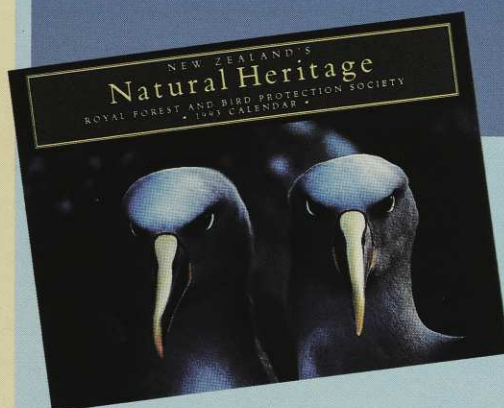


Volume 23 Number 2
May 1992

Forest & Bird



*Antarctica: safe at last? • Parengarenga paradise
helping the kokako • grazing in parks and reserves
the most threatened species • world's largest gecko • recycling*



Forest and Bird's 1993 Calendar

Our 1993 Calendar continues the outstanding quality of previous years, featuring local landscapes, plants and animals.

Buy now for friends and relatives overseas (within 200g postal rate).

Calendar will be available 1 August. Order now and don't be disappointed.

Retail price \$13.95. Special price to members **\$12** (includes post and packing).

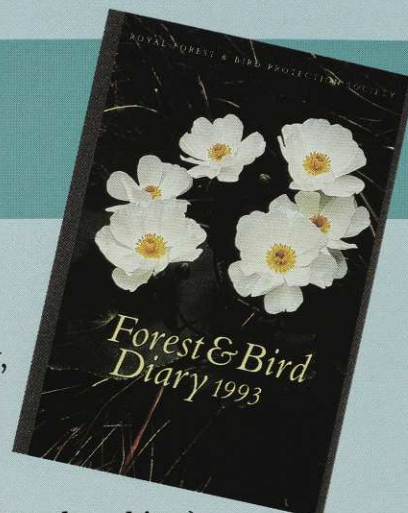
Forest and Bird's 1993 Desk Diary

Our annual much-sought-after diary includes:

- 54 images of NZ landscapes, plants and wildlife.
- NZ's finest nature photographers: Jim Harding, Kim Westerskov, Brian Enting, Andris Apse, Paddy Ryan, Brian Chudleigh.
- Plenty of space to write.
- Spiral bound to lie flat.

Retail price \$21.95. Special price to members **\$18** (includes post and packing).

Send your order with a cheque to Forest and Bird Mail Order, PO Box 631, Wellington.



What gift can you give to a child that's fun,
educational, doesn't need batteries
or doesn't break after
the first week?

There aren't many today, but a gift membership to the Kiwi Conservation Club is one. The KCC is a Forest and Bird initiative for children from 5 years upward that encourages them to take part in practical, positive conservation activities.

• Positive

With problems such as deforestation, global warming and the hole in the ozone layer, it's easy for children to become worried about the future of their planet.

Through the KCC they learn that by taking personal action they can make a difference.

• Active

All over New Zealand KCC members meet regularly to take part in walks to the coast and bush, replanting projects, and conservation activity days.

• Informative

Every KCC member receives a quarterly newsletter full of news, information and their own poems, pictures and letters about conservation.

Give a gift membership to the Kiwi Conservation Club and encourage today's young Kiwis to become tomorrow's conservationists.

Complete the membership insert in this journal and return it to:



Freepost 669, PO Box 631, Wellington.

Membership only \$10!

Family/Group/School membership \$20.

COVER

Emperor penguins with chicks at Cape Crozier on Ross Island in Antarctica. The emperor is the largest of all penguins and the only one to breed during the harsh Antarctic winter. The male penguins hold the eggs on their feet throughout the winter not eating until the young hatch and the females return from the sea.

KIM WESTERSKOV

Selling our birthrights

ONE OF THE SILLIER NONSENSSES of modern economists is the belief that things held in trust for the community, by the state, are always wasteful. The people who guide the Government in such areas appear to know the price of everything and the value of nothing.

So we have seen in recent years a rapid sale of state assets and a discarding of publicly owned utilities. In return New Zealand has received some small reduction in public debt, a freer trading environment and a lot of unemployment with its attendant social costs. Most of us agree that the old New Zealand could not continue without some rationalisation.

Still there remains a touching faith that market forces will solve all our problems. We now have in control of the public service a generation of economists who can have little regard for the enriching social environment of New Zealand; the history and values which make up the consciousness of being New Zealanders. That heritage includes the concept of setting aside reserves for the enjoyment of future generations and the protection of species from extinction. It includes the right to wander by water, the enjoyment of the sea coast, of access to the countryside. Having disposed of their statutory responsibilities for such hungry economic beasts as Think Big, the railways, telecommunications, and public broadcasting, the people who drive the new New Zealand have now moved into the environmental and social aspects of our lives.

In recent weeks Auckland has been threatened with the sale of its harbour, including potential wildlife reserves and recreation areas. In the far south people have had to fight to preserve the integrity of Lake Manapouri threatened with privatisation of the power station. The beech forests of the South Island have been put back on the chipping block, in part because free market forces demonstrate it is more expedient to chip them for Japan than it is to encourage small-scale local industries round the skirts of forests. What local industry could do for local communities is not a value taken into account by free marketers.

There are signs that the Government is occasionally prepared to exercise some control over public assets, in areas where they have given up funding and control but still retain the shares. Electricorp is one such company, which by its extensive investment in hydroelectric power generation has a traumatic impact on our waterways. Yet now the economic ayatollahs are suggesting that water itself be put up for auction. Conservationists would bid against polluters, power generators, processors and others for ownership of what is presently ours by right.

It is the ultimate stupidity to allow commercial trade in what has developed with our civilisation as people's rights – to common water, access to the countryside, and the conservation of the environment for future generations.

Forest and Bird is just one of the many community groups whose members keep alive the conscience and consciousness of New Zealand and its values. While stating the case for conservation we may also need to say, occasionally, that some of the proposals of our bureaucrats are silly, if not downright dangerous. Otherwise we could lose our environmental advances and sorely prejudice our future, simply for the sake of a fad of political fashion.

Gordon Ell

National President



The opinions of contributors to *Forest & Bird* are not necessarily those of the Royal Forest and Bird Protection Society.

Issue Number 264
May 1992
Volume 23 Number 2

Forest & Bird

CONTENTS

Articles

- 12 Antarctica
- 19 Parengarenga paradise
- 26 Kiwi capers
- 28 Kokako recovery
- 33 Grazing in the conservation estate
- 38 Which species are the most threatened?
- 43 Recycling
- 44 Kawekaweau – the largest gecko?

Departments

- 2 Conservation update
- 6 Worldwatch
- 10 Branching out
- 47 Book reviews
- 49 Bulletin
- 52 Officers and lodges



12



19



28



38

Forest & Bird is published quarterly by the Royal Forest and Bird Protection Society of New Zealand Inc.

The society's aims are to protect New Zealand's native species, natural ecosystems and landscapes and promote an appreciation of these.

The Royal Forest and Bird Protection Society is a member of the World Conservation Union (IUCN) and the International Council for Bird Preservation (ICBP).

ISSN 0015-7384

Editor: Ian Close

Design & Production: Creative Services Ltd
Photoprocess: Colourcraft Reprographics Ltd
Printing: Bascands, Christchurch

Advertising Manager: Jill Wood,
Print Advertising, PO Box 3016,
Wellington. (04) 801-6187.

Registered at PO Headquarters
Wellington as a magazine.

Royal Forest and Bird Protection Society
of New Zealand Inc.

Head Office: 172 Taranaki St, Wellington
Postal Address: PO Box 631, Wellington



Dolphin capture refused

CONSERVATION Minister Denis Marshall turned down an application in December from the Hawke's Bay Marineland for the capture of six common dolphins and a leopard seal.

The decision is significant as it is unlikely that permission to capture wild dolphins for display in New Zealand will ever be granted again. An important submission by Forest and Bird's Alan Tennyson helped argue the case against their capture.

Marineland is the only oceanarium in New Zealand displaying live dolphins. In turning down the application Mr Marshall said that Marineland was the only institution in the world to keep common dolphins, a species notoriously difficult to take into captivity and successfully acclimatise in an oceanarium.

Dolphins were first caught for display in Europe in the mid-19th century. From the 1930s they have been captured regularly for research purposes, while specialised dolphinariums first appeared in the 1950s, in the United States.

A large proportion of dolphins captured for display never make it to the oceanarium, but die during capture or in transit. Those that do survive are subject, in the lower-grade institutions, to poor hygiene, sanitation and feeding, and choking on objects thrown by spectators. Even in better equipped institutions they often don't adjust to life in captivity, suffering high stress and boredom. The complex environment and social life of existence in the wild cannot be replicated. Certainly the average life span of a captive marine mammal is significantly shorter than in



DAC COMMUNICATE NZ

A common dolphin goes through its routine at Marineland. With the capture of dolphins unlikely to be allowed again in New Zealand, "entertainment" of this nature will eventually be phased out.

the wild.

The main argument for dolphinariums is that they are educational, and develop in audiences a sense of respect for the animals that bolsters the efforts of conservationists to protect them in the wild. However, the educational value of captive animals is limited because they do not exhibit genuine natural behaviour in an artificial environment.

Many countries are now beginning to reassess the morality of keeping dolphins in captivity. In 1988 Victoria, Australia, passed laws prohibiting the capture and display of dolphins. In New South Wales all dolphinariums except one have been closed down. In the United Kingdom a report on standards in dolphinariums resulted in three quarters of them having to close rather than carry out necessary upgrading.

Dolphinariums still remain in many countries especially in Hong Kong, Taiwan, Japan and the United States, and wild dolphins, mainly bottlenose but occasionally rare species such as beluga,

continue to be captured for display. The sonar capabilities of trained dolphins are also used for military purposes such as the recovery of test torpedoes.

A hopeful sign of change, however, is the growing popularity of viewing marine mammals in their natural habitats. All over the world dolphin and whale-watching cruises allow people to experience these animals in their own environment.

Kakapo comeback?

THIS LAST YEAR has been one of mixed success in the fight to save the world's largest parrot from extinction. Six chicks hatched recently on Codfish Island but only three have survived.

Just over 50 kakapo are believed to exist and fewer than 16 of them are female. Their high vulnerability to introduced predators and competitors, coupled with a remarkably low natural reproductive rate have been the cause of the bird's decline. No natural population remains and virtually all re-

maining birds have, in the past decade, been relocated on Little Barrier, Maud or Codfish Islands.

The \$2-million six-year kakapo recovery programme began in 1989 as a partnership between the Department of Conservation and Forest and Bird, with funding from aluminium maker Comalco.

Last summer male kakapo on all three islands (all reserves managed by DoC) attained breeding condition and "boomed" intensely. On Codfish Island near Stewart Island, more than 20 bowl systems (male booming and courtship sites) were developed and used by the birds, indicating that most, if not all, of the 20 males released there since 1987 had survived and were in breeding condition. Booming, a characteristic male courtship display, was intense each night from late January until mid-March.

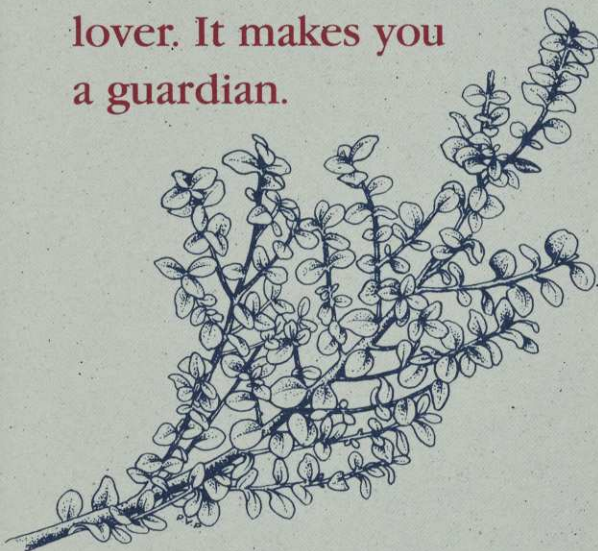
This was the first sustained booming on Codfish since the birds were released there. The booming and associated courtship displays were not in vain. At least 11 eggs were laid in four nests and six

JOIN US!

As a Forest and Bird member you help to protect scores of rare and endangered species.



That makes you more than a nature lover. It makes you a guardian.



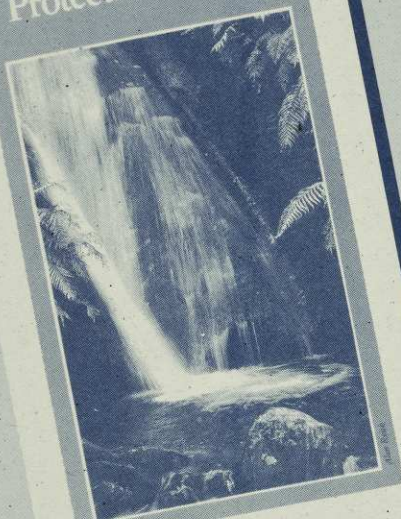
FOREST & BIRD

the luscious rain forest
the endless beaches
the searing deserts
the bustling cities
the silent mountains
the romantic islands

but
where can
I stay?



Royal Forest & Bird
Protection Society



Where there's a will...

If you have any questions about the many ways in which you can give a gift to last, we have the answers . . .

Because of the many enquiries we receive about the ways in which a bequest can be made, we have prepared an easy-to-read pamphlet *Where there's a will*.

Here are some of the questions it will answer . . .

- How do you ensure a bequest is inflation-proofed?
- How best can you ensure your wishes are fulfilled and that your beneficiaries are protected?
- Can you specify *exactly* how your gift should be used?

Write to us today for a free copy of *Where there's a will*.

The National Secretary,
Royal Forest & Bird Protection Society,
PO Box 631,
Wellington.



**the
friendly places
to stay**

*52 Hostels in New Zealand
plus another 5000 Hostels Worldwide*

>>>>SEE COUPON FOR DETAILS>>>>



chicks hatched in March and April – the first known to hatch on the island and the first to hatch without supplementary feeding since the recovery programme began.

Codfish is also occupied, however, by the kiore, or introduced Polynesian rat. Within a few days two kakapo chicks and two eggs were taken by kiore. The three remaining chicks were undernourished due to the failure of podocarp fruiting on the island and competition from kiore for food. The two weaker chicks have been taken for hand rearing to Auckland Zoo, and DoC is now reassessing its hands-off management practice on Codfish and the long-term problem of kiore.

On Little Barrier, at least ten of the 13 males and four

they were the first young known to survive anywhere since 1981 (see cover of *Forest & Bird* May 1991). Thus, supplementing the diets of free-ranging kakapo on Little Barrier has not only been effective in inducing breeding, but also in enhancing the frequency of breeding – a crucial factor in a species that might otherwise breed only at intervals of 4–5 years or more.

On Maud Island in Pelorus Sound where all five kakapo are being given supplementary food, the males boomed intensively for four months. However, although they interacted with the two females, no breeding took place.

Unfortunately stoats, a serious predator of kakapo eggs and young, have again reached Maud – having



JOHN HAWKINS/SOUTHLAND TIMES

Fourteen-day-old kakapo chick on Codfish Island awaiting airlift with Don Merton to Auckland Zoo. The chick was seriously undernourished but is progressing well at the zoo. Both chicks in Auckland will eventually be placed in the captive breeding programme on Maud Island.

of the nine females placed there in 1982 survive. Since no breeding was apparent by 1989 the supplementary-feeding of some females began. The technique brought immediate results – at least two females attempted to breed in early 1990 although no young survived. The following season (1991) four females nested, eight eggs were laid and two young survived. Not only were these the first to have been raised on Little Barrier, but

swum from the mainland some 900 m away – and are proving difficult to eradicate. Although they are not considered a major threat to adult kakapo, DoC proposes relocating at least some of the Maud Island birds on Mana Island off the Wellington coast. One male is to be placed on Mana this month to test the island's suitability.

Mana has recently been declared rodent-free after a successful mice-eradication campaign (see last issue of

Move for saddlebacks



STEVE BRONI

A saddleback is examined before being tagged and weighed during the recent transfer.

SOUTH ISLAND saddlebacks have been reintroduced to Fiordland after an absence of nearly one hundred years.

In March Department of Conservation teams stationed on the Big and Kundy Islands off southern Stewart Island caught 60 saddlebacks in mist nets. The birds were transferred by helicopter to Breaksea Island at the entrance to Fiordland's Breaksea Sound.

South Island saddlebacks came perilously close to extinction in 1964 when their last sanctuary, Big South Cape Island, off Stewart Island was invaded by ship rats. They were transferred to several small nearby muttonbirding islands, where an estimated 300 to 400 birds now live.

The introduction of the

saddlebacks to Breaksea Island is an important stage in the department's recovery plan which aims to build the population to 4,000 birds, distributed and breeding on widely located offshore islands.

Norway rats were successfully eradicated from 170-hectare Breaksea Island in 1988 to provide a sanctuary for saddlebacks and other endangered wildlife (see *Forest & Bird* February 1988).

The South Island saddleback is an endemic wattlebird related to the rare North Island saddleback, endangered kokako and extinct huia. It was once common throughout the South and Stewart Islands but declined rapidly from predation by introduced rodents, cats and mustelids.

Tim Higham

Forest & Bird). If Mana proves suitable for kakapo then other birds from Maud may be relocated there later this winter, but Maud will remain the centre for captive management of the species.

Don Merton, co-ordinator of DoC's kakapo recovery programme and long-time champion of the species is happy with recent progress. He believes that recent advances in our knowledge and understanding of the kakapo, as well as in our ability to

manage it amount to a major breakthrough. He is confident that averting extinction and bringing about recovery of this remarkable bird are now realistic and attainable goals.

A happy footnote: Don Merton was granted an honorary Doctor of Science degree by Massey University earlier this month in recognition of his contribution to endangered species management both within New Zealand and internationally.



Fur seals move north

A FUR SEAL breeding colony has been discovered at Cape Palliser on the southern tip of the North Island – the first time the species has bred on the North Island this century.

Fur seals have been a common sight around the cape for some years and have used it as a winter haul-out site, but this is the first confirmation they are breeding rather than just temporarily migrating.

The Department of Conservation said that 13 pups had been found in the area. A senior marine protection officer, Bruce Dix, said the find was good news. It indicated the species' population



ANDREW TREVALYAN

Two of the new pups from the Cape Palliser colony enjoy the sun.

was rising as well as reclaiming its former range.

Up to 500,000 fur seals prospered around New Zealand's coastline until commercial sealers ravaged the population during the 19th

century. Although they have been protected by law since 1875 the species is still only estimated to number 60,000.

Until about 15 years ago breeding colonies, or rookeries as they are known, were

limited to New Zealand's southern-most regions. But over recent years new rookeries have been found in the northern half of the South Island, and now in the North Island.

However, the good news about the colony had a tragic sequel. In March nine pups were found clubbed to death. DoC has asked for public help in finding those responsible. The seals are protected and killing them carries a fine of up to \$10,000. Wairarapa businesses have offered a sizeable reward for information leading to the prosecution of the culprits. This follows an incident in Otago where DoC and Forest and Bird offered a reward when a number of adult seals were killed in similar circumstances.

Coromandel possums

THE DEPARTMENT of Conservation wants to create a possum-free haven in the Coromandel. DoC is negotiating with local landowners at the top of the peninsula to put an electrified possum fence from coast to coast.

DoC's Waikato operations manager, John Gaukrodger, says that the project is significantly different from other possum control efforts. "The objective is to remove all possums from a mainland area rather than simply control populations to the lowest practical density," he said. If successful, it would be a major conservation feat.

The proposed fence is one component in a major programme to rid a part of the peninsula of possums. The northern end of the peninsula, particularly, contains forest relatively unmodified by possums including the Moehau range in Coromandel Forest Park which is



home to a number of endangered plants and animals. Such pristine areas are now rare on the mainland and DoC had up to 10 professional hunters systematically working through the north Coromandel forest with the aim of removing all possums from Cape Colville south to a line near Waikawau Bay.

Traps and dog teams, such as those used in the successful Codfish Island eradication campaign, have proven the

most effective method of control, and Gaukrodger said few, if any, possums had survived in areas already covered and checked. The Moehau team has combed 6,000 hectares since 1989 killing 4,000 possums. They keep careful daily records and identify hot spots for the second sweep through with the dogs.

The fence will be made of woven hexagonal mesh just under a metre in height, with

a timber base section dug into the ground. It will have strategically placed wire on outriggers to stop stock and wild pig pressure as well as to stop possums crossing. The design has been through extensive trials with wild-caught possums at the Ruakura Animal Research Centre.

John Gaukrodger said the value of the fence was that it would provide a physical barrier to the possums, in addition to the permanent trap lines and bait stations along the southern boundary of the area.

He said that the traps and bait stations, coupled with an intensively-trapped buffer zone to the south of the fence, should greatly reduce the probability of possums reaching the fence itself.

The department has been exploring a number of routes for the fence. It hopes to work cooperatively with local residents and landowners and to have the fence operating by the end of next summer.

Alarm over dwindling kereru

NEW ZEALAND'S native pigeon, the kereru or kukupa, could soon be extinct in Northland, jeopardising the ecology of many forests, according to Department of Conservation scientist Ray Pierce.

Dr Pierce, of Whangarei, has grave fears for the future of Northland's pigeons and says they could disappear within 40 years if action is not taken now.



NORTHERN ADVOCATE

Ray Pierce with a native pigeon nest from the Tangihua ranges. He found the broken egg on the ground near the nest. Teeth marks indicate it was eaten by a stoat.

Native pigeons are vital for the dispersal of seeds from the puriri, taraire, karaka and tawa which dominate most Northland forests and without them the forests would go into decline.

The bird's status is about to be "upgraded" to threatened, and Pierce says it's not a moment too soon.

He has studied 17 pigeon nests in Northland this summer and found that only five pairs managed to raise young. The others laid eggs but they did not hatch, largely because of predation by stoats and rats.

Native pigeons were common throughout New Zealand 40 years ago. Most people think they are still common, but Pierce says research tells a different story. He believes New Zealand is

heading for a second wave of species extinction. Robins, parakeets, yellowheads, kakariki and even kiwi are under threat, he says.

"These are birds which people think are common. But they're not anymore. Forty years ago there were hundreds of kaka in Waipoua forest too and now they are totally gone from Northland. It only took 40 years for them to become extinct and I believe we could be looking at the same time frame for kereru."

Pierce is particularly concerned about the pigeons because of their pivotal role in forest ecology.

"Since the disappearance of the moa they are the only birds which disperse seeds from the taraire and puriri. Without them the forest will be threatened."

Scientists are still in the process of collecting information on what is happening to the birds, but Pierce believes predation by stoats and rats and competition for food from possums are major factors. All adult birds should be able to breed successfully every season, but few manage to raise young.

There was evidence in many of the nests he studied that predators had eaten the eggs. He intends analysing a hair found on one nest to see what type of animal it came from.

Two of the five pairs which managed to raise young were nesting in trees which had metal sheets wrapped around their trunks to stop stoats and rats climbing them. There were also indications that birds nesting in urban areas had more success in raising young, possibly because dogs and cats controlled the number of tree-climbing predators. "One of the few successful nests had two cats and a rottweiler

Replanting a rare tussock



SOUTHLAND TIMES

Nick Torr examines endangered spiral tussock near the Mt Luxmore caves.

A REPLANTING and protection programme is giving an endangered Fiordland tussock a chance at survival.

Te Anau conservation officer Nick Torr said the spiral snow tussock, *Chionochloa spiralis*, was known from only three places – Takahe Valley in the Murchison Mountains, Lake Monk near Preservation Inlet in the far south of Fiordland, and Mount Luxmore near Te Anau (see *Forest & Bird* February 1990).

In Takahe Valley a few hundred tussocks grew on limestone ledges where deer could not reach. Little was known about those at Lake Monk.

On Mt Luxmore there was just one plant. Department of Conservation staff collected seed from this survivor and 50 seedlings were propagated at the department's Home Creek Nursery, near Manapouri.

