut and restores the natural flows around the loop, except during heavy rainfall and flood conditions.

Celyn wondered "where the crabs went" after the barrage's construction. His field surveys confirmed that with the reduced salinity upriver, mud crabs are no longer found as far upstream as they were in earlier surveys. Small black snails have taken over their burrows. His experiments in the laboratory showed that mud crabs can detect salinity changes in the surface water and would actively move into artificial burrows containing more saline water, leading Celyn to conclude that they could move down river towards the sea. A follow-up survey earlier this year showed the upper limits of the mud crab population is further downstream than last year.

Celyn's project also involved looking at different types of bankworks and their relative attractiveness as wildlife habitat.

"People have treated this part of the Heathcote river really badly – they used to pump tar into it and dump car bodies. In some places people dump lots of rubbish on the edge of the banks but the council is trying to strengthen the banks by planting and it's getting nicer."

Bryn and Celyn's workbooks and their exhibits for science fairs are peppered with photographs, sophisticated histograms, pie charts and graphs. Their science projects have made both brothers more aware of the estuary and river environments. They have also increased an already extensive knowledge of these habitats' plants and animals.

Celyn is a supporter of the Kaikoura marine reserve proposal. "If people just keep taking fish, there will be none left – it's good for kids to see live fish – it's part of growing up."

On field trips with his mother he often explains to university zoology students the best way to retrieve hermit crabs from their shells without hurting them and collects tuatua for later dissection and analysis. "I like doing field work, it's relaxing and it's nice being next to the sea."

As a result of media publicity, Bryn and Celyn have addressed several community and service groups about their projects, helping their audiences learn more of the effects of human activities on the estuary and rivers.

The science projects have occupied large amounts of school holiday time and been fitted into a busy schedule along with music lessons, badminton, photography and theatre sports. Both reckon the research and field work is more interesting than school science.

DISMAYED BY the rubbish on the banks of the Avon River near his home, nine-year-old **Thomas Dobbie** organised several clean-ups with friends, filling rubbish bags with an assortment of debris from old cigarette lighters to perfume bottles. "It was an interest in animals first," he says, "but then the environment popped its head in the door."

As an enthusiastic member of Forest and Bird's Kiwi Conservation Club, Thomas set up an Animal Kingdom Club at his primary school to encourage his classmates to become more interested in wildlife. The club published a newsletter with jokes and information about animals around the world. With parental help they organised their own club outings to the estuary and other areas, as well as club fun nights with quizzes about animals.

The grounds of his school also benefited from the club's clean up campaign with the students organising rubbish collecting forays. "We hoped it would mean other kids would have a different opinion about throwing rubbish on the ground."

Now 12, Thomas' love of nature has led to a focus on school science projects on wasps, crystals and birds. He brims with ideas about how he would improve the Christchurch environment if he and Mayor Vicki Buck traded places. "I would try and interest the city's citizens in buying land on the Port Hills and covering it in native plants again. I'd encourage recycling, especially of plastics, maybe by paying people a small amount of money like they do with aluminium cans.

"I'd stop people using wood fires so that we can get rid of some of the smog, try to stop the council putting in any more roads to stop car fumes and encourage people to bike or bus to school and to work." Safeguarding Christchurch's groundwater would also be high on Thomas' list of mayoral projects. "Groundwater is what makes Christchurch unique yet people waste it – turning on sprinklers in the middle of the day when it just evaporates. When people wash their cars on the street, all the water runs into the gutter and pollutes our rivers. It's the little things that are important," he says.

Thomas has clear views on the government's fiscal policies.

"Instead of spending money on tax cuts we could spend money on the environment, on possum control and encouraging people to use buses. The environment is more important because in the future we could have no trees, the air would be really hard to breathe and it would be awful to smell, there would be no pure water and just about the whole of New Zealand would be either farming or cities."