Last year these were replanted on Mt Luxmore, near the parent plant.

Mr Torr revisited these

earlier this year. Most of the young tussocks had survived and he put plastic mesh covers over some to stop hares grazing them.

DoC hopes the planted area can be left open to the public which is near the main Luxmore cave, just a few minutes from Luxmore Hut on the Kepler Track. Information about the tussock and the replanting programme would be posted at the hut and at the planted area.

The Takahe Valley spiral snow tussock population seemed quite strong at present, though the plants appeared to be vulnerable to tramping and browsing by deer, Mr Torr said. Tillers (shoots) from one of the Takahe Valley plants had also been grown into small tussocks at the nursery, and staff hope to check on the Lake Monk population later this year.

The recovery programme was based on the research of DSIR botanist Dr Bill Lee, who wrote a report on the tussock in 1989.

camped at the base of the tree," said Pierce.

Dr Pierce intends to monitor adult birds for the next year by attaching radio transmitters to them. He hopes to build up a picture of what is happening to the birds so a rescue plan can be drawn

up and put in action. Northland is one of the main strongholds of the pigeon because of its abundant food supplies. "If we can't save them here we can't save them anywhere."

Source: Northern Advocate



Ivory ban to stay

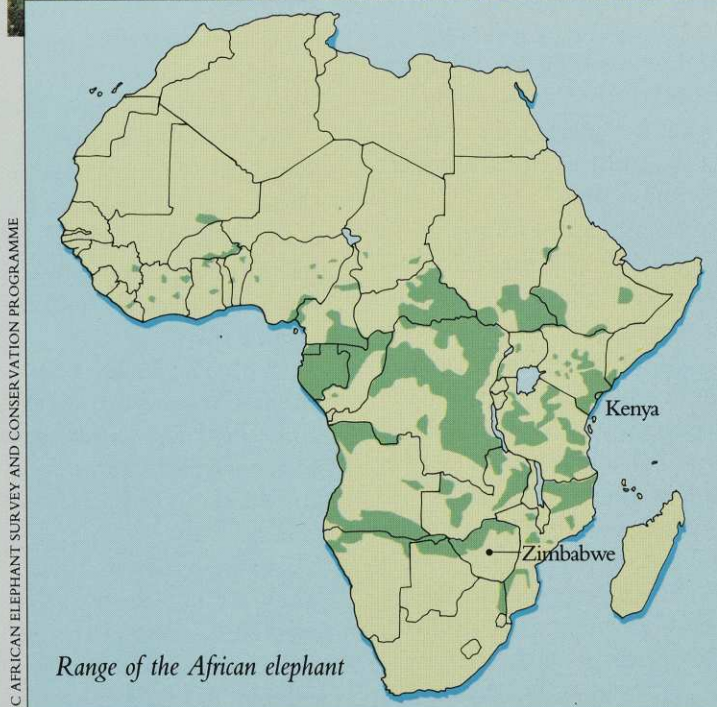
THE BAN on elephant ivory trading is to remain after a meeting of the Convention on International Trade in Endangered Species (CITES) held in Japan in March.

The ban was put in place in 1989 because of considerable evidence that African elephants had become an endangered species. The population had crashed in ten years by almost 50 percent to only about half a million, mainly due to the ivory trade.

The six states at the southern end of the African elephant's range – Zimbabwe, Botswana, Namibia, South Africa, Malawi and Zambia – argued for a lifting of the ban on the grounds that numbers had increased substantially in the last two years. They also claimed that the income from ivory was needed to manage their elephant reserves. The remainder of the 35 states with African elephant populations argued for the ban to stay.

The opponents of the ban have healthy stable elephant populations which are not seriously endangered. However in East, Central and West Africa, elephants have been grossly over-exploited and many local populations are still in danger of extinction. The rapid decline of these northern populations has slowed since the ban came into effect because demand has been reduced, the price of ivory has dropped by 95 percent and more money has been put into anti-poaching efforts. The worry about opening up even the southern populations to a controlled ivory trade is that demand will rise, the price will increase and poaching would inevitably start again in the northern populations.

Advocates of continuing the ban also pointed out the



financial value of elephants as a living resource. In Kenya an elephant is worth over \$14,000 in income from tourism for every year of its life, giving it a potential value of nearly \$900,000. The ivory from the tusks of that elephant would be worth only \$1,000 at the pre-ban price. In Kenya alone elephant-related tourism brings in almost \$200 million a year – more than 30 times what the entire continent made from dead elephants before the ban.

The major concern, after the vote to continue the ban, is that countries such as Zimbabwe, who in culling their herds have built up ivory stocks worth over \$30 million, will start selling the ivory despite the ban.

Source: *Oryx*, New Scientist

Rediscovery in South America

YET ANOTHER rediscovery from the rainforests of South America, emphasises just how little we know

In the ten years before the 1989 ivory ban, Africa lost half its elephants due to uncontrolled poaching and an illegal ivory trade.

about the world's disappearing wildlife. Kaempfer's Tody-tyrant *Idioptilon kaempferi* is one of the least known of the world's birds, having been described from just a single specimen in 1929. Three searches in the same locality in 1987 failed to find the bird.

Last year Mark Pearman rediscovered the species in humid lowland forest in Santa Catarina, southern Brazil, less than one kilometre from where the original specimen was taken.

The immediate forest where the bird was found is owned by the regional electrical company and thus has some degree of protection. The lower slopes of the mountains are secondary growth but, in general, the forest appeared in good condition. Logging trucks were noted in the nearby town of Villa Nova, however, and the area is clearly a potential forestry target.

Source: *International Council for Bird Preservation*

Siberian forests threatened

THE IMPACT of the breakup of the Soviet Union might generate environmental shock waves at least as great as those in the political sphere.

At threat are one of the world's great natural resources – the enormous conifer forests of Siberia. These forests cover over 3.7 million square kilometres, an area more than double that of the Amazon's rainforests. They contain more than half the world's conifers and a quarter of the world's wood.

The declining power of central Russian control, the devastated local economy and the pressing need for hard currency makes the exploitation of the timber difficult to resist. Loggers from Korea, Japan and Western nations are already hard at work.

The most cost-effective way to cut the trees is to fell everything within a given area, without attempts at forest management. This makes it much easier to remove the logs, but the consequent impoverishment and destabilisation of an already poor soil will also make it the quickest way to turn forest to desert.

Once cut, the trees are exported as whole logs or sawn into planks in local sawmills. Russian milling practices are hampered by old technology and are extremely wasteful.

The long-term consequences are all too familiar to those who have followed the destruction of tropical rainforests: erosion, the silting-up of rivers, the serious decline of fisheries and the destabilisation of the sustainable, subsistence economies of indigenous tribal groups.

Another concern is the release of the huge quantities

of carbon stored in the forests and the effect of this on global warming.

Wilderness going in New Caledonia?

IN A REPEAT of events occurring elsewhere in the Pacific, logging in New Caledonia's Ni valley will soon destroy one of the island's last kaori forests and possibly its most important wilderness areas.

New Caledonian kaori (*Agathis lanceolata*), closely related to New Zealand kauri, has already been severely reduced by felling. Stands in the Ni valley where logging has just started represent the finest remaining old-growth forests.

Until recently the remoteness of this valley and rugged terrain of the adjoining ranges north of Noumea has prevented mining and forestry, and limited the activity of hunters. The diverse dryland forests and marquis scrublands adapted to the mineral-laden (ultrabasic) soils of southern New Caledonia are highly endemic and extremely ancient.

A large number of animal species, especially birds, inhabit the region. Perhaps most notable is the endangered crow honeyeater for which these forests are one of the last refuges.

Few Ni valley kaoris have as yet been felled. However, construction of an access road to the head of the valley has already resulted in extensive environmental damage. Debris from the road has buried areas of forest and entered streams while fires have destroyed several hundred hectares of scrub and forest.

Given the low level of land use by Kanak people in the Ni valley and surrounding ranges, preservation of these forests would be less difficult



A mature kaori in the Ni valley. This tree has a girth of nearly nine metres.

than in other areas in New Caledonia and represents one of the few chances for conservation of a relatively unmodified wilderness area on the island.

Simon Bulman

Mitsubishi Man retires hurt

THE COMIC BOOK extolling Mitsubishi's role in tropical rainforest logging (see *Worldwatch* in the last issue) has been withdrawn from Japanese schools. The Japanese Education Ministry asked schools to remove the comic from its libraries on the

grounds that it was "public relations material for just one company".

The 216-page comic, which attributes the bulk of tropical deforestation to tribal slash-and-burn farming, has instead provoked scrutiny of Mitsubishi's dubious record of unsustainable logging in South-East Asian rainforests and its role as one of the world's largest importers of tropical timbers.

The book was to have been the first in a series introducing Japanese corporations to high-school students. Following the bad publicity the series has been abandoned.

SIMON BULMAN



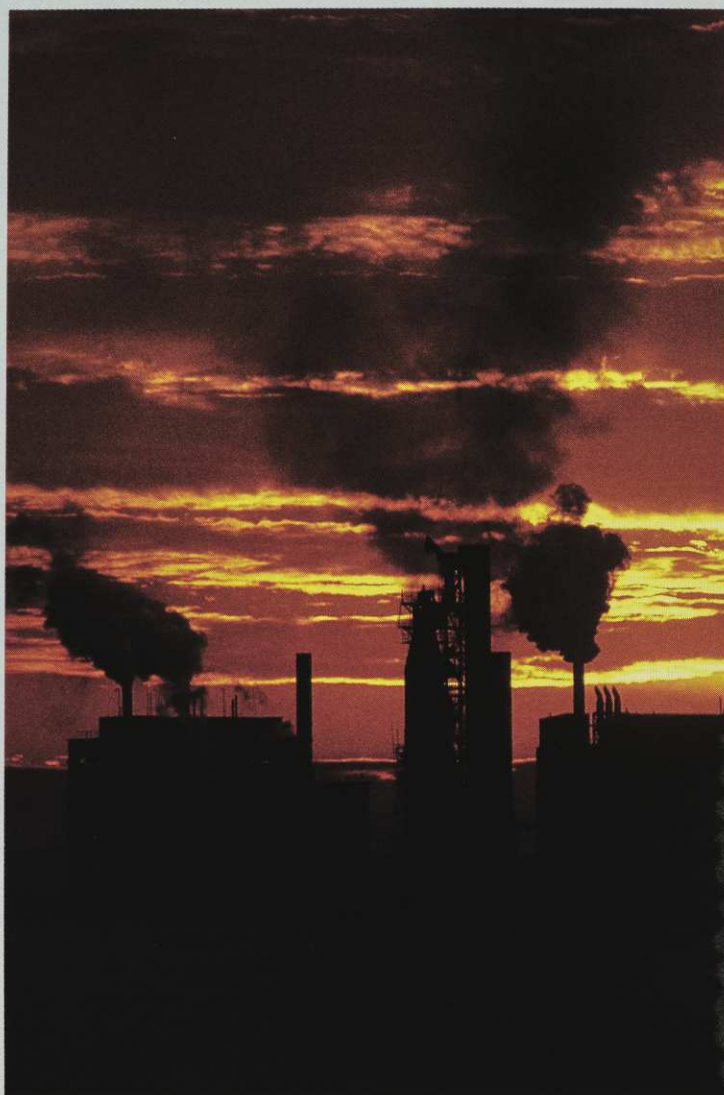
Rio: tough decisions or giant jamboree?

IT IS GOING to be the biggest conference on environmental issues ever held. For two weeks next month the largest gathering of world leaders ever, and 20,000 to 30,000 officials, lobbyists, observers, media reporters and assorted hangers-on will descend on Rio de Janeiro in the name of saving the planet. It is the so-called Earth Summit.

It started with the United Nations conference on the environment in Stockholm in 1972 and continued with the 1983 World Commission on Environment and Development – better known as the Brundtland commission. The Brundtland commission's report in 1987, *Our Common Future*, stimulated a lot of debate and some action. Governments began to accept that the major environmental problems were global. CFCs released in London contribute to an increase in melanomas in Auckland. Fossil fuels burnt in Christchurch contribute to the warming of Arctic tundra. Forest clearance in Amazonia leads to a rise in sea levels in the Maldives. Global problems require global solutions.

In the aftermath of the Brundtland report the United Nations General Assembly decided to convene an Earth Summit – more formerly known as the United Nations Conference on Environment and Development (UNCED). This is what is on in Rio in June.

UNCED has a fearsome list of issues which are looking for solutions: loss of biodiversity, global warming, deforestation and the promotion of sustainable development in the less developed countries to name a few. And



IVOR EARP-JONES/DAC COMMUNICATIONS NZ

An international agreement on a reduction in the emissions of greenhouse gases will be a major challenge for the Earth Summit.

that's before they tackle "Agenda 21", a comprehensive plan to transform the world's economy for the next century.

The work of UNCED lies not so much in the Rio extravaganza but in the lead-up process. This has already involved four major international meetings of government officials, non-government organisations and industry to refine the agenda and place concrete proposals before the summit. The most important of these finished last month in New York.

As part of this run-up to the summit there have been negotiations over two major conventions it is hoped will be signed at Rio.

The first of these is a con-

vention on climate change. While initially talk was of a comprehensive convention with substantial commitment to a reduction in CO₂ emissions, the latest plan has a bottom-line that all the developed nations will stabilise CO₂ levels by the year 2000. This is supported by all members of the OECD except the United States.

The US administration's general lack of interest in UNCED has threatened to make the whole process meaningless. President Bush refuses to be convinced, in an election year, about the reality of global warming. The United States' role as the world's major producer of greenhouse gases with 30 percent of all carbon dioxide

emissions has no doubt influenced his position. The US economy runs on cheap oil and protecting the climate of the planet takes a back seat. This is where the lowest common denominator factor undermines the attempts for a tough agreement. Kuwait and other oil producing countries have also obstructed the climate negotiations.

The second convention planned for Rio is on biodiversity. At one level it is an attempt by western nations to protect the biological heritage of the third world. The latter understandably want some trade off, such as cash grants or a slice of the growing biotechnology industry, before agreeing to any increased protection for their own natural environments.

A third convention on tropical forestry has been dropped because of total lack of agreement on even a framework for negotiation.

Another document under discussion is Agenda 21, an 800-page list of actions to be taken by the world's governments on issues of population, health, poverty, toxic waste, the atmosphere and desertification in the period leading into the next century. The wish-list so far has been costed at over \$1,000 billion. How much of this would be paid by the developed world is a major question. As UNCED Secretary General Maurice Strong points out, "very little of the saving of the world comes cheap or free".

New Zealand's position in the lead up to UNCED has been schizophrenic. We have taken a strong lead on greenhouse emissions with a commitment to cut CO₂ levels by 20 percent by the year 2000. We have also taken a strong international position on the protection of marine mammals and on the exploitation

of high-seas fisheries.

On the other hand, any initiative that might compromise our perceived international trading position is avoided. The problem is that the Ministry of External Relations and Trade is leading most of the delegations and controlling our input into the agenda while the Ministry for the Environment is the junior partner. MERT seems more interested in seeing the Earth Summit as a trade opportunity rather than a place to address the environmental crisis.

Also at Rio will be an alternative UNCED, organised by non-government organisations. They will discuss the need for an international tribunal that is not based on individual states, and an environmental Security Council.

If the Earth Summit is to work it will have to make hard decisions. As Maurice Strong says, it is "the lifestyles of the rich who make up such a small part of the global population that are one of the major risks to our common future – they are simply not sustainable". The summit, of course, will not be a solution itself. It is the processes which it will hopefully set in train which will be the test of whether human beings can confront the environmental nightmares we have created.

Ian Close

Ozone blues

A MEETING of scientists from 25 countries has concluded that the ozone layer will continue to decline at least as fast in the 1990s as in the previous decade. The UN-sponsored meeting held earlier this year in Switzerland was reviewing the first complete study of the ozone layer since 1986. The report found that:

- the ozone layer is declining in all latitudes outside the tropics; and
- the overall decline between the latitudes of 65° north and 65° south – most of the inhabited world – was 2.5 percent over the past decade.

The scientists opposed the use of hydro-chlorofluorocarbons (HCFCs), now being introduced as substitutes for CFCs. While only about one-tenth as dangerous as CFCs, HCFCs still pose a considerable threat to the ozone layer.

Then, in March, NASA scientists discovered the beginning of an ozone hole at high northern latitudes. The immediate culprit is thought to be the eruption last year of

The Pinatubo particles will also gradually make their way into the southern stratosphere. Dr Tom Clarkson from the New Zealand Meteorological Service says that the ozone depletion rate over New Zealand will accelerate over the next two years from 0.5 percent to perhaps 4 percent a year before dropping back again as the volcanic particles fall out of the sky.

The threats of increased ultra-violet radiation from a depleted ozone layer are not restricted to melanomas and cataracts in humans. Ultra-violet also damages plant DNA. Early spring, when ozone is at its most depleted and when plants are putting on new growth, is when they



MARK ROMAN

Mount Pinatubo in the Philippines. The eruption produced a high-altitude cloud of dust and acid droplets circulating in the northern hemisphere. This cloud is capable of accelerating the depletion of the ozone layer already burdened with synthetic compounds such as CFCs. Even cautious estimates suggest that a quarter to 40 percent of the ozone layer over Europe will be lost before it begins to repair itself with the onset of summer in June. This would be almost as bad as the 50 percent ozone loss now regularly recorded over Antarctica.

are at their most vulnerable. Studies on Antarctic plankton suggest that because UV radiation harms some species more than others the balance within ecosystems may be changed.

The US and European governments have now brought forward their phase-out dates for CFCs to 1995. New Zealand Environment Minister Rob Storey says that New Zealand will re-examine its timetable. No decisions have been made, however, to accelerate the phase out of HCFCs which, under the Montreal Protocol, can continue to be made until 2040.

Mexican headache

IN MEXICO CITY they don't count the number of high air-pollution days. Instead, they count those days when pollution levels are considered safe. Last year there were only 11.

On every other day of 1991 the 20 million inhabitants of the world's largest city breathed air considered dangerous by the World Health Organisation. Pollution is worst in the winter when thermal inversions trap toxic emissions, and the incidence of burning eyes, headaches and respiratory ailments sky-rockets.

The government of President Carlos Salinas has now embarked on an anti-pollution drive. The prospect of a North American free-trade agreement with the United States and Canada has given the government the political leverage to crack down on polluters. The largest oil refinery in the city and numerous other factories have been shut down for breaching emission standards. Public vehicles will be converted to natural gas and every vehicle will be kept off the streets for one day a week.

However, environmentalists fear that it is too little too late. Every day 2,000 people continue to move to a city where there are already over three million vehicles and 33,000 factories. These critics fear that once the free-trade agreement is in place the government will resume its cosy relationship with industry, and long-term plans to reduce Mexico City's horrendous pollution problems will be ignored. ♦



Forest and Bird is a member of the International Council for Bird Preservation and is the ICBP's delegate in the South Pacific.



Coromandel block protected

IN 1985 A GROUP of conservationists at Moehau community at the far north of Coromandel Peninsula decided to pool their resources to save their forests. They bought a Lands and Survey licence over 240 ha of low-land forest and shrubland, adjoining the Moehau Ecological Area and Cape Colville Farm Park, to prevent local farmers from clearing it during the Government's land allocation process. Forest and Bird's then northern field officer, Mark Bellingham, ensured that the Department of Con-



MARK BELLINGHAM

Trustees of the Coromandel block, the Mist Preservation Society, with DoC staff and Mark Bellingham at Moehau.

servation not Landcorp administered the licence.

In January this year the block's trustees, including Forest and Bird members,

agreed to protect the land as a private scenic reserve. This initiative will hopefully be an example to other private forest owners around

Moehau. The forest in this area is deer-free and also lies within DoC's proposed possum-free zone (see *Conservation Update*).

Marine reserve proposal for Muriwai

WEST AUCKLAND branch members have been hitting the beaches recently surveying local people to see what they think of the branch's proposal for a marine reserve at Muriwai. They have also undertaken a house-to-house questionnaire that revealed a high level of support for the proposal.

Branch Secretary Ken Catt said Muriwai has the potential to be as environmentally important as Leigh Marine Reserve because it is thought to have the same unique combination of plant, animal and seascape on the ocean floor. A scientist from Leigh has been commissioned to carry out preliminary underwater surveys which will help in defining the reserve boundaries.

Currently the proposal stretches over six kilometres of coastline including the Oaia Island's seal colony and a gannet sanctuary. However, this may change after further public consultation.

Letters call for timber ban



THE PRESS

Michael Inder from the Canterbury University Environment Council (standing) assists Makiko Yamamoto of Japan, Denis Burrow of Dunedin and Haley Wallace write letters supporting a ban on native timber exports.

CONCERN FOR the environment is global and that became very evident in Christchurch two months ago during a one-day stall at the arts centre. The wood-chipping threat to New Zealand's native forests resulted in 120 letters penned in several languages calling for a native timber export ban.

The stall was organised by the Canterbury University Environment Council and

Forest and Bird's North Canterbury branch after previous stalls had proved successful in getting letters of support for a Hooker's Sea Lion Marine Mammal Sanctuary. There were information displays and up to six letter-writers put pen to paper at the same time. The letters were presented to Gail McIntosh, National MP for the Lyttelton electorate, who delivered them to the Prime Minister.

Forest and Bird in Te Anau

CREATING marine reserves and stopping pollution are two campaigns a new group of Forest and Bird members are tackling in Te Anau.

The group was formed in mid-December after a meeting with southern field officer Sue Maturin and has put together a full programme of activities for the coming year.

Group member Simon Hayes said that the first meeting attracted a core committee of 12 and one of the first activities will be painting yellow fish over the drains in the town to highlight pollution problems. Further developing the Kiwi Conservation Club is another priority as the club already has over 40 children.

"We will also be seeking active support from other Forest and Bird branches when further marine reserves are nominated in Fiordland," said Simon.

Pingao planting in Horowhenua



School children from Foxton School planting pingao in the sand dunes at Waikawa Beach.

OVER THE PAST few years there has been an effort by Maori, conservation and other interest groups to re-establish pingao plant communities on sand dunes around the country. Pingao, the golden sand sedge, has declined markedly as sand dunes have been modified and stabilised. As part of the replanting effort, the Horowhenua branch applied to the Lotteries Board for funding in 1990 to build a shadehouse to propagate 2,000 plants for use on the

local beaches.

Problems arose in finding a suitable place to construct the shadehouse and, frustrated by the long delays, the branch decided to purchase the plants instead from a DoC nursery in Turangi.

In mid-December branch members and children from Foxton School planted over 1,800 pingao plants into the sand dunes at Waikawa Beach. The pingao was planted in a rabbit proof enclosure to protect the plants from browsing animals.

Rat eradication

THE RECENTLY formed Rotorua Island section (see *Branching Out* in the last issue) has claimed victory in its war against Norway rats on the island. Staff and patients at the island's Salvation Army Rehabilitation Centre took little over a month to virtually exterminate the rat population using 300 bait stations.

The rats had been destroying vegetation and eating lizards and bird eggs. Now native parrots are being released into the predator-free environment and tree planting is underway.



The Rotorua Island Salvation Army manager, Major Neville Stark, with two of the tubes used as bait stations against the rats.

Quarantine Island benefits from KCC



From left: Ben Knight, Ian Goodwin and James Goodwin building a stile to give access to the western end of Quarantine Island that is being revegetated with natives.

SITUATED IN the middle of Otago Harbour, 19-ha Quarantine Island has been getting attention recently from young conservationists in the Otago Kiwi Conservation Club. Since the club started they have had four weekend visits to the island working on a variety of activities including removing broom seedlings, track cutting and pricking out seedlings in the shadehouse.

The island is half farmland and half regenerating bush so the KCC plan to gradually revegetate further parts of the island with native plants. They have been assisting the resident caretaker who looks after the DoC-owned island. Another regular part of the weekends are beach clean-ups. Because the island is at the head of the harbour it attracts a lot of floating pollution.

Bird hide wins out

WHEN THE Coromandel branch decided to build a bird hide in the middle of Thames township it pitted them against miners and an unsympathetic council. Originally a "1990" project, a lengthy planning hearing saw the project delayed and costs mount up.