All three students are optimistic, however, about the potential for making New Zealand's clean green image more of a reality. Bryn says, "You can't change things by yourself, but by contributing ideas and working with others, you can help change the bigger picture. And these days young people are more aware of the environment and the impact our activities have so we are in a better position than adults." ◆

EUGENIE SAGE *lives in Christchurch and is Forest and Bird's field officer for the northern South Island.*

Whitebait enigma

WHITEBAITING – that symbol of New Zealand life. Can there be any pastime that so exquisitely combines high excitement and dreamy boredom? It's all about the little, silvery fish streaming into the net, into the bucket, and into the frypan. But those tiny fish have a story to tell far beyond the wildest dreams of the whitebaiter.

The whitebait that escape the nets swim on up river. They are not a single species, but the young of five native freshwater fish – inanga, koaro, and three species of kokopu. These fish all belong to the southern hemisphere family Galaxiidae. Kokopu are found only in New Zealand while koaro are also found in south-eastern Australia. Inanga, occurring also in Australia and South America, are one of the most widely distributed freshwater fish in the world.

Galaxiids get their name from the profusion of spots on the first species described, which were fancied to resemble that galaxy of stars we call the Milky Way.

By far the most numerous among the whitebait are the young inanga, swimming upstream to grow into adulthood in rivers, lakes and swamps. Inanga cannot climb even small falls or long rapids, so they do not venture far inland. Neither does the shy, nocturnal giant kokopu whose young seek swamps and creeks overhung with flax and raupo, tree-lined banks and sunken logs where they can skulk and hide during the day.

On the other hand, the young of the koaro, the banded kokopu and the rare shortjawed kokopu are agile climbers, scaling vertical rock faces and turbulent falls to reach small creeks sometimes far inland. They can only live in undisturbed streams edged with native forest or shrubland (or tussock, for the koaro), and their populations reflect their diminished habitat.

Mystery still surrounds the lives of these secretive native fish. Recent studies have revealed the extraordinary breeding habits of the banded kokopu which in heavy rain leave the stream to spawn in the forest litter. Their eggs lie dormant until the next rain, when they hatch and the tiny fish wriggle through the leaves back into the stream.

Best-studied of the galaxiids is the inanga – for the obvious reason that their young make up most of the whitebait we eat. In autumn, sensing the coming of the full or new moon, adult inanga migrate downstream into estuaries. They congregate in the salt marshes or along the grassy riverbanks, awaiting the high tides associated with the lunar cycle. The tide floods over the banks. Almost high and dry, the fish writhe and wriggle in the grasses and rushes, laying their eggs deep

among the grass stems and casting their sperm (known as milt) over them.

The tide falls. The adult fish die but their fertilised eggs remain, out of water but kept damp in the base of the grasses. Two weeks or four weeks later when the high tide reaches them again, the eggs hatch and the tiny fish drift out to sea on the falling tide. They join the young of the other whitebait species that have been swept from their spawning places further upstream.

Drifting for months in the plankton, eating (or being eaten) and growing, the young fish eventually return to shore in spring to crowd into shoals and swim upstream like their parents before them. Those nourished in the harbours or estuaries return upstream in greater numbers than those swept off-shore by the ocean currents to an uncertain future. It follows that those rivers providing upstream, forested habitat and estuarine wetland nurseries, continue to support the largest whitebait populations.

Nowadays whitebait schools are only a shadow of the enormous shoals which used to swim up our rivers.

The whitebait nets take their toll, but it is the loss of native forest cover which has decimated koaro, shortjawed and banded kokopu. And it is the draining and clearing of lowland swamps and creeks which has been the biggest cause in the decline of inanga and giant kokopu. Less than one percent of Canterbury's original wetlands remain, for example, two percent in the Bay of Plenty and eight percent in the Waikato.

Trout – an introduced fish – eat whitebait and artificial barriers block whitebait migrations. While hydro dams largely bar the movement of eels, it is the seemingly inoffensive culverts and dams and fords of roadmakers, farmers and foresters that have spelt death to many small populations of native fish. With simple modifications these structures could be made surmountable and fish-friendly.

Just like many native birds, New Zealand's little-known freshwater fish are threatened. Thoughtful planning by local bodies and landowners can easily accommodate the needs of these fishes, species just as native, just as iconic and just as worthy of protection as our birds and forests.