The proposal was for a hide to be built on the edge of Karaka Stream, 50 metres from a major new supermarket development, overlooking a shingle fan where hundreds of birds congregate. Three to four thousand South Island pied oyster catchers have been recorded at the site plus godwits, gulls, Caspian and white-fronted terns, shags and ducks.

However, when the branch applied for planning

permission, Heritage Mining Company opposed the application on the grounds that increased environmental interest in the area would prejudice their possible mining application over the adjacent sea bed. Branch committee member Keith Purnell had to present evidence at a council hearing and only recently was permission granted. The Thames/Coromandel District Council then billed the branch \$1,300 for their expenses but after pressure from Keith the bill was reduced to \$300.

Although some further funding is still needed the building has begun. Designed by DoC, it is big enough to hold a school class. The branch believes that this creative and positive project will be a great asset to the Thames district. ♦

Antarctica in winter. Fourteen million square kilometres – the last great wilderness on the planet.

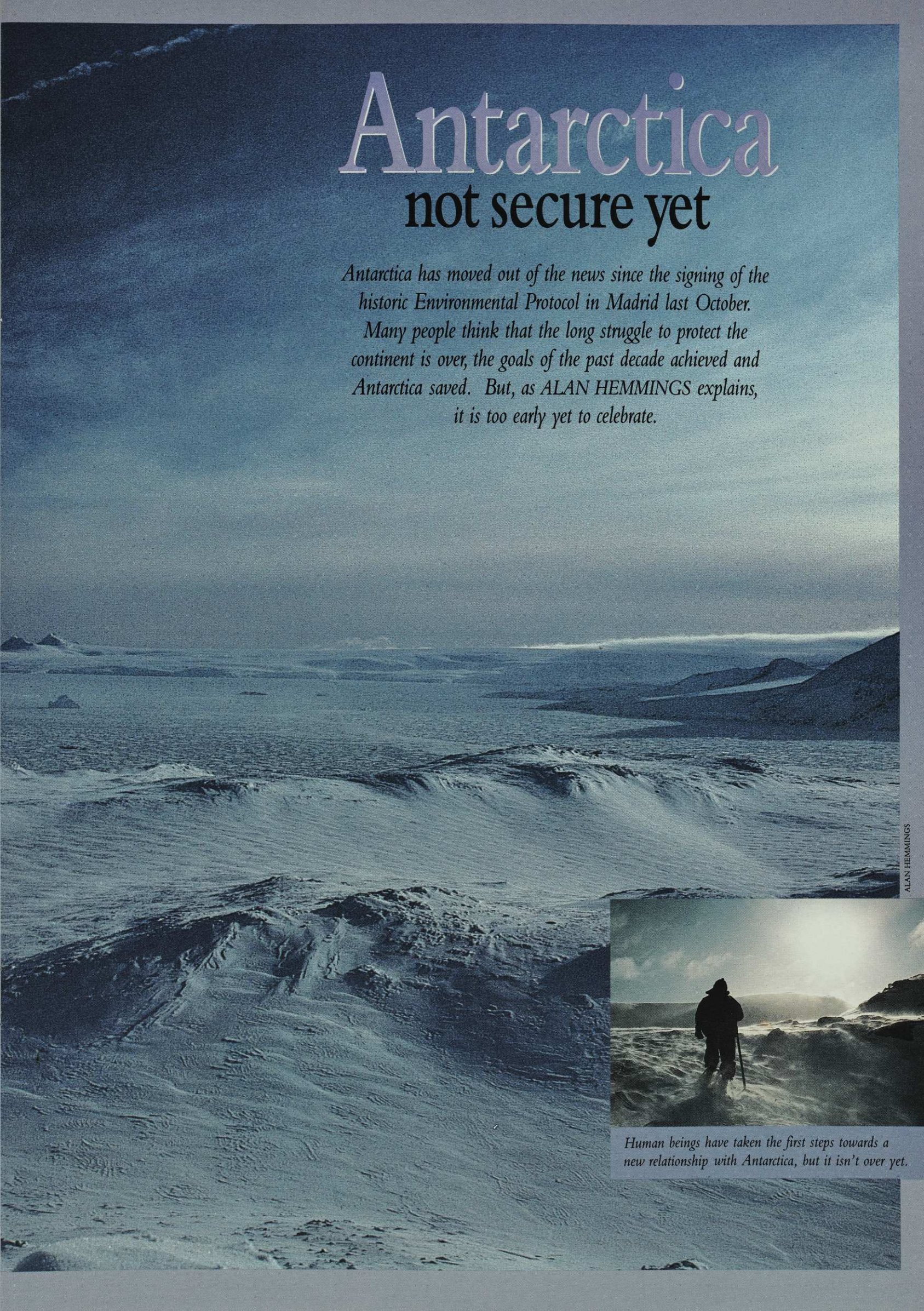


Antarctica

not secure yet

Antarctica has moved out of the news since the signing of the historic Environmental Protocol in Madrid last October.

Many people think that the long struggle to protect the continent is over, the goals of the past decade achieved and Antarctica saved. But, as ALAN HEMMINGS explains, it is too early yet to celebrate.



ALAN HEMMINGS



Human beings have taken the first steps towards a new relationship with Antarctica, but it isn't over yet.

WHILE THE Environmental Protocol is certainly an important step on the road to protecting the world's last continental wilderness, it is far from the end of the matter. It may be signed, but it is not even completed, far less a binding international agreement. Signing simply puts the protocol in the same position as the Minerals Convention back in 1988, when it too was signed. Its entry into force is not guaranteed.

For the protocol to become a binding international obligation it must be ratified by all 26 consultative parties to the Antarctic Treaty. That alone will take several years. Furthermore, we have not even started negotiation, let alone drafting, of rules on liability in the event of damage to the environment there. This is no minor issue. It took six years to negotiate, and a further two years to abandon, the Minerals Convention, yet the liability provisions in that regime were never completed.

The goal of protecting Antarctica as a World Park, sought by Forest and Bird and others in the international Antarctic and Southern Ocean Coalition, has not yet been attained. So why the complacency about Antarctica since October? A major factor is the hype surrounding the signing. For the states of the Antarctic Treaty system it was an important testimonial to their claim to be acting in an internationally responsible manner towards Antarctica in the lead up to UNCED next month. It also restored some appearance of cohesion within the Antarctic Treaty system after the fiasco of the original June signing ceremony, aborted when the United States refused to sign. And, for environmental organisations, buffeted by both recession and

tially cut the staff and resources available to its high-profile Antarctic campaign world-wide. Greenpeace's US magazine declared that "few environmental campaigns constitute as great and unequivocal a victory as the successful decade-long struggle to protect Antarctica." Whether intended or not, it read like a valedictory. Antarctica disappeared as a media issue.

THERE CAN BE little doubt that the protocol is a substantial advance on the Minerals Convention. Its 27 articles set out principles for the protection of Antarctica's environment, rather than its exploitation. Attached to the protocol are a number of technical annexes. At present there are five, dealing with environmental impact assessment, conservation of fauna and flora, waste disposal, marine pollution and protected areas. Further annexes can be added.

States commit themselves to comprehensive protection of the Antarctic environment and its dependent and associated ecosystems. Antarctica is designated a natural reserve, devoted to peace and science. Science remains the priority Antarctic activity, but all human activities must undergo prior environmental impact assessment. Mineral resource activities, other than scientific research, are specifically prohibited, for a minimum of 50 years. A Committee for Environmental Protection is established in an advisory role and the Antarctic Treaty Consultative Meeting (the decision-making forum) will now convene annually.



personnel burn-out, it could be seen as the light at the end of the tunnel. Everybody, it seems, wanted to project it as a victory.

Greenpeace, the most prominent group in the campaign, followed the protocol signing by announcing removal of its World Park station from Antarctica – although clearly the decision predated the signing. At the same time, it substan-



The Pointe Geologie archipelago shows dramatically the impact humans can have in Antarctica. The biggest island is given over to the sprawling French Dumont d'Urville station (inset) and five others have been levelled for an airport. Only four islands remain in their original state in one of the most biologically important (and beautiful) parts of Antarctica.

The Antarctic Peninsula. The coasts of Antarctica are the most dangerous in the world for shipping. Although the protocol now extends the international marine pollution convention known as MARPOL to Antarctica, it preserves the immunity that convention allows to ships owned or operated by governments. In Antarctica, virtually all ships are owned or operated by governments.

ALAN HEMMINGS

ALAN HEMMINGS



Adelie penguins float on the cleanest seas in the world. However, they still need the commitment of the world's environmental organisations.

The protocol has some weaknesses. It leaves individual states as the final judges of their own activities in most situations. Although the Committee for Environmental Protection may evolve into a stronger body, on paper at least it looks pretty weak. It is not the Antarctic environmental protection agency we had hoped for.

Once the protocol has entered into force it cannot, for all intents and purposes, be reviewed for 50 years. However, after 50 years any nation can call for a review conference to consider, for example, lifting the mining ban. The US insisted on weakening the review process agreed in Madrid in April 1991, which required agreement of *all* consultative parties before any modification to the protocol could occur. Now, if the 26 consultative states have not ratified a future mining regime within three years, a state can simply give two years' notice and walk out of the protocol. It can then mine in Antarctica outside any controls by the Antarctic Treaty system.

ALAN HEMMINGS

The Antarctic Treaty system

ANTARCTICA is controlled by the members of the Antarctic Treaty. This treaty, signed in 1959, came into force in 1961 and covers the area south of 60°S. It is usually credited with keeping the continent free of military and nuclear activities. It has also kept in check the issue of territorial claims.

Seven nations claim sovereignty over parts of the continent (see map). Some of the claims overlap. Neither the United States nor the Soviet Union has recognised the seven claims, but both have reserved the right to make their own claims (and there is no reason to suppose the breakup of the Soviet Union will alter this). The remaining 150 plus nations in the world do not recognise anybody as having a legitimate claim in Antarctica.

These conflicting positions are managed, under the treaty, through various devices, including consensus decision-making, free access to all parts of Antarctica and the fostering of science as the legitimate expression of national interest on the continent.

From the original 12 signatories in 1959, the membership has now climbed to around 40. There are two classes of membership. The top tier are the "consultative parties" – nations active in Antarctica which usually have a station there.

"Non-consultative parties" are states which have acceded to the treaty, but are not active in Antarctica – or states which have only just begun operations there, and will later become consultative parties. There

are currently about 26 consultative parties – the uncertainty relates to which of the states of the former Soviet Union will inherit its place – a "who's who" of the developed world and major developing nations. There are 13 non-consultative parties. New Zealand is one of the original 12 consultative parties.

Various subsidiary agreements have been added to the Antarctic Treaty. The expression "Antarctic Treaty system" has been coined to describe this developing body of agreements around the 1959 treaty. In addition to various "rules" agreed at Antarctic Treaty Consultative Meetings, major issues have been addressed through negotiation of conventions linked to the treaty. In this manner, the Antarctic nations agreed a Convention for the Conservation of Antarctic Seals and a Convention on the Conservation of Antarctic Marine Living Resources.

During the 1980s, a minerals convention was negotiated under New Zealand chairing. Opposed on environmental grounds, it was nevertheless signed in Wellington in 1988. Opposition continued and during 1989 it was abandoned by first France and Australia, then Italy, Belgium and (in 1990) by New Zealand. Its rejection by these countries and others prevented the convention entering into force. The past two years have seen the negotiation, in its place, of an Environmental Protocol to the Antarctic Treaty, which includes a prohibition on minerals activities.

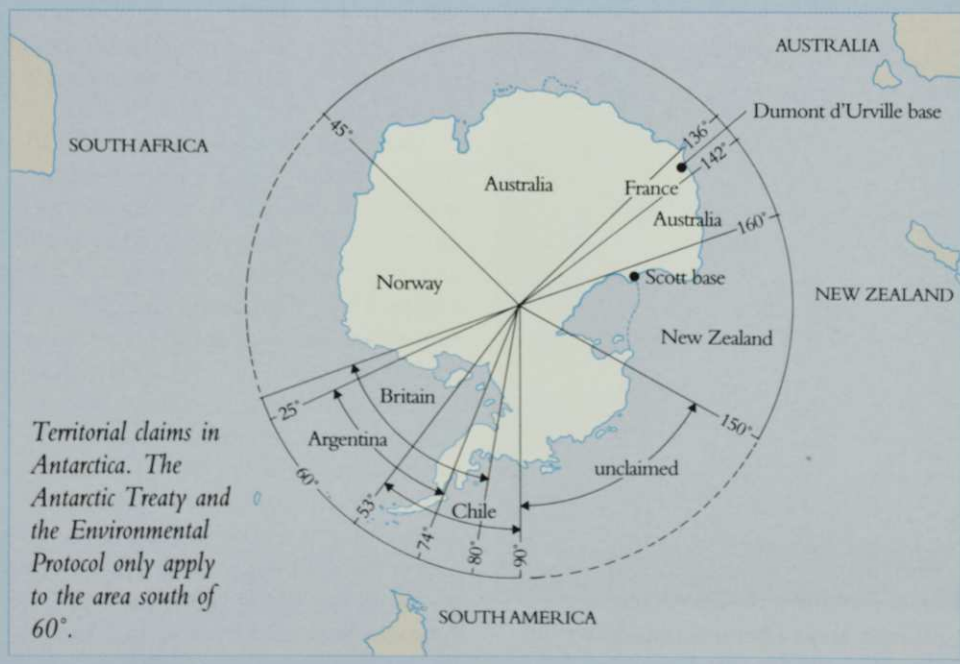
In practical terms this means that mining can occur in Antarctica 55 years after the entry into force of the protocol – with obviously serious environmental impacts. But the *possibility* of mining has more immediate implications too. It makes the ridiculous sovereignty claims in Antarctica far less resolvable and encourages states to continue staking their claims with more stations. Environmental protection and the quality of Antarctic research would have been better served by final resolution of the minerals issue. An unequivocal decision to prohibit Antarctic minerals exploitation in perpetuity would also have signalled a willingness to address the present unrestrained use of non-renewable resources worldwide.

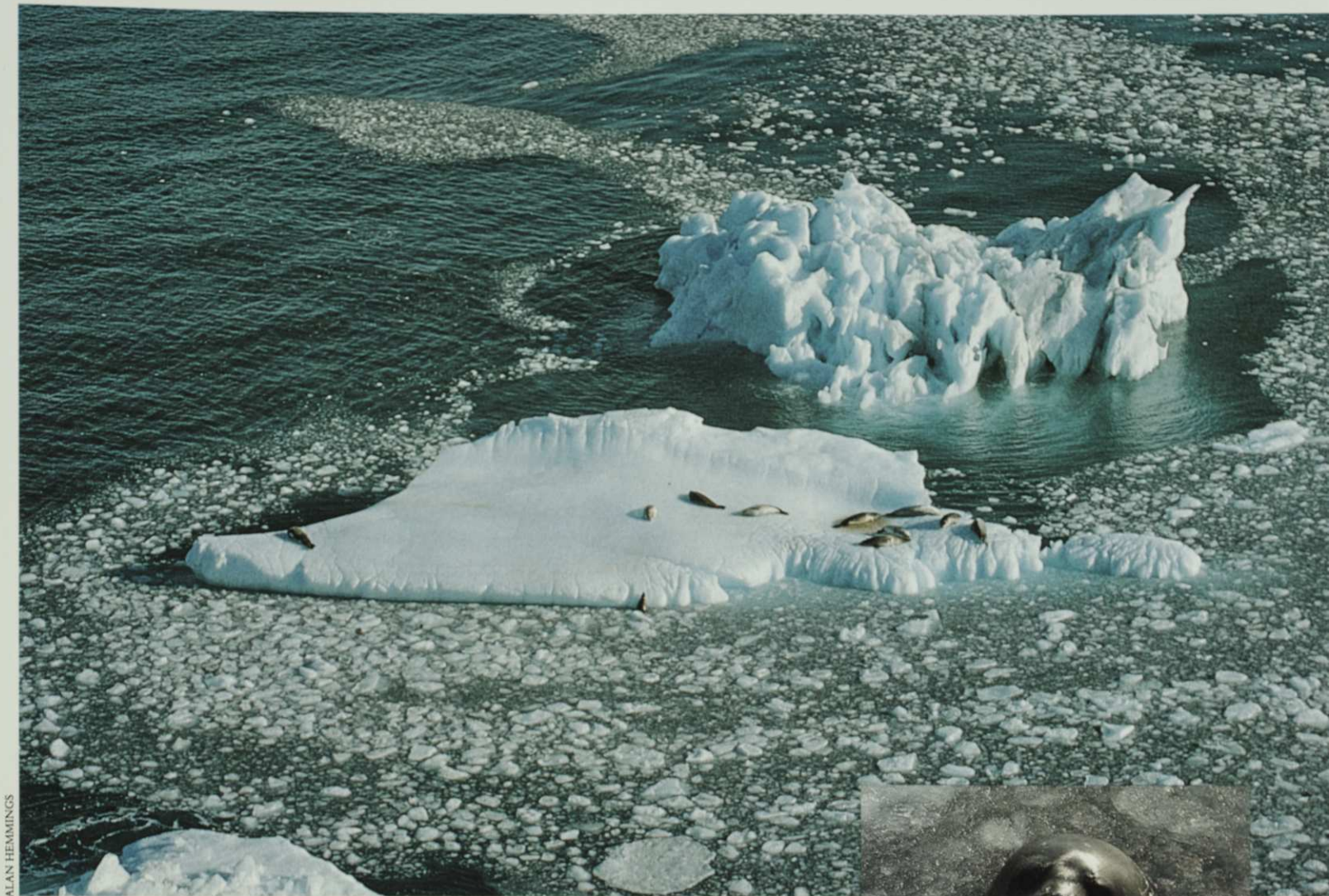
There are also omissions. As a protocol to the Antarctic Treaty, it applies to the same area as that treaty, the land and fast-ice areas south of 60°S. It does not have jurisdiction over the marine environment which supports the animals and plants of Antarctica. This is left to the Convention on the Conservation of Antarctic Marine Living Resources and the International Whaling Commission, neither of which have an impressive record. As Greenpeace film from Antarctica last summer shows, the serious issues of overfishing and continued whaling in Antarctic waters remain.

Deep seabed mining is not specifically dealt with under the protocol. Quite where the deep seabed begins and ends in Antarctica is a contentious issue. With deep-water drilling technology developing apace, the seas around Antarctica are becoming more accessible. The supposed prohibition on mining under the protocol will be meaningless if it does not apply to the sedimentary basins below the sea floor around the continent.

THE PROTOCOL is still not complete. The main body of the protocol includes reference to liability for damage caused by activities in Antarctica, but the rules and procedures are to be developed in a further annex.

The issue is complex, involving decisions about what level of damage triggers the provisions, who is liable, what form liability takes, the extent of the liability, whether it is absolute and unlimited or limited in some way, and what happens if the liable party is unable to meet its obligations. In practical terms, we should expect the provisions to act as a real incentive to avoid environmentally risky behaviour in Antarctica. If, nonetheless, damage is inflicted somebody must clean it up and restore the environment to its





ALAN HEMMINGS

Crabeater seals hauled out on a decaying iceberg. The 10-12 million crabeater seals (which feed directly on krill) are the largest population of large wild mammals left on earth.

previous condition. Should restoration not be possible there may be a case for financial or other penalties.

Decent liability provisions are the "teeth" of the new regime. No judicial system devoid of penalties would have any credibility. Similarly, until this element is built into the Environmental Protocol it is not worth the paper it is written on.

But it is not liability that officials and their governments want to tackle next. Remarkably, they are content to leave even discussion of what may be required until the next Treaty meeting in November.

Their perennial bogey is tourism, or perhaps it is non-governmental expeditions – they never quite seem to know. In New Zealand, environmental groups have argued for the past two years that the best way of addressing any impacts of tourism is through rigorous regulations applying to all human activities. Bear in mind that every environmental horror story that has come out of Antarctica has been due to government-supported expeditions, not tourists.

The protocol does apply to all activities, and provides the basis for regulating tourism. What we need now are not

further discriminatory rules for some visitors to Antarctica, but urgent work on the liability provisions and development of a strong Committee for Environmental Protection. These are the steps necessary to turn the protocol into something which really makes a difference in Antarctica. The protocol will not have legal effect until every consultative party has ratified it. This entails each state passing domestic legislation to make the protocol binding upon its own citizens. For some states – for example the United States, where the Senate must ratify any foreign treaty – this will take several years. The joker in the pack, unfortunately, remains the possibility that one or more states will decide not to ratify the protocol. What happens in regard to the states of the former Soviet Union is unclear. Even if Russia alone inherits the USSR's consultative party status, ratification of an Antarctic protocol may not have any great priority there at present.

In New Zealand, the process could be finished by the end of the year if the Government gives the legislation some priority. One way to expedite the process is to re-introduce the Protected Areas (Prohibition on Mining) Bill, drawn up by the previous Labour Government.



ALAN HEMMINGS

Weddell seals are the most "Antarctic" of all seals, giving birth on the fast ice in the winter. They maintain access holes in the ice with their teeth.

What you can do

THE TWO PRIORITIES for New Zealand in 1992 must be domestic ratification of the protocol and leadership in the negotiation of the Annex on Liability. Please write to your MP and to the Ministers of Conservation, Environment and External Relations or the Prime Minister, calling on them to support the passage of the Protected Areas Bill and to direct their officials to begin work on liability rules as a matter of urgency. The Antarctic and Southern Ocean Coalition, of which Forest and Bird is a member, also needs your financial support. Donations towards the costs of protecting Antarctica may be sent to ASOC(NZ), PO Box 11-057, Wellington.



ALAN HEMMINGS

The passing of an Antarctic icon. Huskies have largely been replaced by mechanised transport, and concerns about the introduction of diseases and the killing of seals to feed them, mean that the few remaining dogs must be removed by April 1994.

This sought to prohibit mining in both Antarctica and New Zealand's major conservation areas.

Although both the Minister of External Relations and the Minister of Conservation have said they would support its reintroduction, there has been no progress to date. The domestic mining provisions seem to alarm some in government. Since ratification requires New Zealand to prohibit mining in Antarctica

anyway in what it calls a New Zealand dependency (the Ross Dependency), it would seem somewhat incongruous not to do the same in the protected areas at home.

Although ensuring the protocol enters into force is important, it will only lead to a commitment on paper. There are numerous agreements, solemnly entered into, which we see flouted every day somewhere in the world. Indeed, Antarctica became an international issue, in part, precisely because the Antarctic Treaty states were breaching even their own rules. Ensuring that all this effort actually results in improved behaviour in Antarctica will be essential. This requires positive interpretation of the letter and spirit of the protocol, which like other parts of the Antarctic Treaty system has its share of deliberately ambiguous and woolly "obligations". New Zealand has an international responsibility, therefore, to establish strong precedents in the interpretation of the protocol and good models in its own Antarctic activities.

not completed, not in force, does not address all the problems and seems to have a fixed lifetime. This does not mean that it cannot become an important instrument for attaining that World Park, if properly completed, interpreted and complied with. Fifty years should also be long enough to establish a no-mining use of Antarctica as a norm, to be extended in perpetuity. But, that will not happen if we wait 49 years before we do anything more.

Antarctica is one part of the world where New Zealanders are particularly well placed to make a major contribution to an issue of international importance. It also offers a rare opportunity to safeguard the environment over a huge area, in a world where we are so often faced with a scramble to preserve just fragments. ♦



Alan Hemmings is Forest and Bird's newly appointed northern field officer. He has been a research fellow with the Antarctic Policy Group in Environmental Science at

the University of Auckland and a member of the Antarctic and Southern Ocean Coalition for the past four years. He spent two and a half years in Antarctica with the British Antarctic Survey.

HOW CLOSE ARE WE to a World Park? Right now the protocol falls far short of the expectations for such a park. It is

Go with the flow



It's early morning.

Perhaps you wish you'd left some of your gear at home, because your pack feels as if someone filled it with bricks. Boulder hopping is a nightmare.

Your pack behaves like a straightjacket and belongs in the garage.