Spare a thought for the whitebait. They are the children of old New Zealand, of species so closely adapted to their environment that they undertake migrations beyond the wit of humans to fully understand. Perhaps we should think beyond the frypan? ◆

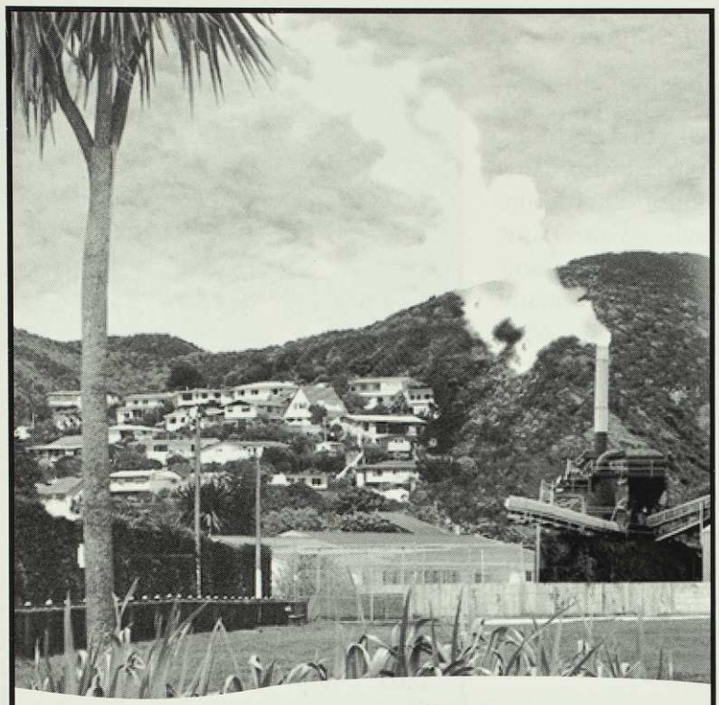
Ann Graeme

Ann Graeme is the national coordinator of Forest and Bird's Kiwi Conservation Club.

Actions to help native fish

- Protect and restore riverside vegetation.
- Protect spawning areas at river mouths.
- Ensure all dams, culverts and other obstacles in waterways are built to allow fish passage.
- Tighten controls on whitebaiting.
- Refrain from introducing trout to waterways where they have not yet been liberated.
- Give native fish priority over introduced fish in managing waterways.

ILLUSTRATION BY TIM GALLOWAY — 75% OF ACTUAL SIZE



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book reviews

New Zealand Frogs and Reptiles

by Brian Gill and Tony Whitaker (David Bateman) 1996, 112pp, $24.95

New Zealand might be short on mammals and low in numbers of forest birds, but it does have a wonderfully diverse array of lizards.

Thus the reissue of Brian Gill's 1986 handbook, totally revised and updated, is welcome. This time he had the collaboration (mainly with photos) of freelance herpetologist Tony Whitaker. As well as the lizards, the book covers frogs (three native and three introduced), two species of tuatara, and – often overlooked as part of our fauna – five marine turtles and two sea snakes.

A lot of new skink and gecko species have been recognised in the decade since the first handbook, and there are likely to be more described as the biochemical genetics of lizards in this country is currently the subject of much study.

There are brief descriptions of each species, plus notes on distribution, habitat, habits and conservation status (many are rare or threatened due to predation or habitat loss). A number of keys assist in distinguishing species in the wild, and the photos are clear and carefully chosen.

Information on each species is unfortunately restricted by the field guide format. The book, however, will help to increase awareness of our rich and distinctive reptile and amphibian fauna as well as being a useful guide to identification.

Wild South's Living Treasures of New Zealand

by Rod Morris and Peter Hayden (Harper and Collins) 1995, 192pp, $79.95

As modern scientists are forced to become more and more specialised, it is the makers of quality nature documentaries who have inherited the great 19th-century tradition of natural history inquiry.