The solution is obvious

Macpac's unique Dynamic harness lets the pack flow with your body, and not against it. The hip belt is centrally attached, so the pack pivots and flexes at the base of your back.

Get yourself a **Macpac** and free yourself for what is really important.

Enjoying the outdoors in unrivalled comfort.



Parengarenga Paradise



ALAN TENNYSON

THE PARENGARENGA'S waters flow crystal clear through narrow channels that open onto vast estuaries, brilliant white sand dunes, mangrove forests and shell banks. There are over twenty thousand birds there each summer and an amazing array of fish, sharks and rays in the water year round.

The Maori people, who own much of the land around the harbour, are clustered in just two areas. About 150 Ngati-kuri people live right on the harbour at Te Hapua and another 250 Te Aupouri people are gathered around Te Kao, just south of the harbour. They are known by the collective name of the Aupouri people.

The Parengarenga could be a "garden of Eden" but all is not well there. This magnificent harbour and its people are besieged by a variety of problems from within and without. But the most critical issue for the Aupouri people is their pri-

It's a place few New Zealanders have ever heard of and fewer have ever seen. The closest thing to a wilderness harbour left in the country. It's called the Parengarenga and it's a jewel in New Zealand's crown. For MARK FELDMAN this Northland harbour is an oasis of austere beauty, a wild and empty place in an overcrowded world.

mary food supply, the fishery. As jobs have disappeared from the privatised forests, and public benefits have declined, the Aupouri have had to look to the harbour for their food only to discover that the food is no longer there. Not long ago the Parengarenga was a cornucopia of seafood. There were year-

round supplies of trevally, kahawai, mullet, kingfish and snapper. In winter the numbers of kingfish might decline but the schools of trevally more than made up for it. In the summer enormous numbers of school sharks flooded the harbour and provided a plentiful supply of oil, hides and meat to be dried and traded with other tribes. There was no way anyone who lived on the harbour could go hungry. Even an unskilled fisherman could always catch a meal.

But all that has changed. The fishery has been damaged and the harbour depleted of its riches. Here's what's happened to some of the Aupouri people's fish.

The kahawai, a non-quota species, were plentiful in the harbour when the Quota Management System (QMS) was introduced in 1986. With the temporary reduction of quota for other species, the big companies, led by Sanfords, targeted schooling kahawai during the winter months. In just four years they killed



Looking south-west across the Parengarenga with Kokota Spit on the left. Ninety Mile Beach is in the far distance. The clear, clean water of the harbour gives rise to extensive eel grass beds. It is an area of very high biological productivity and therefore very important for fisheries and the huge wading bird population.

LLOYD HOMER/DSIR GEOLOGY & GEOPHYSICS



fifteen million. Although this fishing was south of the Hauraki Gulf it depleted kahawai populations right along the east coast. When the kahawai died the terns and shearwaters that depended on them to drive smaller fish to the surface also disappeared.

During this slaughter there were frequent outcries from recreational fishermen and concerned MAF scientists that things were out of control. But nothing was done. A catch limit of 6,500 tonnes was finally set in 1990 but this was way too high and the kahawai remain badly depleted.

Trevally gather in large surface schools and can be easily taken by purse seiners and trawlers. And that's just what happened in the 1970s. The east coast was fished especially hard and the pressure reduced the numbers of trevally migrating into the harbour during the winter. Since the QMS was introduced the trevally catch has continued to be too high to

permit a significant recovery of this long-lived species.

There has been a similar story with snapper. MAF spent tens of millions of dollars to compensate commercial snapper fishermen when the QMS was introduced in 1986. At that time a total allowable catch of 4,710 tonnes was established for the north-east coast.

Soon after the quotas were announced commercial fishermen started using the Quota Appeal Authority to regain some of their lost quota. Now the quota has increased to 6,000 tonnes, higher than the commercial catch before we paid all that money to introduce the QMS.

An increase in the price of snapper, corrupt fish wholesalers who also own boats and hold quota, and the growing use of gill nets has fuelled a black market in snapper that probably accounts for an additional 2,000 tonnes a

year. Fisheries enforcement by MAF in Northland is negligible. The result is that the snapper have continued their decline off Northland and snapper numbers in the Parengarenga have suffered even more.

Kingfish are New Zealand's most valuable tourist species but MAF has almost thrown the resource away. When quotas came in, kingfish were left without

protection and commercial fishermen found it easy to target them with floating long lines and gill nets. The numbers of kingfish in the Northland area went in to rapid decline. By 1989 the terrific summertime kingfish runs in Northland harbours, including Parengarenga, were just about gone.

The Minister for Fisheries and MAF could have prevented all these problems. Instead they have let things get worse. The solutions are simple:

- a reduction in the snapper quota to below its 1986 figure of 4,700 tonnes for the north-east coast.
- a ban on all gill nets in Northland with the exception of mullet and flounder nets in shallow estuaries.
- the elimination of all purse-seining for kahawai from the east coast of the North Island for at least five years until the kahawai recover.
- kingfish to be made a sport fish only. Possession or sale of kingfish by commercial fishermen should be illegal.
- a reduction in the trevally quota. This could be achieved by limited target fishing for the species as much of the trevally caught is a by-catch of the trawl snapper fishery. The rest is targeted by trawlers, purse seiners and gill nets.

retrieved with power winches caught large numbers of trevally, snapper and kahawai. By waiting until cover of darkness to do this illegal fishing the people responsible could be confident of not getting caught. With MAF enforcement 250 kilometres away in Whangarei and complacency rife among the local people there was nothing to fear.

There was one legal way for the Maori people to protect their harbour. This was the taiapure provision of the 1983 Maori Fisheries Act which could make it possible for the Aupouri people to manage the harbour themselves and to ban all commercial fishing until they felt the harbour had recovered. But the taiapure process is very slow and paved with paperwork. There was no time for that. In 1991 the people of the Parengarenga decided to act.

At first there were reports of locals shooting at the illegal boats. Then definitive action was taken and some burned-out car bodies were strategically dumped in the channels so the drag nets couldn't be used.

But that wasn't enough. Finally the Aupouri people put a gate up on the Paua road, blocking all access by vehicle to the Paua wharf and the informal camp ground nearby. Recreational fishermen



Kokota Spit on the right is Maori land and is the largest area of dunes containing entirely native plant communities in New Zealand. Ngatehe Point is on the left. ACI dredges sand for glassmaking from the main channel.



A school shark is released after tagging. The sharks are tagged to find out more about their life cycles and migration patterns.

- a ban on commercial fishing in all Northland harbours with the possible exception of controlled mullet and flounder fishing in less populated areas.

Not all the damage to Parengarenga's fishery has come from government and bureaucratic inaction. For the past ten years nasty things have been happening within the harbour as well.

By illegally laying gill nets completely across the narrow channels of the harbour commercial fishermen were able to capture entire schools of shark in a single night. Nets dragged along the sandy, smooth bottom of the harbour and then

and campers who wanted to enjoy the beauty of Parengarenga were able to get a key. But the commercial fishermen who had been operating illegally could not. The Aupouri people had made their stand. They were going to protect their harbour and its resources.

EACH DECEMBER, for as long as anyone can remember, the school sharks have come into Parengarenga Harbour. They'd come and go in waves, venturing right up over the mud flats at high tide to warm

their bodies in the summer sun. People once thought that they came in to have their young but this appears not to be the case. While the sharks are in the harbour they are all pregnant, but with eggs that have embryos many months away from being born. No males ever seem to venture into the harbour.

With so many sharks in such a confined space they made an easy target for commercial fishermen using long lines or gill nets. During the early eighties huge numbers of sharks were taken from the harbour, sometimes by obstructing the narrow channels with gill nets and capturing an entire school. In the mornings the fishermen would clean the sharks for hours, throwing the waste into the harbour and stacking the bodies like cordwood on the deck of the boat. It was a pretty grim scene and made a hell of a mess.

When the QMS was introduced, the average school shark catch was reduced by 40 percent. Since then the Quota Appeal Authority has authorised another 100 tonnes of quota, increasing the total



ERIC TAYLOR/DAC COMMUNICATE NZ

to 70 percent of the pre-QMS catch. We have a good idea how many tonnes are caught inshore but much of the deep-water shark catch goes unreported. The total is clearly too much. Even the original 1986 quota was higher than scientists felt was sustainable.

Ironically, the older school sharks are not even safe to eat. Because they live a long time they accumulate large amounts of mercury in their tissues. This mercury is toxic to humans; so toxic that it is not safe for an adult to eat older school sharks more than once every two weeks. And pregnant women and children shouldn't eat them at all.

Yet the killing and selling goes on. This is especially tragic because sharks don't lay hundreds of thousands of eggs per year like finfish. They have a few young every two to three years and that's it. It takes them a decade to reach reproductive age and they live at least 45 years. If shark populations are hit too hard by over-fishing they cannot bounce back in five or ten years.

Now there is even a greater danger to our shark populations. Our fishermen are becoming more aware of the great value of shark fins in Asia. Businesses have developed in New Zealand to process these fins for export. The value of the fins can make it worthwhile to catch the sharks,

take their fins and throw the dying bodies back. This process is called "finning" and has been going on world-wide.

School sharks, unfortunately, are also an unavoidable by-catch of our coastal and offshore trawl fishery. They are also caught in large numbers on long lines that target hapuka and groper. This by-catch of school sharks may well be equal to a safe quota with no allowance left to permit additional target fishing. It's certainly ridiculous to allow commercial fishermen to selectively catch additional large numbers of pregnant, mature females in the Parengarenga and harbours like it. Harbour fishing for sharks clearly must stop.

To inhibit the development of a black market in fins the sale of shark fins by fishermen should be made illegal as well. All fins should be passed on by wholesalers after the bodies are processed and all sharks landed with fins attached.

THE PURE WHITE silica sand dunes of Parengarenga Harbour have attracted more than the tourist's eye over the years. Once every month a tug and two barges leave Auckland to mine the sand for the ACI New Zealand Glass Manufacturers Company.

Three thousand tonnes of the sand is

pumped into each barge as a slurry and deposited on the deck. As the water runs back into the sea it carries with it the smaller sand particles. Most of this material settles out but some is carried into the harbour and deposited around the Shell Banks and Dog Island. At the same time there seems to be a growing defect in the foreshore of the Kokota Spit, where the sand is mined.

Measurements of the dunes over the sixty years the mining has been going on reveal no definitive trend but because the dunes are constantly moving no one can be sure that the hundreds of thousands of tonnes that have been removed are being naturally replaced.

The Maori argue that the spit is being eroded, that fine sand is being deposited inside the harbour, and that if the spit is breached because of the erosion the harbour's interior would be forever altered.

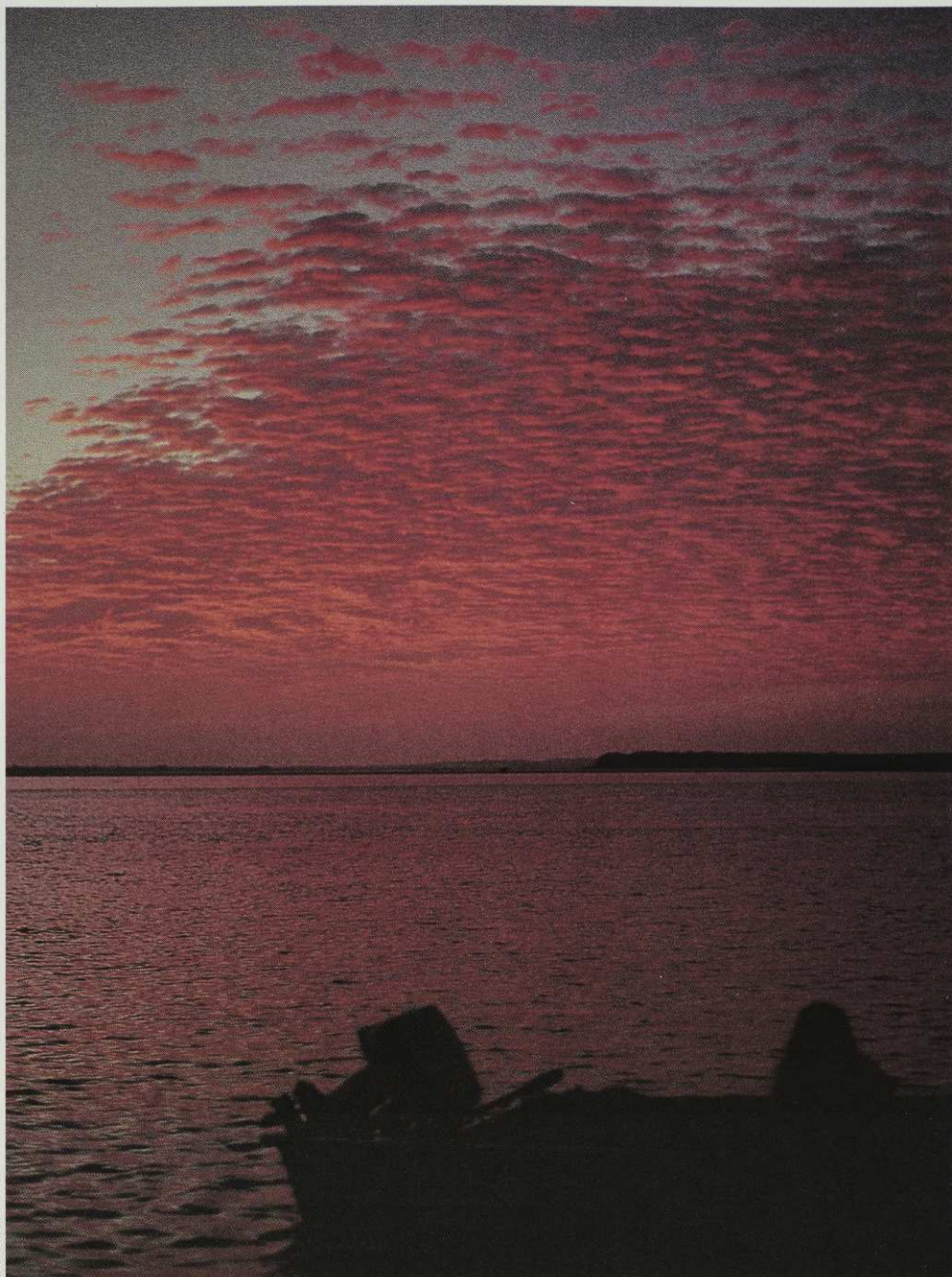
But can it be stopped? ACI is the last glass making industry in New Zealand and already recycles more than a third of all the used glass in this country. Coloured glass can be most easily made from recycled material but clear glass requires a higher percentage of pure ingredients – the sort of uncontaminated silica sand found at Parengarenga.

ACI's lease on the Parengarenga dunes is due to expire in 2011. At that time a

choice will have to be made by the Ministry of Commerce whether to cancel the lease or continue to take chances with the future of the harbour. It will not be an easy decision.

MORE THAN 20,000 wading birds live at Parengarenga in the summer. New Zealand dotterels, variable oyster catchers, Caspian terns and reef herons are some of the threatened species that use the harbour, but there are many other species there. The bulk of them are Arctic breeders such as godwits and knots, and these other birds, especially the godwits, have always been a part of the diet of the Aupouri people. Before the Maori had shotguns they made nets out of flax to capture the birds for food. Many species were taken but the impact was not great because there were so many birds and so few people.

Today there are fewer birds and more efficient hunters using shotguns. The guns target the godwits more effectively but are also more wasteful, wounding many birds that escape and die later. Between the dangers of their life in Asia and the hunting in the Parengarenga, the godwits are under considerable pressure. Wading birds that form dense roosting flocks have always been very vulnerable to shooting. Worldwide, similar migrating waders that were once abundant, such as the Eskimo curlew and slender-billed curlew, are on the verge of extinction because of overhunting.



MARK FELDMAN

Sunrise, and the Parengarenga appears a place of timeless tranquillity.



MARK FELDMAN

Another threat to the wild sanctity of the Parengarenga. Before and after. . . a barge which never made it over the dangerous Parengarenga bar and has been left as a local eye-sore.

THERE IS a huge demand for top quality oysters world-wide. The world's main producers are Korea, Japan, France, China and the United States, but the water quality in all these countries is suffering and so is their oyster crop.

Northland, with its clean-water image and abundant intertidal areas is in a position to expand its one-percent market share. But oyster farms, like every other form of aquaculture, are no "free lunch".

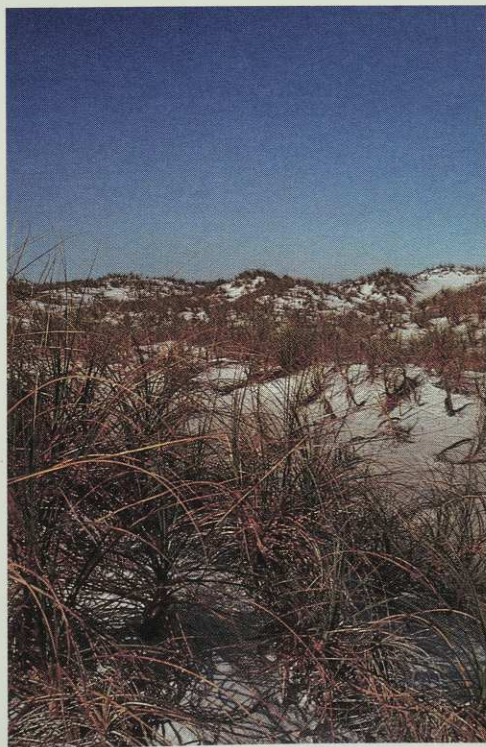
Oyster farms have some significant environmental impacts: they increase siltation, are unsightly, decrease available habitat for birds and can result in garbage piles of old wood and shell fragments. Some of these problems can be solved by better management techniques such as growing the oysters in netlon bags rather than on wood boards, and requiring the owners to put up a bond to ensure the area is cleaned up after the harvest.

Two oyster farms are operating at Parengarenga, and local people have plans



ROD MORRIS / DOC

▲ Caspian terns are one of the threatened species of birds that breeds each summer at the Parengarenga. Their nests are usually shallow unlined hollows in the sand near high-tide mark.



ALAN TENNISON

Pingao on Kokota Spit. Te Hapua, home of the Aupouri community, is one of the major pingao weaving centres in the country.

for expansion over other areas of this harbour, and Houhora and Rangaunu harbours further south. In 1986 the Department of Conservation (with assistance from MAF, the Health Department and Forest and Bird) identified areas suitable for marine farms and areas of conflict with conservation values. If properly situated, oyster farms would have little conflict with potential recreational activities and would bring some employment to the Aupouri.

THE AUPOURI people are in a unique position to plan the future of their harbour and avoid the mistakes that have been made elsewhere. They have a low population density, lots of land and a harbour that could, once again, be a rich resource. By choosing their activities carefully, moving slowly, and planning ahead they can preserve the beauty of their home and still profit financially.

A low-intensity tourist industry based on camping, guided recreational fishing, bush tours, bird-watching and boat tours, a subsistence fishery, moderate numbers of oyster leases, low-impact farming tech-

niques, and restricted motel developments will bring the most financial gain with the least environmental damage.

But the lure of quick profits without adequate planning is a threat to future generations. Allowing a hodgepodge of old caravans, buildings and sheds to proliferate around the harbour will quickly destroy its beauty. Hunting makes the shore birds timid and unavailable for a tourist industry. Commercial fishing by pakeha or Maori will deplete the food supplies of the Aupouri people. Extensive oyster farms could destroy bird life and water quality.

There are many mistakes that others have made before. There is no need to make them again. The Aupouri people are custodians of a magnificent harbour. I wish them luck in the future. ❖

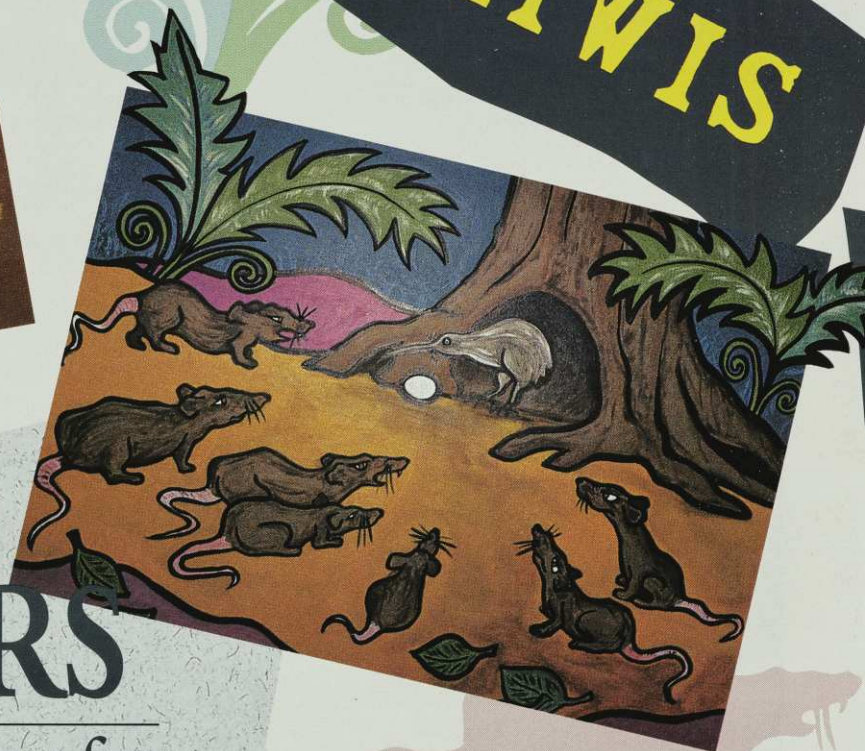


Mark Feldman is an American doctor with additional degrees in biology and zoology. He has held over thirty world and New Zealand fishing records and writes regularly about fishing and fisheries conservation.

WHAT

ARE

KIWIS



KIWI CAPERS

making the conservation message fun

Last summer over 100,000 people visited a kiwi exhibition at the Auckland Museum. Called the Kiwi Kids Activity Centre, the display showed children that kiwi are in trouble, they can be helped, and that conservation can be enjoyable. CATHY BARR from Forest and Bird's Auckland office explains how it happened.

LATE LAST YEAR a five-year recovery programme for the kiwi was set in train. Launched by the Department of Conservation in partnership with Forest and Bird and sponsored by the Bank of New Zealand (see *Forest & Bird* November 1991), the kiwi recovery plan is designed to promote research and action which will ensure the survival in the wild of this country's national symbol.

To help spread the message for kiwi conservation, a major educational display on kiwi was created at the Auckland Institute and Museum. The display was part of the museum's summer promotion on the New Zealand ratites – that ancient flightless family of birds which includes the kiwi and moa.

Forest and Bird was approached by the museum and asked to assist with informa-

tion for an interactive children's display. The centre was designed by Jenny Rattenbury, a volunteer at Forest and Bird's Auckland office, and built by volunteers and children from Point Chevalier Primary School.

The display emphasised the features that distinguish the three species of kiwi from other birds – coarse feathers, inability to fly and nostrils at the end of the beak. Having been shown why the kiwi is special, visitors were then told of the dangers which threaten the survival of this bird and how they can be overcome. Using colourful displays, storytelling, games, drawing competitions and a tunnel to crawl through to discover the bush at night, children were told of the problems facing kiwi today.

One of the reasons for the success of the display was that, unlike many traditional museum exhibitions, children were encouraged to be involved, not just to

look and listen. They could touch and take part in some of the exhibits. They were asked to draw pictures of kiwi in trouble, to stroke a kiwi and feel its coarse feathers, and to play the kiwi version of snakes and ladders.

Children also acted as guides during the exhibition – a first for the museum. These "kiwi kids" from Forest and Bird's Kiwi Conservation Club and Point Chevalier School were first given training sessions. The young guides dressed in kiwi costumes helped to break down the formality of the museum environment. Visiting children did not feel that they were in a classroom being taught by an adult.

Public response was enthusiastic and museum staff are keen to see similar exhibitions on natural conservation themes in the future. The display was successful not only for the high number of visitors, but also for the degree to which it raised children's awareness of a major conservation issue. As a result of this reception,

AFRAID



OF ?



Perhaps the best thing about the display for many children was the large snakes and ladders game in which the snakes were threats to kiwis (dogs, rats, fire and cars) and ladders ways in which kiwis can be helped (keeping dogs on a leash, keeping an eye out for kiwi while driving in the bush at night, planting a tree or not setting gin traps).

Forest and Bird are adapting the display so that it can be moved around the country. The activity centre will be set up at the Northland Regional Museum in Whangarei during the May school holidays, and will move down the country over the following months. ❖



Left: Particularly popular was a 10-metre-long crawl-through tunnel that recreated the sights and sounds of the forest floor at night. Centre: The exhibition got the visitors involved. Here children examine the coarse, shaggy feathers of a kiwi and its small wings. Right: The displays, games and drawing competitions were put together by volunteers and children from a local school with the help of museum staff.



KOKAKO RECOVERY

THE PLIGHT of the North Island kokako (*Callaeas cinerea wilsoni*) first received wide-spread attention in the late seventies when Rod Hay began his pioneering research sponsored by Forest and Bird. The results showed clearly that the main reasons for kokako decline (and the decline of other specialised endemic species) were loss of forest habitat through logging, and competition and predation from introduced mammals.

In the late 1970s and early 1980s the protection of New Zealand's native forests was the main focus of conservation activity. As a bird dependent on the integrity of the forests the kokako became a symbol of this movement. The swing of public sentiment against logging, powerfully demonstrated by letter-writing campaigns and tree-top protests in the important kokako forest of Pureora, finally saw a reduction in the destruction of indigenous forests. When Crown-owned forests were transferred to the Department of Conservation in 1987, logging stopped on these lands. On private land a breakthrough was achieved in the Tasman Accord, in which Tasman

Forestry agreed to protect its native forests. This example from the largest forestry company paved the way for the New Zealand Forest Accord in 1991 negotiated between Forest and Bird and the forestry industry, so ending the era of wholesale native forest destruction for pine plantations.

But though the kokako's forests were largely saved, the birds continued to decline. The knotty problem remained of introduced mammals – the predatory rats, stoats and wild cats, and the possums, goats and deer which compete with the kokako for food and degrade its forest home. In 1985 help came from an unexpected quarter to the kokako forests of the King Country. Bovine tuberculosis had been spreading through the possum population in the western Taupo area towards the Waikato dairy herds, so the Ministry of Agriculture initiated a poisoning campaign to reduce possum numbers. Concerns about the possible effect of the 1080 poison on kokako resulted in a four-year programme which monitored kokako in Pureora forest during poison drops. During six poison operations only one of 83 kokako was reported missing, presumed poisoned. This small loss was

offset by the huge benefit to the kokako as their forest and food source recovered from the effects of possum browsing.

By the end of the 1980s it was evident that new advances in kokako management were needed, because on-going work was beginning to raise some crucial questions. Are kokako continuing to decline in the large forest tracts such as Puketi, Pureora, Mamaku Plateau and Te Urewera National Park? What are the exact effects of predators and browsers on kokako? Is management really helping kokako at all?

In June 1988 fifty people attended the Kokako Research and Management Workshop in Rotorua. The enthusiastic team of biologists, managers and conservationists discussed the most critical work needed to save kokako. A group of specialists was chosen to develop a recovery plan. Both the group and the plan evolved over the next few years, and the recovery plan was finally approved by the New Zealand Conservation Authority

*Female kokako with a chick in the nest in the ►
Coromandel Range. The chick's pink wattles
which develop a week after birth will turn
to lilac at fledging.*

◀ The North Island kokako is the only member of the ancient New Zealand wattle bird family still surviving on the mainland. Of its relatives, the huia is extinct, the South Island kokako is presumed extinct and the saddleback survives only on predator-free islands.

and the Department of Conservation late last year. The committee overseeing the administration of the plan includes representatives from Forest and Bird and the Forest Research Institute.

The aim of the recovery plan is:

- to protect key populations of kokako. These are populations which will contribute most significantly to the species' survival
- to carry out research that will help to understand the bird's complex ecology and habitat
- to evaluate current management techniques for kokako
- to use techniques such as island transfers and captive breeding to conserve remnant populations.

WHILE IT MIGHT seem obvious that predators and browsers are causing kokako to decline, the evidence is largely circumstantial. Kokako nests are notoriously hard to find. No one can say with certainty that kokako are declining because they aren't trying to nest (which would suggest that browsers are limiting food so therefore the birds can't get enough nourishment for reproduction), or that kokako are breeding but eggs, chicks, or adult birds are being killed by stoats, rats or other predators. Is one more important than the other?

Work at Rotoehu forest by John Innes (Forest Research Institute Rotorua), Paul Jansen (DoC Rotorua) and others will help answer these questions. Radio transmitters are being attached to adult birds, allowing workers to spy on the birds' nesting attempts (see *Forest & Bird* May 1990). In the first year, only one of five pairs attempted to breed – and the eggs in that nest were destroyed by an unknown predator. In the summer of 1990-91

twelve pairs did their best and made 16 attempts at producing clutches. Young kokako survived from just two nests and rats were usually responsible for the loss of the others. This summer only one nest was successful despite eight nest attempts.

Another objective is to develop the management methods which will allow kokako to keep on producing enough offspring to maintain populations. The task is very complex. Browsers and predators can switch roles, and management techniques can have unexpected effects. Browsing animals like possums may dip into a kokako nest for a quick feed. Poisons such as 1080, which target possums, are very effective against predatory rats. When rat is taken off the menu, a hungry stoat may increase the number of birds in its diet. Kokako do not cooperate either, and many frustrating hours can be spent tracking elusive parents and their offspring.

It takes highly motivated people to carry out the job of controlling goats, possums, mustelids and rodents in the

The decline of the North Island kokako encapsulates the problems of wildlife conservation in New Zealand. This bird, of ancient lineage and haunting tone, is the only species of the endemic wattle bird family still living on the mainland. GRETCHEN RASCH looks at the recovery programme for the kokako's dwindling mainland populations.



research-by-management areas. The "gamekeeper" approach suggested ten years ago by Rod Hay is being used at Mapara, where Philip Bradfield looks after the 1,300-ha reserve. He is assisted by Te Kuiti and Hamilton DoC staff, and this summer they recorded three successful nestings.

Sponsorship from Tasman Forestry through the Threatened Species Trust, administered by Forest and Bird, supports a similar project at Kaharoa, where Hazel Speed is reporting promising results. Last summer she found six pairs of kokako and two nests successfully reared chicks. This summer there were ten pairs of kokako,

and young fledged from three nests. While the increase in successful nesting is encouraging, the increase in kokako pairs may be even more significant. It suggests that forest territories which previously only supported a single kokako may now provide food for a pair, because the forest is rejuvenating after the removal of goats and possums.

HARD DECISIONS must be made today when conservation resources are limited. There are 29 discrete populations of kokako, and not every population can be

intensively managed. Choices must be made as to which populations are more important, and the chosen populations where management may be most effective are Pureora, Mamaku (including Kaharoa), Urewera, Rotoehu, Mapara, Puketi, Little Barrier, Great Barrier and the Hunuas.

Kokako surveys and research have concentrated on the central North Island forests and, only last summer, new surveys found an unexpectedly large number of kokako in the Ureweras. Nearly 300 were recorded in the Waimana valley area, suggesting a major population exists in this remote, rugged wilderness.

Kokako recovery: for whom and at what cost?

DR JOHN CRAIG, a zoologist from Auckland University, has questioned the effectiveness of a mainland kokako recovery programme. He argues that the money could be better spent on offshore island programmes. Although Forest and Bird supports the mainland programme we believe it is important to canvass other views on this issue.

MUCH RARE species work is based on a belief that organisms have measurable habitat requirements. Researchers document the ways animals and plants currently use their environment and use this as a guide to the habitat needs of that organism. However, this approach has a number of important problems.

Firstly there is an assumption that animals and plants are optimally adapted to the environment we find them in and that they will not do as well or better anywhere else. It also assumes that present day habitat is the same as past habitat. Another problem is in the assumption that what organisms do is determined by genetics; that behaviour is fixed and hence they cannot learn to do other things. How likely are these aspects true for kokako?

Kokako are described in the recovery plan as birds that inhabit forests, especially tall forests, that maintain large territories and have a low breeding rate. Hence to manage kokako one needs a large area and tall forests.

But the historic distribution of kokako covered many forest types and in prehistoric times included vast areas of shublands. It is now known that the birds appear to feed heavily on shrubs and therefore they may do better on an island with regenerating shrubs than in an older tall forest.

If possum and other browsers have depleted the present habitat of kokako then wouldn't we expect them to use much larger areas and have greatly reduced breeding output?

The example of the saddleback, the other surviving wattle bird, is informative. Saddleback were also considered to be a bird of tall forests and to have an equally low breeding rate when they were restricted to Hen Island. When put on Cuvier Island with its regenerating shrub layers, saddleback laid larger clutch sizes, more than one clutch per year and lived in very small territories. When finally put onto Tiritiri, which had been considered unsuitable because of a minimal area of mature forest (less than 20 ha), some saddleback more than doubled their breeding rate compared to the already increased rate seen on Cuvier. How do we know that kokako won't respond similarly?

Kokako were present on Motutapu Island (1,500 ha) within the last 500 years and could probably survive on islands as small as 150 ha (early naturalists record them on islands of this size) with far less management than is currently needed on the mainland. Given the statement by the Recovery Group that many of the existing populations are probably doomed, and therefore birds from these populations may be available for transfer, shouldn't a greater range of options be considered for kokako recovery including islands that have open public access?

Another issue is cost. Given the urgency and seriousness of the conservation problems in New Zealand, which has as many rare taxa as the mainland United States, serious consideration of each programme's cost effectiveness is needed.

The present cost of mammal control in mainland areas is often much higher than the cost of eradicating mammals from an island of similar size. Furthermore, mainland control must be repeated whereas the island eradication option is permanent. Current plans to eradicate mammals from Rangitoto and Motutapu Islands offer the potential to do more for kokako and rare species management than any of the existing programmes for kokako on the mainland. It will cost less, allow the return of kokako to part of their former range and provide access for more people to their natural heritage.

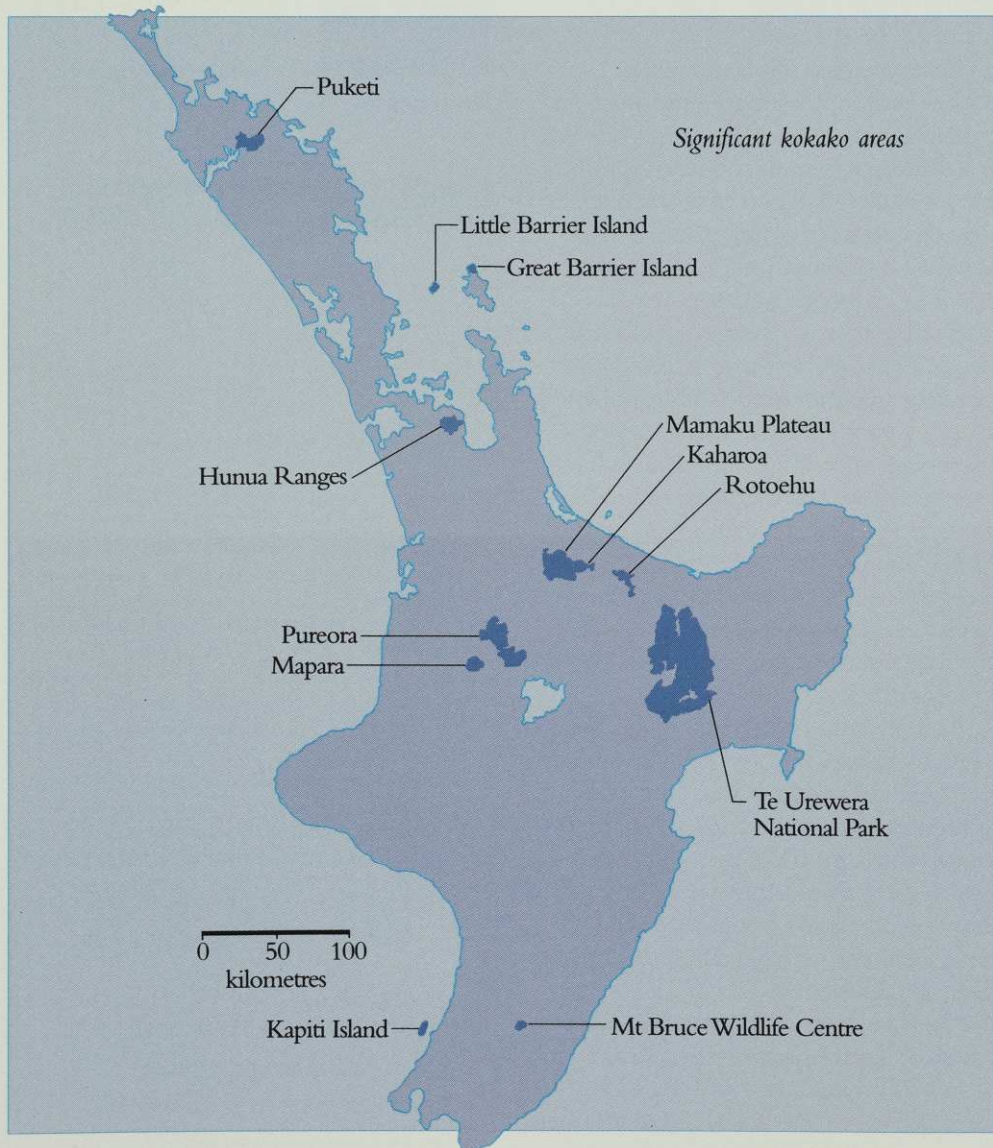
In early years of recovery programmes when there is a high priority on building up numbers of individuals the cost of producing young should be considered. Rough calculations suggest that the cost of some mainland young in species such as kokako and takahe are considerably greater than the cost per bird of island-reared young.

The research on kokako has given an excellent data base on the flexibility of kokako behaviour. The first three years of the programmes of "research by management" have also provided necessary information on the relative costs and benefits of different island and mainland options. For the benefit of kokako, isn't it timely to stop, publicly evaluate all the existing information and with the help of people with a wider range of financial and advocacy expertise produce an updated plan?

Doing more doesn't mean more of the same.



Hazel Speed, member of the recovery group, setting a stoat trap in Kaharoa forest. Stoats are a predator of kokako nests, but how significant they are in the decline in kokako numbers is one of the questions the recovery group wants to answer.



But what will happen to the other kokako populations scattered around the North Island? Without management, and even with management, they are probably doomed. Their best chance and most useful role may be if they are transferred to an offshore island, or taken into captivity.

A decade ago when logging was at its height in the Bay of Plenty, 34 birds were rescued before the forests were clearfelled and burnt. They were taken to Little Barrier Island where they have thrived, and today island-bred birds outnumber the immigrants.

Kapiti is the next most suitable island for kokako. This summer five birds from the west Waitomo forests were captured and taken to Kapiti. Over the next five years fifteen pairs will hopefully be established on the island.

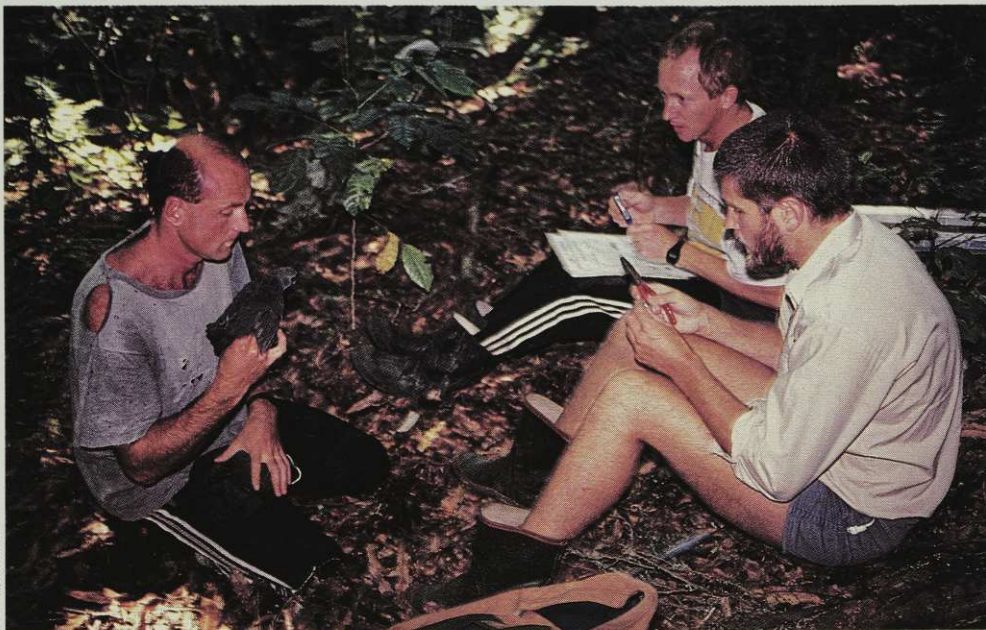
The South Island kokako

IF THE NORTH ISLAND kokako has problems, they are nothing compared to those of the southern subspecies (*Callaeas cinerea cinerea*).

One hundred years ago this bird, which is mainly distinguished from its northern cousin by its orange rather than blue wattles, was abundant throughout the South Island. Facing the same pressures of predation and habitat modification as its northern counterpart the bird declined rapidly in numbers during this century and many scientists have considered it extinct for the last 30 years.

However, there have been enough unconfirmed sightings over that period from areas as widespread as Stewart Island, Nelson Lakes, north-west Nelson, Wakatipu Forest and Fiordland to keep alive the hope that this secretive bird survives in dense remote forests (see *Forest & Bird* May 1989).

A feather found on Stewart Island in 1987 is the best evidence to date that the southern kokako is holding on. It was confirmed only last year after microscopic analysis at the University of Amsterdam that the feather did indeed belong to the South Island kokako and that it had come from a recently living bird. The chances of survival of this subspecies, however, must be considered pretty slim while the threats of stoat predation and competition from browsers for food continue.



Kokako banding in Rotoehu forest. From left, Kerry Brown, John Innes and Paul Jansen. Radio transmitters are attached to adult birds so that their nesting activities can be followed. The transmitters are short-lived and designed to fall off within a few months.

Other lone birds or pairs may be taken into captivity at Mt Bruce Wildlife Centre. They will form the basis of a captive breeding population, another insurance against extinction and a source of study.

ISLANDS FREE of introduced mammals are havens for endangered native birds, and these island populations are an insurance against extinction. Compared with the relative ease of island security, mainland management of

kokako is difficult, time-consuming and expensive, and there is no guarantee it will save the birds from extinction in the longer term.

So is it worthwhile? Why not take the easy option, save money, and rest on the laurels of Little Barrier and Kapiti Islands? Some scientists favour that option (see page 30) but Paul Jansen vigorously champions the recovery plan and its mainland programme.

Until the research is done, the doomsayers' opinions are premature and unwarranted, he says. He points out that at Kaharoa, where introduced mammals are controlled, kokako have increased to ten pairs with six young produced last summer, a significant increase over the previous summer's numbers.

Gerry McSweeney, former director of Forest and Bird, also argues strongly for mainland programmes. "Offshore islands usually have their own, often unique, assemblage of animals and plants which may be threatened by the introduction of 'foreign' species like kokako", he says. "They also provide little opportunity for ordinary people to participate in the conservation programmes or to benefit from viewing threatened or endangered species in accessible locations."

As the results of the various studies come in, it may become apparent that management need not be comprehensive or regular. Perhaps control of key predators, in those fruitful years when kokako food is most abundant, may be enough to allow breeding and population stability. New technology may make pest control easier and cheaper.

Island sanctuaries too are vulnerable. Catastrophes may occur. Fire, storm or rat invasion could overturn the island harmony overnight. Even if disaster does

not strike, this territorial species will need management to ensure its long-term survival on an island of only 3,000 hectares. There had been no kokako on Little Barrier Island for thousands of years, suggesting the island may be too small for them to survive naturally over a long period. Kapiti Island, at 2,000 hectares, is even smaller.

The position of the kokako recovery group is clear – don't put all your eggs in the basket of island sanctuaries. Their philosophy is optimistic. They believe that, with good management, the North Island kokako will recover from its century-long decline.

A depressingly large number of New Zealand's threatened birds are now restricted to offshore islands, inaccessible and invisible to most people. Against the odds the kokako survives on the North Island. For the sake of the birds themselves, their part in the forest ecosystem, and the people of New Zealand, let us try and keep them here.

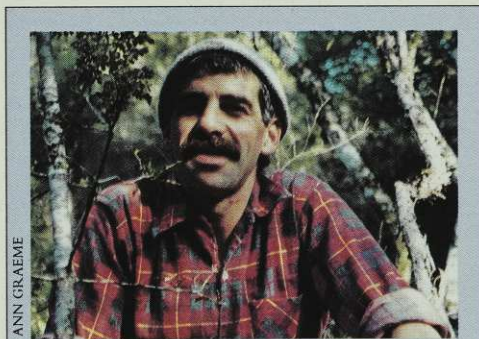
Acknowledgements

Thanks to Ann Graeme for additional information. ♦



Gretchen Rasch has been involved with kokako since 1985. She works in the Threatened Species Unit of DoC and is the author of the kokako recovery plan.

She is currently based in Te Anau.



On his farm north of Rotorua, Forest and Bird member Winston Fleming has placed a covenant on 30 hectares of native bush adjoining the Kaharoa forest. Kaharoa is the site of a kokako research programme sponsored by Tasman Forestry.

Since the bush was fenced to keep out grazing stock, the understorey has flourished and a pair of kokako have taken up residence. Winston calls his venture the Kiwi Outback Experience and guides visitors through the forest or provides billy tea and venison at his bush hut where guests can enjoy the bird song at dusk. Prospective visitors can contact Winston on (07) 332-3629.

S.E. AUSTRALIA WILDLIFE & BIRDING TOUR

\$3270.00 per person

27 Sept - 11 Oct 1992

HIGHLIGHTS OF THIS FULLY GUIDED TOUR

Sydney, Canberra, Melbourne, opals, Snowy Mountains, Aboriginal culture, Bushrangers, Eastern Grey Kangaroo, Red-necked Wallaby, Sugar Glider, Bush-tailed Possum, Common Dolphin, Koala, Platypus, Swamp Wallaby, Wombat, Lyrebird, New-holland Honeyeater, White Cockatoo, Crimson Rosella, Rainbow Lorikeet, Yellow-tailed Black Cockatoo, Australian Raven plus over 200 other species of birds.

Ralph Levinson at Travelworks has been setting up special interest tours since 1977. In line with our philosophy that travel should be an enjoyable learning experience, this tour will be limited to just 16 people.

Travelworks

Travelworks NZ Ltd
PO 28440, Remuera, Auckland 5.
Ph: 09 522 0330, Fax: 09 522 0331

TAANZ BONDED MEMBER

Write, phone or fax for further details.

PARKS AND GRAZING

Visitors in national parks in the South Island, or one of many other protected areas, will often be greeted by the incongruous sight of farm animals among the forests, wetlands and tussock grasslands of the backcountry. Unrestrained, and usually with the approval of the Department of Conservation, they graze with little assessment being done of their environmental impact. The integrity of these major protected natural areas is threatened, says MIKE HARDING, and these unique remnant slices of natural New Zealand are being slowly transformed into examples of an English country park.

CROPPED PASTURE and muddy stock-trampled tracks are familiar images of the grazing lands that dominate the New Zealand countryside. However, the herds of curious cattle or straggling mobs of sheep that are a common sight from our country roads are not confined to farm paddocks.

Over 114,000 hectares of conservation lands are grazed with impunity by domestic stock. And that does not include over 4,000 hectares of grazing licences within national parks or the many cases of trespassing stock. Each winter, at Mavora

Up to 4,500 sheep graze the Eglinton Valley within Fiordland National Park. A scientific assessment of their impacts in 1991 stated that sheep are restricting regeneration of forests and shrublands, trampling wetland margins, selectively grazing large native herbs and encouraging the establishment of weeds.