The people who make these documentaries not only spend a huge amount of time observing a wide range of the natural world in great detail, but they have become extraordinarily skilful at recording what they find on film and videotape.

A number of important observations of the behaviour of our native animals, such as the courtship dance of the male kakapo and kea predation of sheep, for example, were first witnessed by Rod Morris, a *Wild South* producer and one of this volume's authors.

A celebratory tour through some of the wonders of New Zealand's natural world by the people who bring you *Wild South*, the book ranges from the obvious tuatara and kakapo, to the less-documented bats, whitebait, peripatus, glow-worms and grasshoppers. The emphasis is on wildlife but plants do get a look in.

The authors are skilled at telling a good story while keeping the material hard-edged and informative, and the photos, as one would expect from Rod Morris, are terrific. This is sharp, intelligent natural history.

New Zealand Alpine Plants

by A.F. Mark and Nancy M. Adams (Godwit Publishing) 1995, 269pp, $49.95

Over 90 percent of this country's alpine plants grow nowhere else. This is an even higher degree of endemism than in the New Zealand flora as a whole and is puzzling to biologists since our alpine environments are only thought to be about two million years old. These fascinating and hardy plants have obviously evolved very rapidly.

This is the fourth edition of *Alpine Plants* since it was first published in 1973 and the book has become the standard general guide.

Several new species and the changes in plant names and taxonomy that have occurred in the decade since the previous edition are included: *Cotula* and *Hymenanthera*, for example, are now *Leptinella* and *Melicytus;* and a number of grass genera, such as *Poa* and *Chionochloa*, have been extensively revised.

The book is printed on better paper than previous editions which does more justice to Adams' clear, delicate illustrations which accompany each plant description.

Not as handy in the field as John Salmon's guide (also published by Godwit), but Mark and Adams is considerably more comprehensive, covering most of the 600 or so vascular plants found above the treeline in this country.

Reviews by Ian Close

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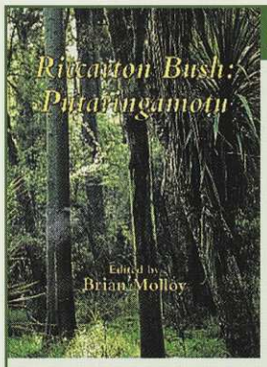

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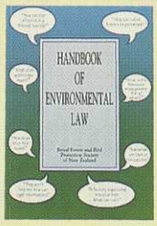

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AGM to be in Porirua

MEMBERS ARE invited to attend the 73rd Annual General Meeting of the society to be held at the Royal New Zealand Police College, Papakowhai Rd, Porirua, at 8.30 am on Saturday 15 June.

The agenda will be as follows:

- Apologies
- Confirmation of last year's minutes
- Presentation of the Annual Report and statement of accounts
- Appointment of auditors
- Motions of which due notice has been given
- Routine business.

A copy of the Annual Report is enclosed with this journal.

A meeting of the society's council will follow the AGM and members are welcome to attend any of the weekend sessions. Contact Tania Dewitt at central office for more information.

J.S. Watson Conservation Trust grants

THIS TRUST IS administered by Forest and Bird. Applications are invited from individuals or conservation groups for financial assistance for conservation projects over the 1996-97 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 earth in which they live.

A total of $10,000 is available. It may be awarded to one or more applicants, or held over for a subsequent year.

For further details and application forms, write to Watson Grants, Forest and Bird, PO Box 631, Wellington. **Applications close 31 July.**

Waikato Branch conservation grants

APPLICATIONS are invited for grants totalling up to $6,000 to assist with conservation projects during the summer of 1996-97.

There is no restriction as to the type of project, provided it contributes to the protection of the natural environment and/or its flora or fauna, though relevance to the Waikato-Coromandel area could be an advantage.

An acceptable proposal could involve: research relevant to conservation; direct practical work such as acting as a wildlife warden or fencing bush; educational, journalistic or legal enterprises aimed at promoting good environmental principles; or any combination of these or any other conservation-orientated activity.