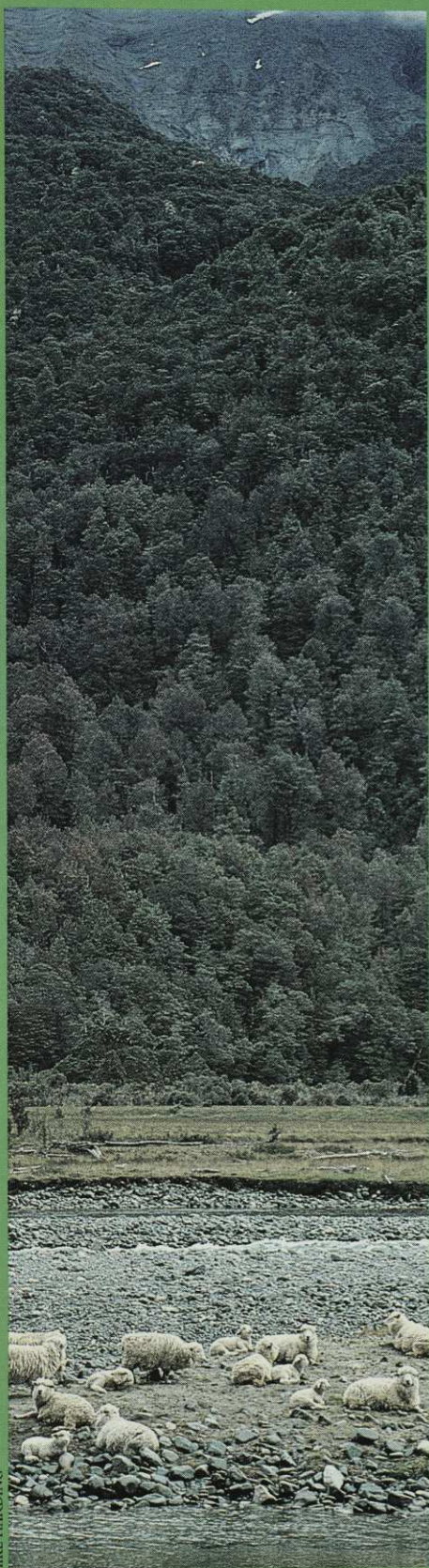
Lakes Park in northern Southland, some 600 cattle graze dense red tussock grasslands – the best protected remnant of the extensive native grasslands that once covered the Southland plains. Wading into bogs and streams, they wallow in the water that feeds the Mararoa River – one of the country's best-known trout streams.

Alongside the scenic Milford highway hundreds of sheep graze the grassy flats of the Eglinton Valley within Fiordland National Park, surrounded by the towering peaks of this prestigious World Heritage Area. Straying freely into the tall red and silver beech forest, they browse young seedlings and inhibit forest regeneration.

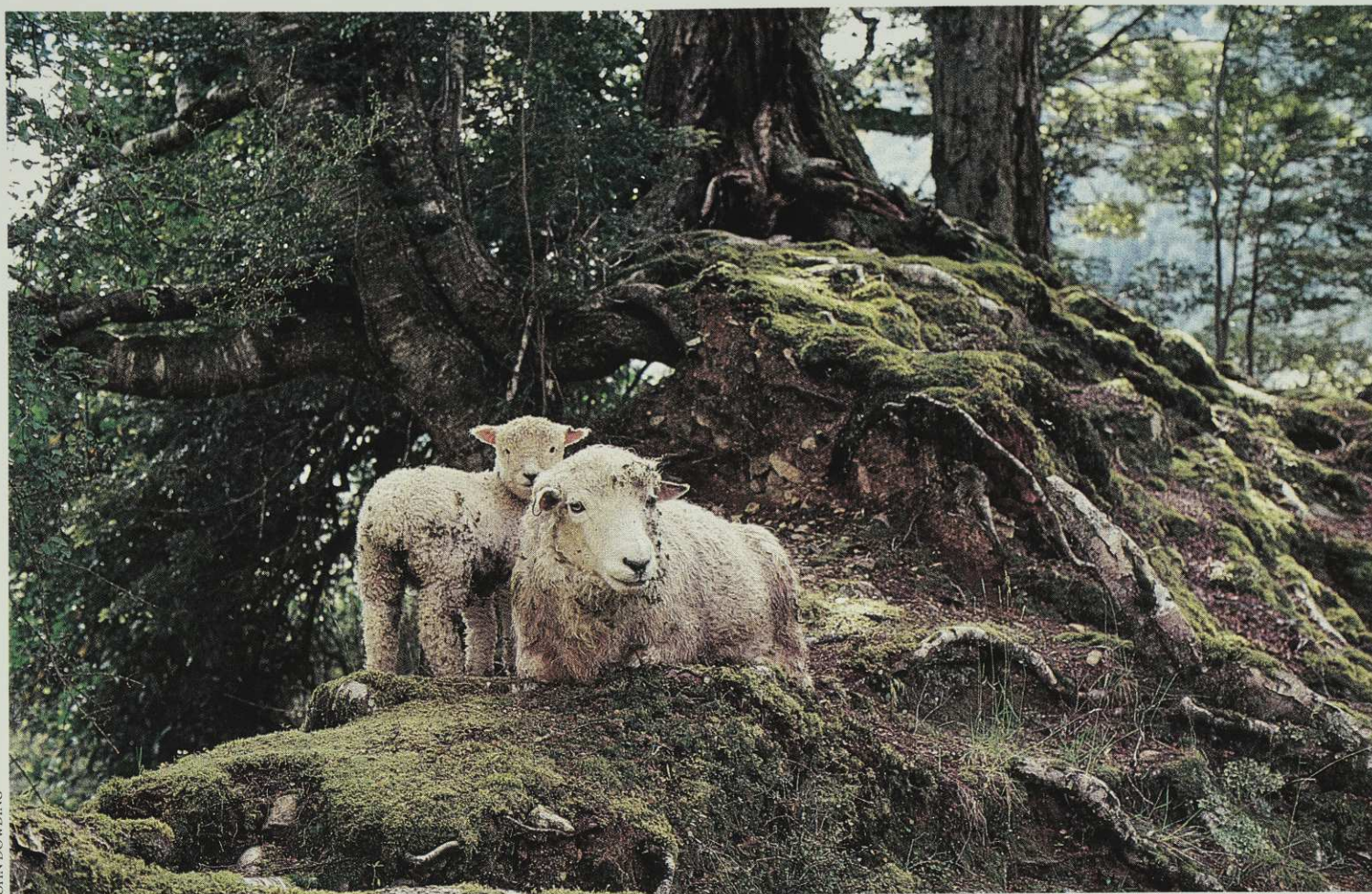
And each autumn cattle trample their way through the magnificent beech forests of Mt Aspiring National Park to spend the winter grazing the grassy flats of the Dart, Wilkin and Siberia valleys. At the entrance to Mt Cook National Park, one of the country's key tourist attractions, sheep graze the Birch Hill flats, a rare area of eastern montane grassland within a national park.

Why are these destructive animals allowed to graze in areas set aside for nature conservation and specifically for the strict protection of the indigenous flora and fauna? Several arguments have been put forward: historic rights to grazing; reduced fire risk; the impracticality of fencing; the economic viability of adjoining farms; weed control; the maintenance of grassland conservation values; and even the contention that browsing mammals replicate the role of extinct native avifauna, such as the moa. Somewhere in the debate it appears to have been forgotten that the public conservation estate contains only the battered remnants of a unique indigenous flora and fauna. Surely grazing can only be justified in national parks and reserves if it directly assists in maintaining conservation values, such as the light grazing of some tussock grasslands.

New Zealand's flora and fauna evolved over millions of years in the absence of browsing mammals. Introduced wild animals have had a devastating impact on palatable native plants, slowly



MIKE HARDING



JOHN DOWDING

Sheep stray for several hundred metres into the beech forest of the Eglinton Valley in Fiordland National Park, browsing beech seedlings and understorey plants.

transforming forest, shrubland and grassland ecosystems and threatening native bird and insect populations. Domestic stock have a similar impact except that they are concentrated on valley floor grasslands, wetlands and forest margins. These high-fertility ecosystems support rich native plant communities.

STUDIES of grazing patterns in South Westland show that the natural regeneration of forest on stable river flats is inhibited by domestic stock. Even light grazing and camping within the forest margin eliminates palatable understorey species, prevents the regeneration of broadleaved plants and can eventually lead to changes in the forest canopy. Concentrated grazing causes the forest margin to retreat. In beech forests east of the South Island's main divide, grazing animals inhibit the establishment of seedlings by camping and browsing in the shelter of the forest margin. Ironically, there is often healthier regeneration at beech forest margins on nearby pastoral lease country, where strict stock limits apply to the grazing of sheep, than in the major valleys of some national

and forest parks. Natural succession of shrubland and forest on many river flats has been thwarted for years by domestic stock.

The impact of stock on forests is not limited to the grazing of palatable plants.

Trampling at forest margins and along cattle tracks compacts the soil, restricts plant root development and reduces plant vigour. Compaction reduces the soil water holding capacity and increases runoff and soil erosion. Heavy trampling



MIKE HARDING

In Lake Sumner Forest Park sheep and cattle have a major impact on forest margins, inhibiting regeneration and, in serious cases, causing the forest margin to retreat.

in wet areas leads to soil pugging. Many backcountry walkers are familiar with these slippery cattle tracks several metres wide, that alternate between muddy wallows and mounds of exposed tree roots.

This trampling has an even more devastating effect on wetlands, bogs and streams. Cattle require large quantities of water and enjoy wading and standing in the water they drink. Treading of the stream bed can increase suspended sediments and trampling breaks down the internal water balance of the wetland drainage system. In high-altitude wetlands cattle cause severe damage to sensitive wetland plants, expose the fragile peat soils and can alter the water holding capacity or water yield of the wetland. Turf margins of ponds and tarns can also be severely damaged by cattle trampling. The specialised turf plants may be able to withstand grazing and trampling from soft-footed animals such as waterfowl, but cannot tolerate the concentrated impact of clumsy, hooved mammals.

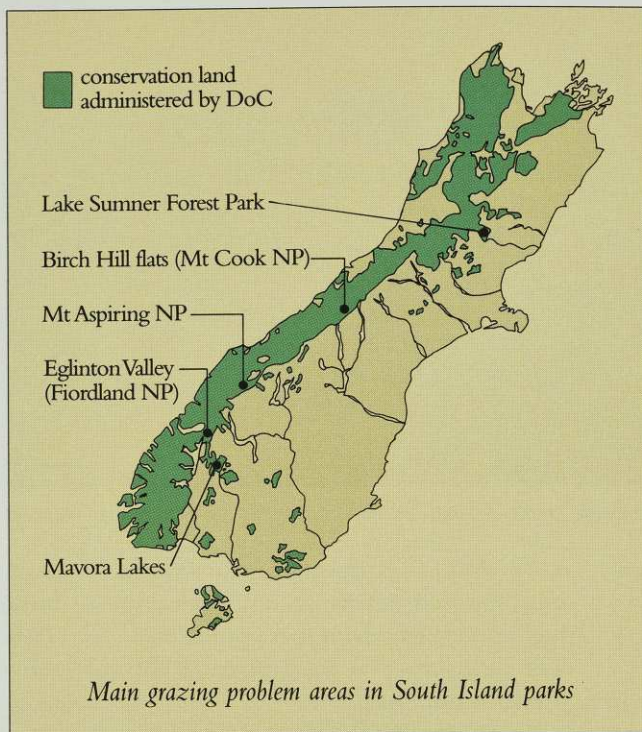
Cattle also affect water quality by excreting directly into waterways. This

leads to nutrient enrichment of the stream or bog and increases the risk of spreading disease-causing organisms. Many waterways within protected areas

are important for wildlife, recreation, and downstream urban and industrial uses. Pollution of these waterways is both unnecessary and unacceptable.

Because introduced grasses dominate many river-terrace plant communities, graziers advocate stock access to control tall grass growth and reduce fire risk. Rapid grass growth occurs in spring and early summer and fire risk reaches its height in late summer and autumn. However, the demand for grazing is usually during the winter. Moreover, the intensity of grazing required to effectively reduce the fire hazard would be ruinous to the grassland vegetation and would devastate adjoining forest margins and wetlands.

The valley floor grasslands of national and forest parks often form long enclaves, extending for many kilometres into surrounding forest. There is increasing concern about the impact of grazing animals on the forest-grassland margin. This biologically rich transition zone suffers most from domestic stock. Fencing is often impractical and usually



have a delicate balance between water quantity and flow and very low nutrient levels. Wetlands in the headwater catchments help maintain water quality in

DoC's grazing policy

RELEASED FOR comment late last year, this draft policy covers land administered under the Conservation Act 1987 and the Reserves Act 1977. It does not include national parks. The policy statement claims that conservation lands are a significant resource to the farming community, despite the fact that there are only 114,000 hectares of conservation land used for grazing compared with 17.7 million hectares of agricultural land.

The policy proposes that grazing be by licence with a 5-year term and no right of renewal, unless a conservation management strategy or plan is in place which allows for longer licence terms. It also acknowledges that it is either illegal or inappropriate to graze nature or scientific reserves (Reserves Act) and ecological, wilderness or sanctuary areas (Conservation Act). Commercial grazing of goats and deer, or the grazing of land where stock can freely enter adjoining protected areas, will not be permitted.

However, the draft policy does

not go far enough in addressing the major impacts of domestic stock on protected natural areas. It repeats the time-honoured argument that low-grazed vegetation reduces fire risk and assists public access.

Except for stewardship areas where grazing could be permitted in special circumstances, provided there are no significant environmental impacts, grazing should generally only be allowed where there is a direct benefit for conservation. A good example may be the light grazing of native tussock grasslands to prevent the invasion of exotic woody shrubs. In other areas grazing should be phased out. This can often be accomplished without confrontation by letting licences lapse when the current lessee withdraws, or by purchasing a lessee's interest.

It must be remembered that grazing is a privilege on the DoC estate which can be withdrawn where there are unacceptable impacts. It is worth noting that traditional river flat grazing in southern South Westland was recognised by the Government

in the 1989 decision to include the area in the South-West World Heritage area. A process of reviewing the leases and deleting the most sensitive ecological sites is currently underway.

Public access to conservation lands is also threatened under the policy as it proposes that hunters must gain permission from graziers to enter public land covered by a grazing licence. These are often river flats and provide the most practical access to the backcountry. Licence-holders' rights to prevent hunting access have already effectively closed whole valleys to recreational hunting in the South Island. Farmers wishing to graze public land must accept the restraints imposed by free public access.

A copy of Forest and Bird's submission on the grazing policy is available from PO Box 631, Wellington. Submissions closed with the Department of Conservation on 31 March, but members with outstanding concerns should write to DoC's Resource Use Manager at PO Box 10-420, Wellington.



MIKE HARDING

Cattle cause severe damage to the banks of lakes and rivers, pugging soil, trampling plants and reducing water quality.

very expensive. Besides, fences and gates are usually the last thing people want to see when they leave the farmland to venture into backcountry parks and reserves. The role domestic stock play in maintaining favourable grazing conditions for other introduced animals is unclear, though possums will travel long distances from adjoining forest to feed on short grassland.

Introduced predators may also benefit from domestic

stock. Animal carcasses provide a ready meal for wild cats and stoats, sustaining higher populations of these predators. The short-cropped grasslands may also aid predator dispersal.

Domestic stock also spread weed seeds. Small hard seeds pass through the gut of grazing animals to be deposited elsewhere in dung. The occurrence of sheep's sorrel (*Rumex acetosella*) throughout the eastern South Island, from valley grasslands to alpine shingle screes, is a good example. White clover (*Trifolium repens*) is also spread by grazing animals. Pasturing stock on grassland with white clover before sending them out to backcountry blocks is a traditional method of establishing this important grazing plant in remote areas. Ground bared by trampling provides favourable sites for weed invasion, and increased fertility from dung often benefits introduced species. Wool, hair and hooves can carry seeds long distances and have been implicated in the spread of ragwort (*Senecio jacobaea*) in river valleys. Some grazed areas within parks have even been oversown with introduced pasture grasses to improve grazing.

maintain tussock cover by preferentially browsing competitive introduced grasses. Tussock grasslands are also susceptible to the invasion of introduced woody shrubs or herbaceous weeds. Controlled grazing may be a cost-efficient way of limiting shrub or weed growth. However, there is increasing evidence that grazing patterns influence the susceptibility of a grassland to the invasion of hawkweeds (*Hieracium* spp.). These opportunistic plants exploit exposed ground and out-compete native species. Increased long-term monitoring is required to determine whether grazing is beneficial in conserving particular values, such as maintaining tussock cover.

Grazing at Glenorchy, Mt Aspiring National Park

THE FOREST up valley from the fence was inspected and found to be in a very poor state due to excessive browsing from cattle. There is the main beech canopy but no sub-canopy or replacement forest.

Regeneration and seedlings on the forest floor are virtually non-existent. There are the occasional subspecies of horopito, coprosma, and totara which have been heavily browsed.

As the canopy forest matures and falls there is no replacement regeneration to provide an acceptable healthy cycle . . . Regeneration is establishing well in areas where cattle have difficult access e.g. steep banks.

The track has suffered as a result of stock movement but this would have been the normal situation over many years.

Mud holes are common with deep ruts in soft erodible soils."

Report by Senior Ranger B. Ahern, February 1977

EACH YEAR millions of dollars are spent controlling wild animal populations. Yet domestic stock continue to graze within some of the most important protected natural areas in the country. Most of this grazing occurs under DoC licences or permits.

In its recently-released draft grazing policy DoC proposes to restrict grazing to 5-year licences with reassessment before renewal (see panel, page 35).

Light grazing by sheep can sometimes be beneficial to native plant communities. Monitoring of silver tussock grasslands has shown that sheep help

SEVERAL CONSERVATION boards and DoC conservancies are presently tackling the issue of grazing on conservation lands. At Mavora Lakes Park the Southland Conservation Board has decided that grazing is inappropriate and has recommended that grazing cease (see panel).

Also in Southland, debate over grazing in the Eglinton Valley has raged in the local papers. Farmers have backed the owners of Te Anau Downs, who graze the adjoining Eglinton Valley, claiming they are dependent on continued grazing of the national park. However, the lack of regeneration at the forest margin and the presence of sheep within the beech forest have alarmed conservationists and park managers. The red and silver beech forests of the Eglinton Valley are an important refuge for the endangered yellowhead and the site of important research into the ecology of forest birds and predators. Continued grazing of the park by domestic stock begs the question whether the park's primary purpose is nature conservation or to provide off-site benefits for

the farming community of Southland.

In Otago the review of the Mt Aspiring National Park management plan has prompted further discussion of grazing in the park's backcountry valleys. Farmers claim that they secured agreements that grazing would continue when the park was established. However, no one has been able to produce any such written agreements or binding undertakings. Cattle continue to graze in the park despite severe local damage to forest and stream margins and strong opposition from conservation and recreation groups. Despite the obvious impacts and the concerns of park users, expressed through submissions to the management plan review, DoC staff continue to reassure farmers that their right to graze the park will continue.

In Mt Cook National Park the grazing of the Birch Hill flats by sheep is being promoted in response to the problem of stock trespassing into the park from the adjoining Tasman riverbed. Potential impacts of stock have been countered by arguments about the difficulty of fencing the park boundary. Little thought has been given to the cause of the problem – stock straying from Glentanner Station onto the Tasman riverbed – or to monitoring of potential impacts of stock on the grasslands and shrublands of the national park. Ironically, Glentanner has probably benefited more than any other high country farm from the neighbouring national park as the station has successfully diversified into tourism enterprises.

National parks were set aside to protect vulnerable indigenous ecosystems from the depredations of introduced animals and to allow, where appropriate, public use. The Reserves Act 1977 has the primary purpose of protecting representative examples of the indigenous flora and fauna of New Zealand, particularly from the effects of introduced animals. As a country we have a proud record of setting aside important natural areas, but



Cattle browsing has reduced this metre-high broad-leaved snow tussock, in the proposed Torlesse conservation park, to a stump. Repeated browsing will kill the plant.

MIKE HARDING

protection of those areas from introduced grazing animals is far from satisfactory. And, despite the fact that the vast majority of the countryside has been dedicated to pastoral production, there is continued pressure to compromise protected land for grazing.

The integrity of the country's national parks and reserves is at stake. While the uniqueness of New Zealand's natural environment and the curiosities it contains are extolled by tourist brochures, the agents of habitat destruction, introduced animals, are tolerated in the country's main nature tourism destinations.

If sheep and cattle and rural landscapes are what tourists come to see there are over 17 million hectares of farmland to satisfy that demand. If it is the unique and

Mavora Lakes



ROGER SUTTON

North Mavora Lake looking towards the upper Mararoa valley. Forested margins along the western side of the lake are being slowly killed by cattle. Mature trees are dying and there is no regeneration.

THE SOUTHLAND Conservation Board is about to take on the bull by recommending that Landcorp's cattle be removed from the flowing red tussock grasslands of Mavora Lakes Park.

The Mavora cattle were once described by the now-defunct Land Settlement Board, as a "scenic dimension in an otherwise stark mountain landscape". Now there is a new body in charge and the board will soon announce the long overdue review of the management plan and call for public submissions.

At stake is the future health of the red tussock grasslands, cushion bogs, and beech forests of the park. Recent reports by botanists, Dr Bill Lee from DSIR, and Professor Alan Mark from Otago University, point to the damage caused by cattle.

On the other side of the fence Federated Farmers claim that the results of five years of monitoring are

inconclusive, and that more damage will be done by removing the cattle because of increased fire risks and rank grass smothering the remaining native herbs.

These claims were refuted by Professor Mark who said that once cattle are gone the palatable native herbs will be given a chance to establish.

There are now very few opportunities left in New Zealand to protect lakes, red tussock grasslands and wetlands. These once dominated much of Southland's landscape.

Mavora Lakes with its dramatic combination of high mountains, blue lakes, red tussocks, and olive green beech forests is of immense importance for nature conservation and outdoor recreation and deserves the highest protection. It is imperative that the cattle are removed as soon as possible.

Sue Maturin

distinctive indigenous plants, animals and landscapes of this unusual land that excite visitors then let us be sure we protect them fully from the effects of domestic stock. The challenge now lies with the conservation boards and DoC to phase out all grazing of domestic stock in national parks and to ensure that the new grazing policy for other public conservation lands does not compromise their ecological and recreational values. ♦



Mike Harding is Forest and Bird's Christchurch-based field officer. He was formerly a ranger at Arthur's Pass National Park and is currently working on high-

country conservation issues.

IN THE PAST, species conservation in New Zealand has concentrated on birds and some reptiles, with some work on plants and the occasional marine mammal and invertebrate. There has been no systematic way of working out which conservation work should have priority.

One of the main factors in determining priorities has been the interests and expertise of scientists and managers rather than the needs of threatened species. There has been extensive work, for example, on the Cook Strait and northern tuatara populations which each number more than 50,000 animals. Scientific interest in this species is high but should this interest dictate our conservation priorities especially when their population is far larger than that of the Chatham Island oystercatcher or the Mokohinau skink?

More recently, the Department of Conservation, which has primary responsibility for protecting native plants and animals, has made a conscious effort to work on a wider range of species. However, this has been difficult given that the expertise of DoC staff has remained based on particular groups such as birds and some reptiles.

Another problem is that once you have identified the species under threat which ones do you work on? In the Northland conservancy, for example, there are more than 40 endangered species, many endemic to the region, while there are few threatened species in Hawke's Bay. There was an obvious need for a method to identify the priorities for species conservation and the factors affecting the survival of those species.

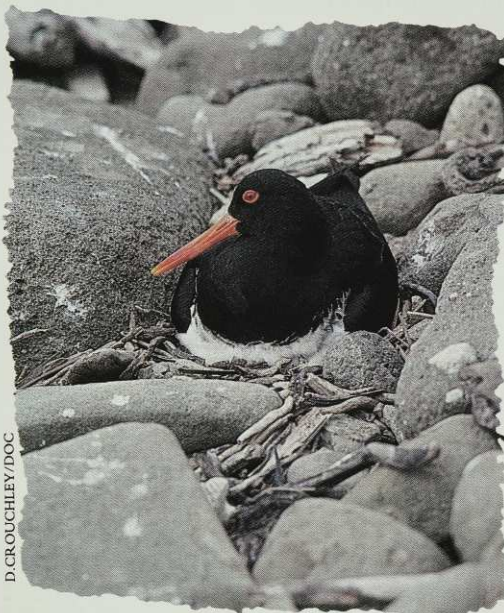
In the past two years DoC has helped develop a more systematic approach. This has evolved into the Species Priority Ranking System (SPRS) which is applied to indigenous vascular plants, terrestrial insects, spiders, land snails, amphibians, reptiles, birds, bats, marine mammals and a separate list of plants important to Maori. At present it excludes other marine fauna, other invertebrates and non-vascular plants (mosses, liverworts and algae).

The SPRS was developed along the lines of existing US, Australian and World Conservation Union species ranking systems. Most of these use a number of common criteria based on taxonomy, threat of extinction and natural and cultural values. This was refined so the system could be used to compare New Zealand ferns with fish, or penguins with palms rather than the traditional approach of only comparing species within a group, such as different species of birds.

The criteria used in the SPRS are:

WHO GOES INTO THE ARK?

how to decide which species are the most threatened



D. CROUCHLEY/DOC

The dilemma faced by all conservation managers and scientists is how to set priorities for different threatened species. How threatened is each species? When do we have to act to save a species? How much of the limited conservation budget should go into a particular species as opposed to another? ALISON DAVIS, MARK BELLINGHAM and JANICE MOLLOY look at some recent advances.

Above: The population of the Chatham Island oystercatcher is less than 90 and still falling. Cats and introduced wekas are the likely causes of this decline.

- taxonomic distinctiveness: i.e. the absence of close relatives
- population features: number of populations, mean population size, largest population, distribution, condition of largest population, decline of wild populations
- vulnerability: whether a habitat is under legal protection, the extent of habitat loss, the impact of predators and harvest, competition, habitat or diets specific to that species, reproductive and behavioural specialisations
- potential for recovery through propagation or protection away from the species' natural habitat
- cultural value to both pakeha and Maori

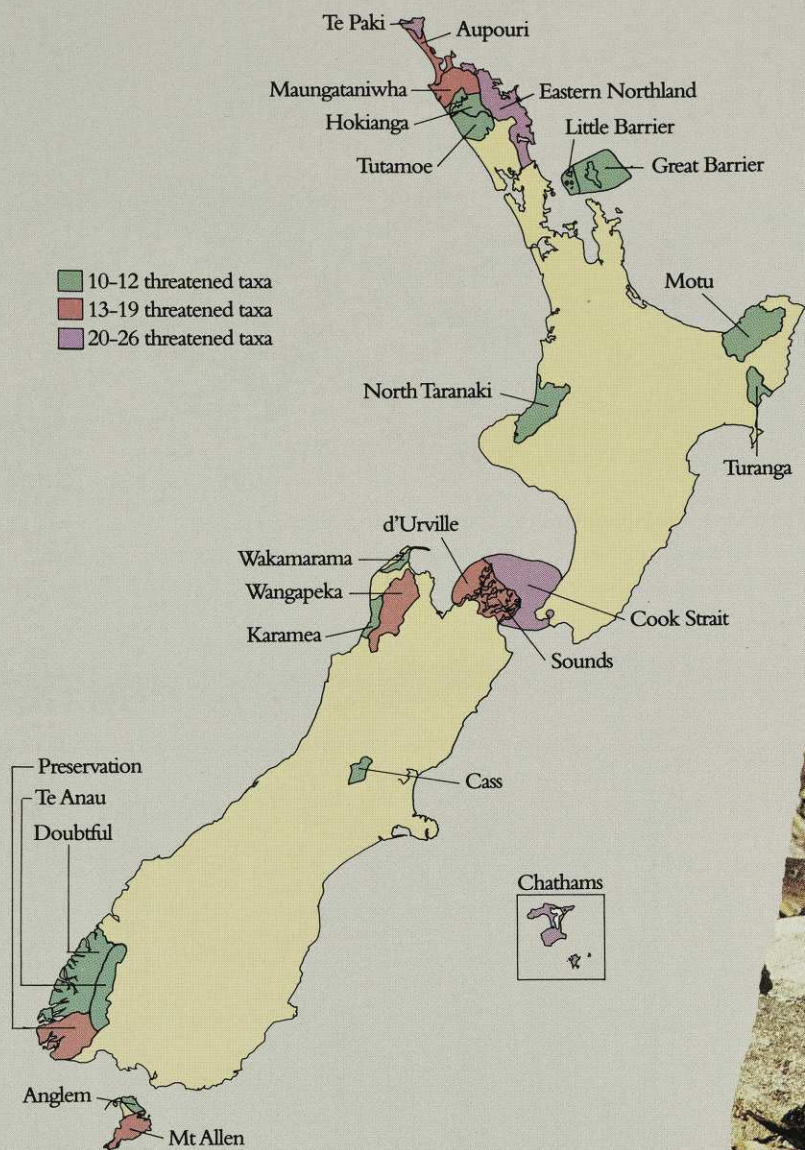
The species were grouped into taxa, which are taxonomic units that include both species and subspecies. Taxa were scored against each of the criteria and, rather than ranked linearly, were assigned to three categories of urgency. Category A are the threatened taxa requiring urgent recovery work to prevent possible extinction. Category B are those taxa requiring recovery work in the short term and category C are those requiring recovery work in the medium term.

THE PRINCIPAL REASON for developing the ranking system, was to aid DoC in setting species conservation priorities, and to identify taxa needing urgent recovery and protection work. Since the ranking system has been developed there has been better targetting of funds, a process helped by the formation of the Threatened Species Unit of DoC which co-ordinates this work.

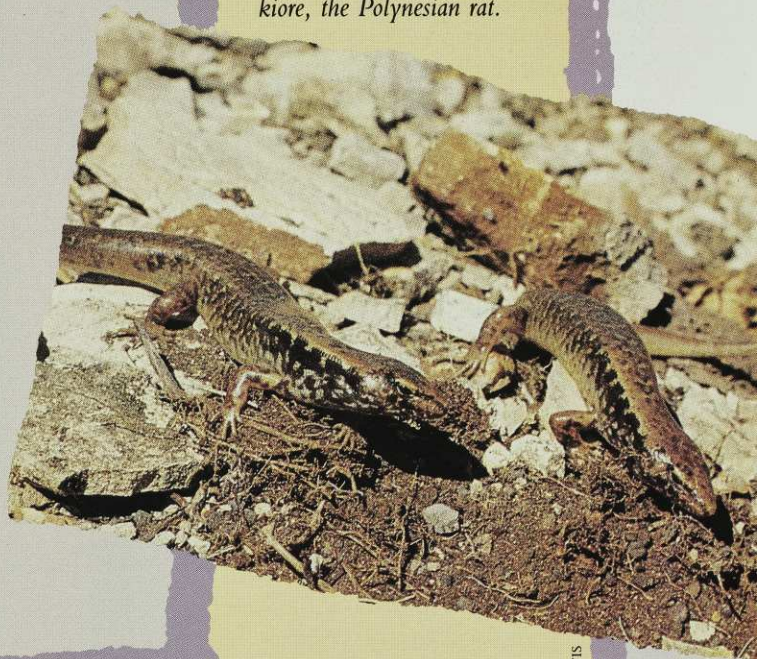
In developing the ranking system we accumulated a considerable amount of information on New Zealand plants and animals. This has enabled us to build up conservation profiles of 284 plants and animals (85 in category A and 199 in categories B and C). These profiles were previously not available for most species, particularly insects. The profiles will be extremely useful for managers and conservationists working on threatened species as they give information on the state of a population and pinpoint the main factors affecting its survival.

Figure 1 shows the proportion of threatened taxa within each group. Using the groups covered by the SPRS the estimate of the total biota of New Zealand is 23,000 taxa, of which 20,000 are insects. 284 of these taxa are endangered and vulnerable.

There is some justification for the concentration on bird protection and



The Mokohinau skink, *Cyclodina "mokohinau"*. This recently recognised species is found only on one small rock stack south-east of Whangarei. It has been given higher priority as a threatened species by the new SPRS, which may lead to it being re-established on other islands where it was wiped out by kiore, the Polynesian rat.



ALISON DAVIS

Figure 1: New Zealand taxa covered by the Species Priority Ranking System.

group	no. of taxa in SPRS	threatened taxa as a percentage of total group
reptiles & amphibians	27	60
birds	70	42
freshwater fish	6	22
mammals	6	16
land snails	51	11
plants	93	5
insects	31	0.2
total	284	

recovery programmes with just under half of the bird fauna endangered or vulnerable. Reptiles and freshwater fish groups also have a high percentage of threatened taxa while only five percent of all plants are threatened. All of New Zealand's frogs and bats are threatened. The small proportion of threatened insects probably reflects a lack of knowledge of this group.

The level of taxonomic distinctiveness of individual taxa is important in deciding where to put the conservation effort. If protection and maintenance of biodiversity is the goal we should be saving taxa with the highest level of taxonomic distinctiveness before those less distinct taxa. In other words a plant which is the only member of its genus has a greater priority than one which is one of 20 species in the same genus.

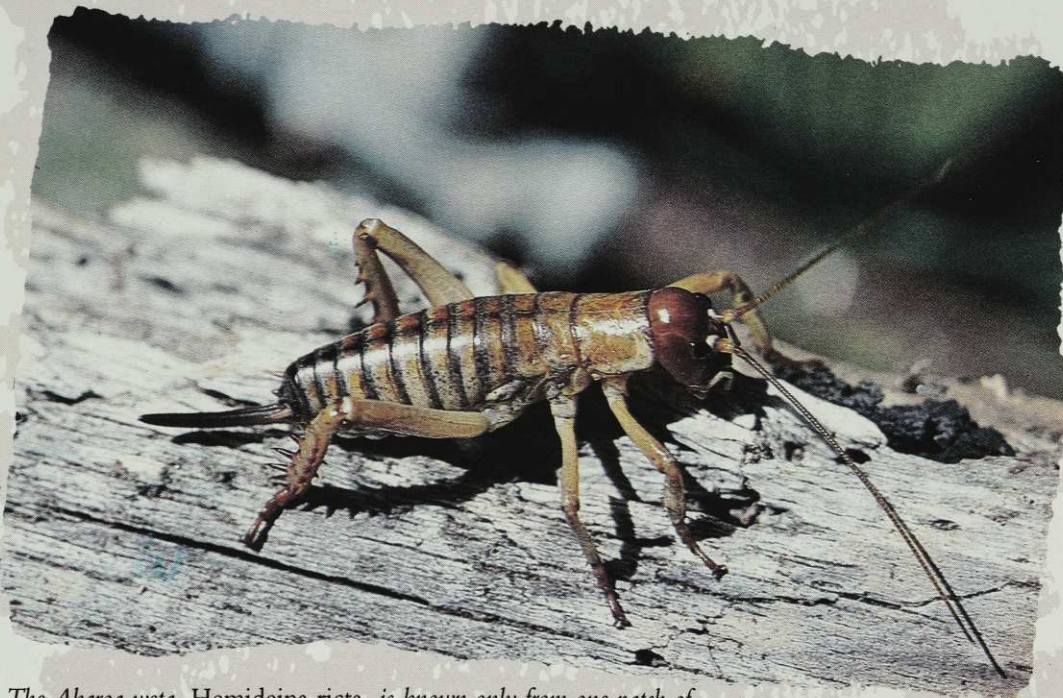
Our analysis showed that birds, followed by plants, have the highest number of taxa that are taxonomically distinct. Again this may well justify the disproportionate conservation efforts on birds in New Zealand. Birds, being at the top of the food chain, are also good indicators of ecosystem health.

ANOTHER GOAL of the SPRS is to identify major threats to taxa and how these threats might differ between groups. When we looked at threats of predation, competition and habitat loss on these taxa it is clear how much of a future problem exists to control and eliminate predators.

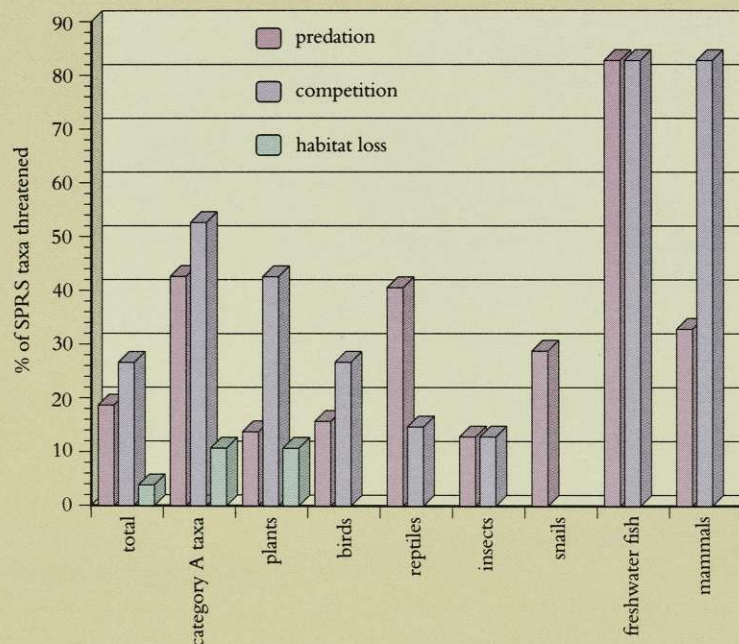
The analysis shows that predation and competition are the main factors that seriously threaten the survival of New Zealand plants and animals. Almost half of the category A taxa are affected in this way. It may seem surprising that habitat loss is less important but this is because 70 percent of threatened taxa are in habitats where we expect negligible change in the next ten years. While habitat loss has been a major cause in the past of the depletion and extinction of many populations, natural areas are now more secure with a large slice of New Zealand administered by DoC. However, the SPRS does not identify whether a plant or animal has sufficient stable habitat to survive in the long-term. All the taxa seriously affected by habitat loss are plants.

Predation is affecting the survival of a considerable proportion of mammals, freshwater fish, reptiles/amphibians and land snails, while competition is having its biggest effect on mammals and plants. The major factors are introduced animals (possums, rats, trout, deer, goats) and weeds, and the impacts of the fishing and farming industries.

GREG SHERLEY



The Akaroa weta, *Hemideina ricta*, is known only from one patch of bush on the Banks Peninsula. As DoC's Canterbury conservancy covers the Chatham Islands with its high number of threatened species, fewer resources are available for the mainland species.



Percentage of the 284 SPRS threatened taxa seriously affected by predation, competition and habitat loss. The main threats to these plants and animals comes from introduced predators and competitors.

MARK BELLINGHAM



The Te Paki kauri snail, *Paraphanta busbyi watti*, is gravely threatened as the few remaining populations are being ravaged by pigs. Pig and possum predation is threatening most large native snails.

Loss of habitat is often irreversible, particularly in the short-term, and the prevention of habitat loss is often easier than controlling the insidious effects of predation and competition. We identified three threatened habitat types which are declining rapidly that are important for threatened taxa:

- coastal herbfields and dunes
- freshwater wetlands
- lowland shrublands.

It is no co-incidence that these habitats are also threatened ecosystems that were severely reduced in historical times. Nine-tenths of New Zealand's original wetland, for example, has been lost.

A high priority will be to prevent any further loss of habitat of the 11 taxa which we expect will have major threats to their habitat in the next ten years. All of these taxa are plants and they are endangered from other factors also.

THE SPRS can also be used to identify key sites for species and habitat protection. Although habitat may not be declining for a taxa, neither might it be legally protected. We found that ten percent of threatened taxa did not have any legal habitat protection. The highest proportion were freshwater fish, while the highest numbers were plants. In contrast, more than half of our threatened land snails, insects and reptiles/amphibians have legal protection on most or all of their habitat.

Even when habitat sites are legally protected the threatened taxa present can be harmed by predation and competition. Often a protection programme for a species, such as animal or plant pest control, or water level restoration are needed in addition to protection of habitat.

Apart from the three declining habitat types listed above, there are other important habitats which have little protection. Marine areas, for example, are critical due to the high number of seabirds. Very few marine areas important for seabirds are protected, and seabirds are not protected beyond 20 kilometres at sea.

The habitats most important for threatened plants, namely lowland shrubland, coastal herbfields and freshwater wetlands are the most severely reduced in area and are under-represented in the conservation estate. In contrast, forested habitat of land snails is more abundant and better protected.

We also mapped the distribution of endangered and vulnerable taxa to understand any geographical patterns. We expected some concentration of threatened taxa because there are many endemic plants and animals in New Zealand which only occur in one or two areas.

What we found was that a third of threatened taxa – and half of those in category A – have only one population, and are found in very restricted areas. As would be expected, snails, plants and insects have the narrowest geographic range. Only 11 of the taxa (nine of them plants) are also found outside New Zealand in a threatened status.

With many threatened taxa having few populations and restricted ranges, our next task was to see if these taxa were concentrated in any of New Zealand's ecological districts. We found an uneven distribution of threatened species with highest numbers in the Te Pahi, Chatham Islands and Cook Strait ecological districts. The high numbers of threatened taxa in some districts have tended to escape the notice of conservation policymakers and managers. This needs to be corrected and it also emphasises the need to target conservation efforts across the country according to national needs first and regional needs second.



The chickweed, Thelyphyton billardieri, was once widespread on beaches in New Zealand and Tasmania. It has virtually disappeared from everywhere, except the Chatham Islands.

Habitat destruction and the introduction of exotic species have influenced present-day patterns of regional biodiversity. Some areas have become refuges for remnant populations. In these areas the distribution of threatened taxa does not always represent a centre of endemism and biodiversity, but rather a history of chance survival of vulnerable species.

In order to protect and maintain its biodiversity New Zealand must protect sites that are rich in species and have diverse ecosystems. Where these sites all occur within any one ecological district, such as Te Pahi in the far north and the Chatham Islands, these are key areas on which to focus protection efforts.

ANOTHER ROLE for the SPRS will be to enable researchers to identify key areas for the study of threatened species that are likely to attract research funding. DoC and conservation organisations such as Forest and Bird can focus on raising the profile of some endangered but forgotten species and their habitats.

The SPRS can also provide a better focus for the various commercial sponsorships for threatened species. Forest and Bird, the New Zealand Conservation Authority and DoC are attracting considerable commercial sponsorships for such species. In the two years it has been operating, the Threatened Species Trust has generated over \$2 million for kakapo, kokako and kiwi – all high priority threatened species. Sponsors are more likely to support recovery programmes if their species can be shown to be particularly important and if they can see that the conservation managers have got their priorities worked out with strategies for assisting species in serious decline.

FOR TOO LONG in New Zealand species and habitat conservation has had no unified identification of threats to species. We now have a process where profiles of threatened species, threat factors and their relative importance can be used to guide conservation efforts.

Identification of key taxa and habitats will aid the protection and maintenance of New Zealand's biodiversity. At the same time this should not detract from efforts to protect the more common species and representative ecosystems and communities that are the backbone of New Zealand's natural biodiversity. ♦



Alison Davis has worked on a number of threatened species projects. She is the manager of protected species policy for the Department of Conservation.



Mark Bellingham is the field director of Forest and Bird. He has coordinated Forest and Bird's work on threatened species for the last five years.



Janice Molloy is a protected species policy officer at DoC and has coordinated the development of the SPRS.

A technical report on the Species Priority Ranking System is available from DoC's Head Office, PO Box 10-420, Wellington.

From the World's Finest Wildlife Artist

YOUR CHANCE TO MAKE A SIGNIFICANT CONTRIBUTION TO THE
SURVIVAL OF 5 THREATENED NEW ZEALAND BIRDS



▲ KERERU

▲ KOKAKO

SADDLEBACK ▲

TAKAHE ▲

TUI ▲

Raymond Ching's Bird Drawings

Raymond Ching
considers these drawings
to be amongst his finest works.

The reproduction of these five drawings of some of our rarest birds, in a **limited edition of only 200 signed and numbered prints** of each bird, is clearly a triumphant achievement by master printers. They must rank amongst the finest reproductions of works of art produced. They are printed on handmade flax paper, long considered by lithographers to be superior for the exact rendition of the finest pencil lines.

Each image measures approximately 550mm x 380mm, set on a paper size of 640mm x 450mm.

Charlotte H. Gallery, in association with the **Royal Forest and Bird Protection Society**, are pleased to make these unique and beautiful prints available to you at less than half of the published price!

For each print you order, a donation of \$35.00 will be forwarded to the **Royal Forest and Bird Protection Society's** fund for the protection of these threatened birds.

This is a **once-only** offer, we urge you to send your order now. Stocks are limited.

Please send me the following Signed & Numbered Raymond Ching Print(s):

KOKAKO ☐

TAKAHE ☐

TUI ☐

KERERU ☐

SADDLEBACK ☐

Name _____

Total prints ordered @ \$135 each _____

Address _____

Cheque enclosed for \$ _____

Signature: _____

OR: Charge my Visa/Bankcard Exp. date: ____/____/199

☐ ☐

Send to: Charlotte H. Gallery, P.O. Box 6269, Wellesley Street, Auckland 1. Ph: 0-9- 309 0612.

Recycling

MOST OF US have an instinctive belief that recycling is a positive process. We associate it in our minds with all the old-fashioned virtues of thrift which were part of our grandparents' daily lives, but which we have now largely discarded, and feel guilty about.

Re-using empty jam jars to store screws in the garage, or rooting seedlings in old yoghurt pots on the kitchen window sill, not only make complete sense in terms of the environment and saving resources, but they also make us feel less wasteful.

In addition to making us feel better, there are two very sound reasons to recycle: to reduce the overall amount of resources we use, and to reduce the amount of wastes needing disposal.

Before deciding to collect materials that would otherwise have been discarded, it is necessary to make sure that those materials *can* be recycled, that someone will want to buy them when they have been recycled, and that doing so does not involve the use of more resources than it saves.

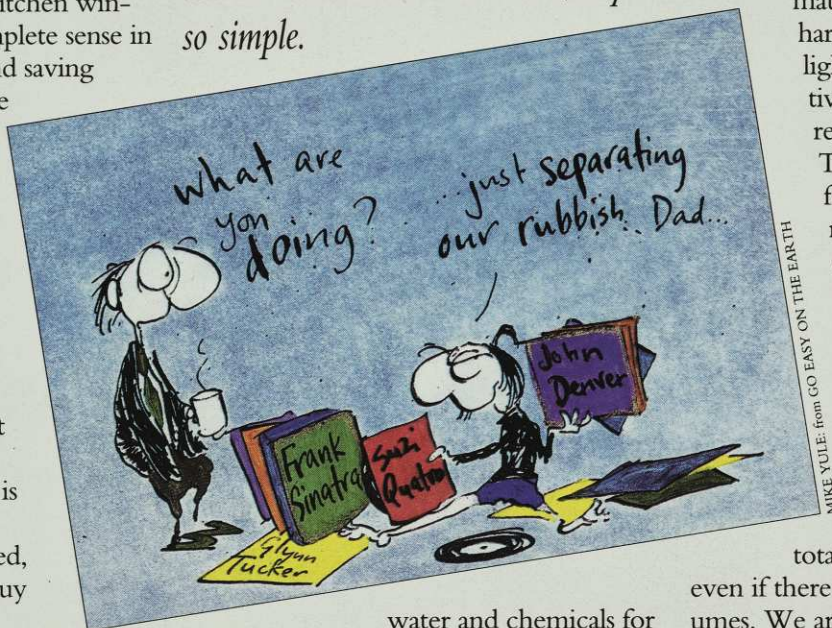
The last point is perhaps the most crucial, and certainly the most difficult to answer.

Quite often the terminology we use is wrong. We say we have "recycled" our glass or newspapers when what we have actually done is deposit them at collection points.