Each application should clearly present: the aim of the proposal; an outline of how it would be carried out; the estimated total cost, the amount sought from this grant and any other sources of funds available or being sought; and the names and addresses of two referees.

For further details write to the Secretary, Forest and Bird, Waikato Branch, PO Box 11-092, Hillcrest, Hamilton. Applications close 31 August.

Constitution

THE FOREST AND BIRD constitution was recently updated by the society's council. A booklet containing the revised document is available to members. Please send a cheque for $4 to Forest and Bird, Box 631, Wellington.

Photos please

DOC SCIENTIST Philip Simpson is searching for photos of native birds eating cabbage tree fruits, other special cabbage tree images or good cabbage tree stories for a book he is writing. If you can help, contact Philip at the Stout Research Centre, PO Box 600, Wellington, phone 495-5233 x8883, fax 496-5439.

Correction

THE CAPTIONS to the photos of mudfish on page 15 of the February issue were transposed. The upper photo is of a brown mudfish (note absence of pelvic fin) and was taken by G.A. Eldon. The lower photo is of a Canterbury mudfish and is by Rod Morris.

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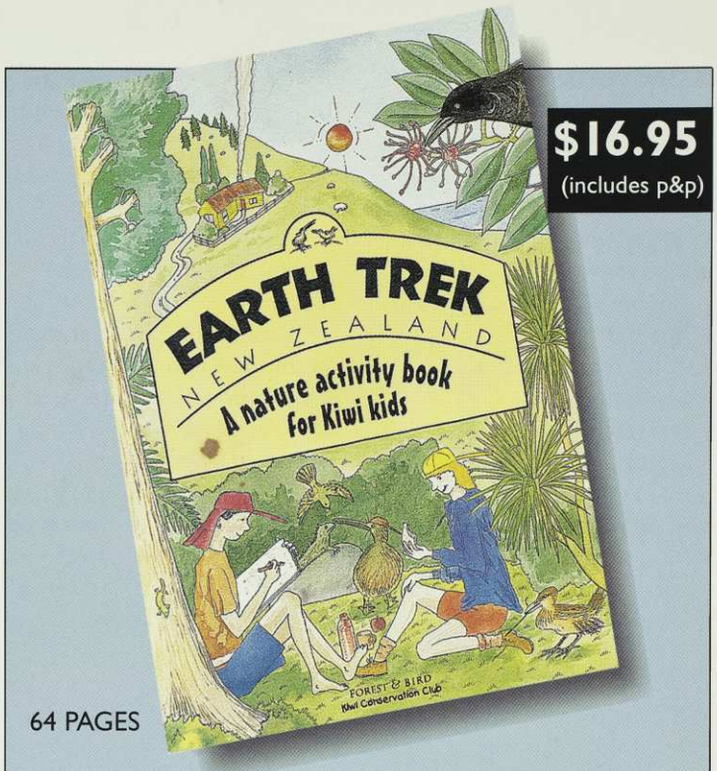

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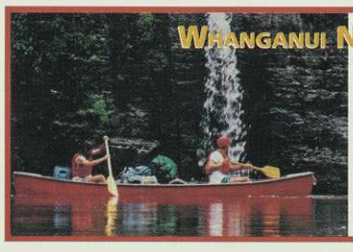

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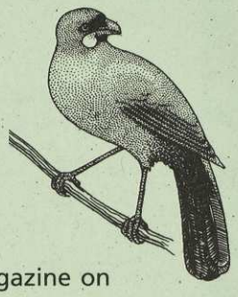

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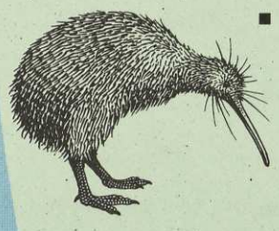

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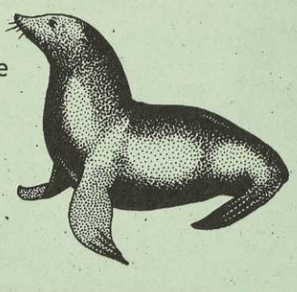

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