Recycling is really a lengthy circular process which has to include transporting those collected materials to a processing facility where they must be cleaned and sorted; the "new" raw material which is produced must then be manufactured into a new product which must comply with the same safety, health and hygiene regulations as a product made from virgin materials. The new products must then be distributed to wholesalers from where they are sent to retail outlets for sale. Only when the products have been purchased can we really say that the original item has been recycled.

These processes all involve energy, and the use of additional resources – maybe

We all feel that the recycling of rubbish is good thing. But why is more than one tonne of solid waste dumped each year for every New Zealander? As this article adapted from the British WARMER BULLETIN explains, the issues of waste collection and disposal, recycling and the environment are not always so simple.



water and chemicals for washing the collected glass, or for repulping the old newspapers, diesel fuel to drive the delivery trucks – even perhaps the metals needed to manufacture more trucks, and the rubber for their tyres. And those processes also all involve an environmental impact: exhaust fumes from the trucks, extra wear on road surfaces, waste water and chemical sludges from paper de-inking. Their energy use also has an environmental impact, as fossil-fuel-fired electricity production is one of the major sources of greenhouse gas emissions.

Once we have recognised that to recycle products also has an effect on our total use of materials and our potential to cause environmental damage, we then have to start to make the very difficult calculations to decide whether we should recycle or not. In many cases, the answer is yes. In some the answer will be no.

There is in addition a potential major conflict between the first "law" of waste management which seeks to reduce the amount of waste being created, with the demand for more recyclability. Manufacturers have already reduced the amount of

material they use, for economic rather than environmental reasons. Glass bottles now use only 40 percent of the glass used 30

years ago, and steel cans, too, are thinner. Plastic is one of the new materials designed to use less material in both manufacture and distribution energy. While making a bottle from less material is unquestionably a sound decision in both environmental and resource terms, it may mean that it is more likely to be broken in use and not reach a bottle bank. Making the bottle thicker-walled, and heavier, has the negative effect of requiring more fuel to transport it, as well as using more raw material, but may help to ensure that it is returned for recycling.

On the other hand, economies of material use can make products harder to recycle, because their light weight makes cost-effective collection and transport for reprocessing more difficult. This is the case with plastics for example. The plastics recycling problem is also compounded by their low cost and therefore the low value of the recycled material to a potential buyer.

We must not let our warm feeling about recycling cloud our judgment. If by recycling a product, we use more resources in

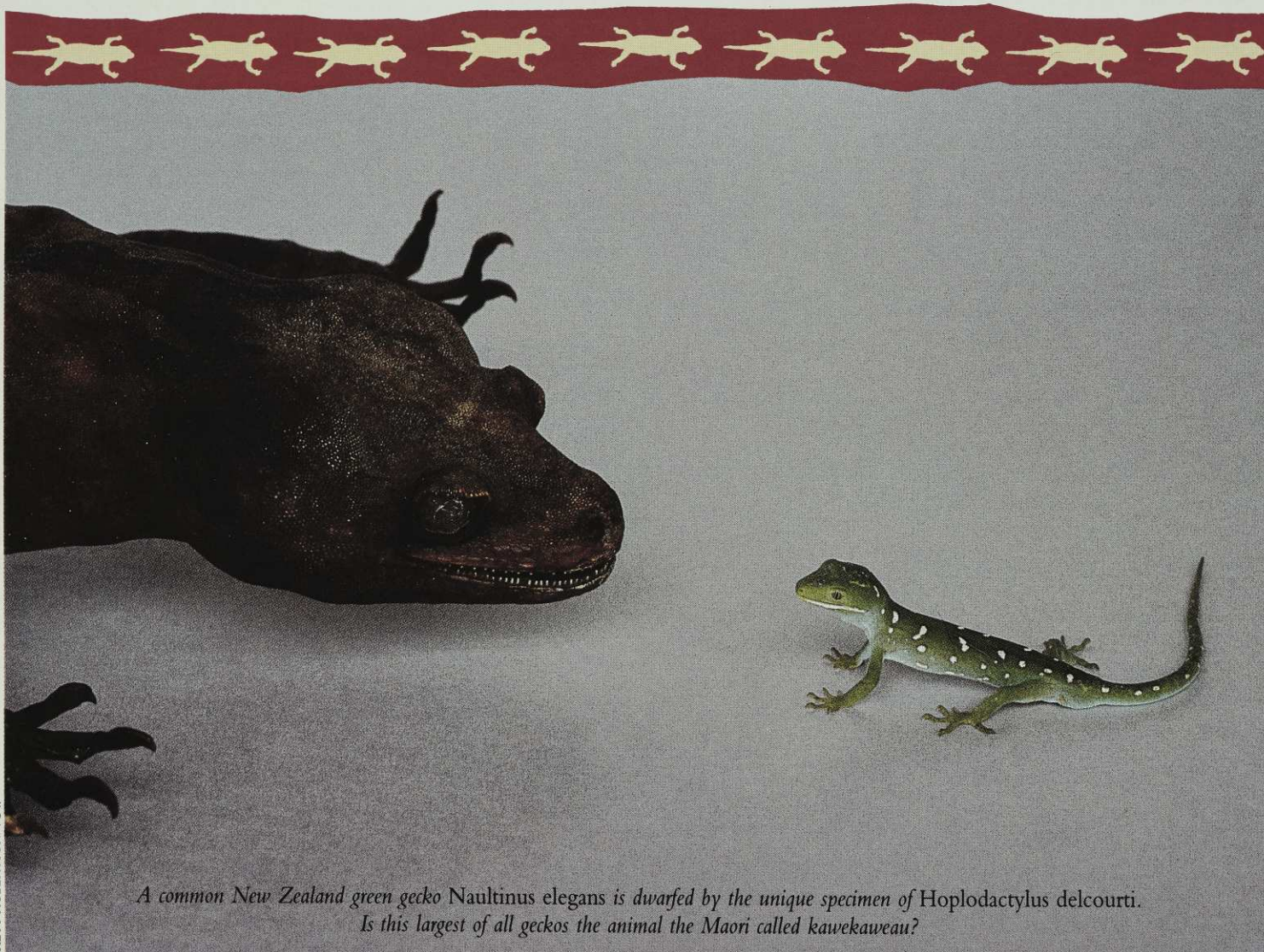
total, we should not recycle it, even if there is a reduction in waste volumes. We are not really running out of waste disposal sites, rather places where people will accept waste disposal sites.

Nor must we forget that household waste – on which most of the public concentration is focussed – makes up less than 40-50 percent of waste volumes overall in New Zealand. Industrial, agricultural, demolition and other sources make up the greatest proportion of wastes, but they are largely invisible to the general public. Recycling industrial and demolition waste could have much greater impact towards reducing waste disposal volumes.

Even assuming we were able to recover *all* the potentially valuable, recyclable materials in our household waste (an unlikely scenario), estimated to be 50 percent, we will still have the other 75-80 percent of our total waste which needs proper management.

Recycling is a part of the solution, and has an important contribution. But so do reducing our consumption in the first place, and secure, environmentally sound disposal methods, whether they be composting, anaerobic digestion, incineration or landfill. ♦

Was the kawekaweau the world's largest gecko?



A common New Zealand green gecko Naultinus elegans is dwarfed by the unique specimen of Hoplodactylus delcourti. Is this largest of all geckos the animal the Maori called kawekaweau?

A unique specimen of a gecko, discovered languishing in the basement of a French museum, may be the only tangible evidence of the large forest lizard called kawekaweau in Maori folklore. TONY WHITAKER looks at what is known of the kawekaweau and recent efforts to confirm that the specimen of *Hoplodactylus delcourti*, the world's largest gecko, came from New Zealand.

WHEN PAKEHA arrived in New Zealand Maori told them of large lizards – known as kawekaweau (sometimes kaweau or koeau) – which inhabited the dense forests of the North Island. Kawekaweau were usually described as about 60 cm long and arboreal, and were distinguished from a similar-sized reptile, the tuatara. Some accounts describe them as ground-dwelling or amphibious, and it was even suggested they could fly. They reputedly ate the berries of forest trees such as tawa.

Although some early pakeha settlers are believed to have seen kawekaweau, there are no known specimens or precise descriptions. In fact, the best account, from 1870, was also the last. Gilbert Mair described how a Urewera chief had killed a kawekaweau found beneath the bark of

a rata tree in the Waimana Valley, near Whakatane. This animal was said to be “about two feet [60 cm] long, and as thick as a man’s wrist; colour brown, striped longitudinally with dull red”.

By the middle of this century the absence of any further sightings, and the complete lack of material to support the existence of a lizard of half a metre or longer, meant the biological reality of the kawekaweau was in doubt. It seemed that either the animal was mythical, like the taniwha and kumi, or perhaps based on grossly exaggerated accounts of a much smaller species of lizard.

Then in 1979 Alain Delcourt, curator at the Museum d’Histoire Naturelle de Marseille in France, found a study skin of a huge gecko among a collection of mounted reptiles stored in the museum’s basement. Unfortunately, there was no information with the specimen or in the museum registers of where, when or by

whom it had been collected. And although it had been in the museum since at least 1902 there was no indication of when it arrived.

Realising immediately the significance of his find – at 62 cm it was half as long again as the previously largest known gecko, *Rhacodactylus leachianus* of New Caledonia – Delcourt sent photographs of the specimen to various herpetologists hoping for identification. Finally Aaron Bauer and Tony Russell in the United States, specialists in gecko taxonomy, concluded from the external form and X-rays of its skeleton that the large gecko at Marseille was probably a species of *Hoplodactylus*, a genus until then found only in New Zealand.

In 1986 Bauer and Russell formally named the Marseille gecko *Hoplodactylus delcourti*, honouring Alain Delcourt. Since then, *H. delcourti* has generally been regarded as part of the New Zealand fauna and has been closely linked with the kawekaweau of Maori folklore. However, doubts and questions remain about its genealogy and about how and when it got to Marseille.

FROM THE BEGINNING of the colonial period Marseille was the French base for many voyages to this part of the world and most material returning from here would have passed through that port.

The huge gecko may have been obtained by the museum between 1833 and 1869, a period for which all museum records have been lost, or it may have formed part of the founding collection when the museum was established in 1819. Another possibility is that it was acquired by the original director, during a visit to India and the Far East in 1819.

An argument often used by those sceptical of the close link between the Marseille gecko and the kawekaweau, is the apparent absence of skeletal material of a large gecko amongst the relatively well documented sub-fossil faunal remains from New Zealand caves and dunes. Bones of tuatara and many of the larger species of lizards now extinct on the mainland occur at widely distributed sites, yet bones large enough to be from *H. delcourti* had never been recognised.

However, two bones collected in central Otago in the 1870s could be from a gecko of this dimension. One was a reptile jaw bone, similar in size to that from a large tuatara (60 cm) but, instead of being serrations of the jaw itself, the teeth were separate as in lizards. The other was a small curved bone believed at the time to be the rib of a kumi – a large reptile in Maori folklore. The jaw bone

can no longer be found but the “rib” is still in the Canterbury Museum. Re-assessment of this “rib” indicates it is probably a cloacal bone – paired bones occurring in the genitalia of male geckos – which its length (14 mm) suggests came from a gecko about 60 cm long.

AS PART OF the sesquicentennial celebrations in 1990 the National Museum of New Zealand mounted a special exhibition, *The Forgotten Fauna*, focussing on the remarkable New Zealand herpetofauna. After protracted negotiations with the Museum d'Histoire Naturelle de Marseille and the French government, approval was gained to bring *Hoplodactylus delcourti* to New Zealand as the exhibition's centrepiece. The specimen was on display for two months before a multi-disciplinary research effort was mounted to try and work out its age and origin. This research had the makings of a real detective story.

The specimen of *H. delcourti* is what zoologists call a “study skin”. Rather than being preserved as a pickled specimen the animal has been stuffed, but instead of being mounted in a natural posture it is out straight and with its limbs extended. X-rays of the specimen show the skull is

intact and the limbs are present but the vertebral column and ribs are gone. The skin has been tanned and it has had artificial eyes fitted.

Researchers were not allowed to open the specimen so they had to be content with what could be gleaned from the outside or from X-rays.

First to check out the specimen were National Museum taxidermist Noel Hyde, and Rose Evans and Valerie Carson of the museum's Conservation Unit. In their opinion the animal had clearly been prepared by a trained taxidermist.

From his knowledge of the history of taxidermy Noel believes the mount was prepared early in the 19th century. Earlier taxidermy techniques on small animals involved leaving their skeletons more or less intact to frame up the mount. Later techniques used elaborate wire or wood frameworks for the same purpose (X-rays show there is no wire or wood in this specimen), and usually involved the removal of most of the skull and all limb bones except for the toes. The artificial eyes lack the detail of the realistic glass eyes that became common-place in taxidermy by the middle of last century. The thread is 2-ply linen that would have been widely available through the 19th century.



The shape of the *H. delcourti* specimen and the scales on the head and feet are remarkably similar to those of the other geckos in New Zealand and the main reasons for its placement in the endemic New Zealand genus *Hoplodactylus*.

The material used to stuff zoological specimens can often indicate their origin. This was examined in the hope that the big gecko might contain plant fibre peculiar to New Zealand such as flax. Instead, the stuffing almost certainly contains sisal, a fibre commonly used in taxidermy last century.

An expert on the New Zealand geckos, Rod Hitchmough at Victoria

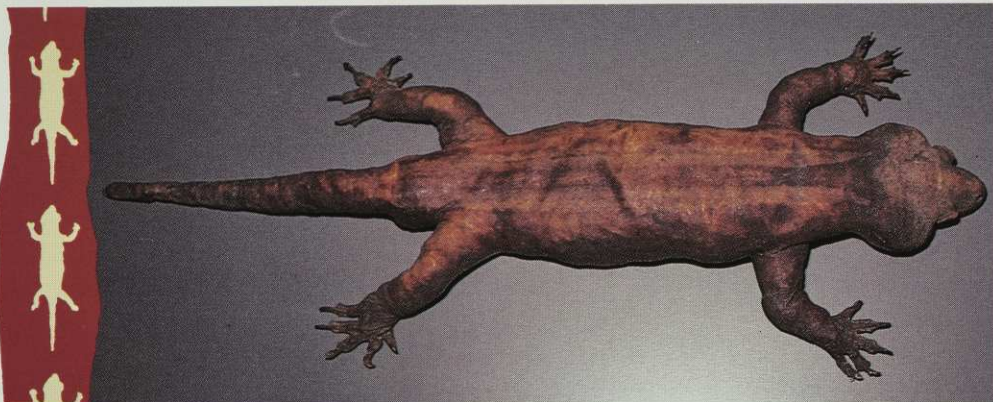
who studies plant pollen), Dallas Mildenhall. If the pollen adhering to the specimen turned out to be predominantly of New Zealand plant species it would show that if not actually collected here the animal had, at the very least, been in this country at some time in the past. No luck. The pollen Dallas was able to collect from the skin surface and the stuffing proved to be all from European plants –

Maybe somewhere amongst the papers of Reischek or Aubin there is more detail on what these animals were.

The negotiations to borrow the *H. delcourti* specimen, and its subsequent arrival and display, created widespread publicity and the National Museum received a number of fresh reports of very large lizards. Most of the sightings seemed to involve unwitting exaggeration of size or misidentification but a few, particularly one near Gisborne, could not be explained away so easily.

There are several, albeit remote, possibilities. Perhaps one of the bigger lizard species that were formerly widespread on the mainland (e.g. Duvaucel's gecko *Hoplodactylus duvaucelii* or robust skink *Cyclodina alani*) or the tuatara still survives on the East Coast or maybe tuatara from offshore islands have been released in the area. Maybe a large species of lizard from Australia has been liberated there. Or, just perhaps, the kawekaweau still lingers on in some remote corner of the country.

If it can eventually be proven that the specimen of *Hoplodactylus delcourti* is indeed from New Zealand, it is almost certainly the animal the Maori people



The colour and colour pattern of the only specimen of *Hoplodactylus delcourti* closely match Mair's 1873 description of the kawekaweau – "... colour brown striped longitudinally with dull red".

University, re-assessed the external form of the gecko, counting and measuring scales and checking body proportions. He confirmed Bauer and Russell's placement of the big gecko in *Hoplodactylus*.

X-rays of the specimen were able to provide sufficient detail of the skull and limb bones to also show that its placement in *Hoplodactylus* is probably correct on the basis of its bone structure. The *H. delcourti* specimen is a male and fortunately one of its cloacal bones is still in position, adhering to the inside of the skin at the base of the tail. The X-ray images are remarkably similar in shape to the kumi "rib" in Canterbury Museum and it is virtually identical in size.

Next came Victoria University parasitologist Ruth Ainsworth who thoroughly examined the whole exterior surface of the *H. delcourti* specimen in the hope of finding New Zealand parasitic mites still adhering to it. Unfortunately this was not to be.

After the parasitologist came the geneticist. Laboratory techniques with DNA now allow genetic "finger-printing" to identify the relationships between species or even between individuals. Geoff Chambers, from Victoria University, hoped that minute tissue samples scraped from the inside surface of the skin would show how *H. delcourti* is related to other geckos and prove it is correctly placed in the New Zealand genus *Hoplodactylus*. Sadly however, the samples yielded no DNA, perhaps because of the tanning process used on the skin.

The final effort to prove a New Zealand origin for *H. delcourti* involved DSIR's forensic palynologist (a person

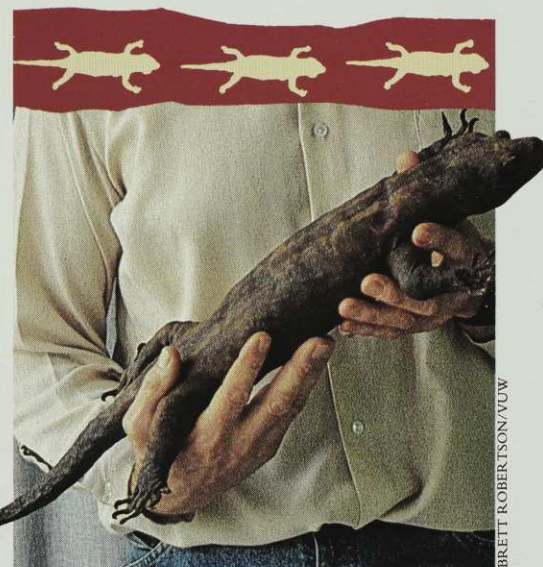
mostly pines, spruces and hops.

Although nothing was discovered that would tie the Marseille specimen to a New Zealand origin, neither was anything found that is inconsistent with it having come from here. The most likely scenario – common to many zoological specimens taken to Europe from New Zealand – is that the gecko went to Europe pickled in alcohol and was later prepared as a study skin by a professional taxidermist.

W HERE TO FROM HERE?

Because the Museum d'Histoire Naturelle de Marseille made it quite clear that the loan of *H. delcourti* was an exception to their general policy, the New Zealand research was carefully recorded on film, X-rays and transparencies. Because the most convincing proof of a huge gecko in the New Zealand fauna will probably come from the discovery of skeletal remains in cave or dune deposits, the X-rays of the specimen will be used to prepare a reference atlas for palaeontologists working on sub-fossil fauna.

Closer to home there might be leads in some lost papers of Frederick Manning or Gilbert Mair both of whom supposedly saw or held specimens of kawekaweau. And finally there is the mysterious story of Jean Aubin and Andreas Reischek. In 1882 when Reischek was in the King Country searching for Maori artifacts he left his cases of specimens reputedly containing some very large stuffed lizards in the care of Jean Aubin, storekeeper at the border town now known as Pirongia.



"about two feet long, and thick as a man's wrist ..." was how Gilbert Mair described a kawekaweau killed near Whakatane about 1870. *Hoplodactylus delcourti* in Wellington in early 1990 for display and research.

knew as kawekaweau. Sadly, the lack of confirmed sightings since the 1870s suggest the kawekaweau is now extinct and must join the long list of species that have succumbed to habitat destruction and the impact of introduced predators since humans arrived in this country.



Tony Whitaker is one of New Zealand's foremost herpetologists. Formerly with DSIR he now works as a freelance ecologist specialising in lizards.



A Living New Zealand Forest

by Robert Brockie (David Bateman)
\$95; special price to Forest and Bird members \$85

In 1966 the DSIR commenced a major series of studies of the Orongorongo Valley forests near Wellington – a study of the links, interactions, balances and imbalances of the forest plants and animals. The study continued for 25 years and the 1,200-ha research block became one of the most intensively examined forest communities anywhere in the world. It generated over 80 scientific papers, a score of departmental reports and many of its findings have already been incorporated into conservation management practices.

Here for the first time the study, its findings and their implications for all New Zealand's forests are put together in a coherent form in non-technical language. The results, if we didn't already know it, make depressing reading. Far from being pristine, our forests are being radically altered and their stability and tranquillity is largely illusory. Natural disturbances, such as droughts, gales and earthquakes which for millenia the forests took in their stride, have been supplemented, particularly in the last 150 years, by the depredations of foreign animals. The activities of these animals says Brockie "have outstripped the self-healing power of the forest, degrading its botanical integrity, reshaping its makeup and structure, consigning it to an impoverished future. Alien predators and competitors came to dominate the native animal life of the forest." This is certainly the book's central message.

While the overall results are the most important, it is the detail of the various forest processes and interactions that provide the fascination: the changes with the seasons; the fact that nearly a third of the rain falling on the Orongorongo forest is held in the canopy and evaporates without reaching the ground; that the main food of



M. J. MEADS: FROM A LIVING NEW ZEALAND FOREST

The native fly, *Pales* sp., sunning itself on hard beech leaves in the Orongorongo Valley. The larva of this fly is a parasite of pupae of the native *Helm's* butterfly, effectively holding the butterfly population in check.

feral cats is rats and possums, not native birds; and that rabbits have adapted to living in the bush as well as they do in open country.

Brockie was one of the team leaders for part of the study. He writes elegantly and the book is well organised and produced. Some of the 30 colour plates are not particularly good but that is maybe because they were record shots taken over a 25-year period. All the plates are thoughtfully captioned as are the 150 well-drawn figures and diagrams.

Ian Close

The New Zealand Descriptive Animal Dictionary

by Malcolm Foord

Malcolm Foord's animal dictionary is a valuable resource book for libraries, natural history researchers and schools. The book's sub-title says it all: "The Common Names of the Animals, Native and Introduced, Large and Small, on the Land and in the Waters of New Zealand and her Outlying Islands, with a Short Description of Each". Scientific names are included in each description but not as headwords.

Over 8,000 names – all known vertebrates and invertebrates – are listed in 500 pages, covering almost 4,000 species or subspecies. The descriptions are suc-

cinct and in plain English. In addition to his own extensive knowledge of New Zealand's fauna Foord has drawn material from a wide variety of sources and these alone make a valuable bibliography of works on New Zealand animals.

The only part of the dictionary that could be improved is the Maori names. These often differ between iwi, explaining the proliferation of names for some species. More recent work on Maori names for insects in northern New Zealand will add to this dictionary. But dictionaries are organic books. Their compilation is a monumental task (Foord spent 10 years on this one) and once started can always be added to. Foord published this dictionary himself. If you cannot find it in your bookshop it can be purchased directly from the author, 39 Park Street, Dunedin at a special price to Forest and Bird members of \$29.50 plus postage of \$4 (South Island) \$5 (North Island).

Mark Bellingham

A Field Guide to New Zealand Birds

by Geoff Moon (Reed) \$34.95

Bird lovers and photographers will be familiar with Geoff Moon's outstanding photography in his large format bird books and calendars. In this new field guide each species has an informative text and is well illus-

trated with photos, although it doesn't include many seabirds or rare vagrants. In recent years there has been a rash of simpler bird field guides and of these Moon's guide is easily the best.

This guide shows the power of photographs for bird identification. However, we still lack a good comparative photographic field guide, like the American Audubon guides, which point out distinctive features of different birds and compare them with similar species. Perhaps it will be Geoff Moon's second edition.

Mark Bellingham

A Field Guide to the Alpine Plants of New Zealand (third edition)

by John T. Salmon (Godwit Press)
\$39.95

This is the third edition of John Salmon's alpine plant guide. The authoritative text and excellent photographs continue to make it the best reference book for novices to the alpine flora. The guide's division of plants into habitats, e.g. grasslands, scrub and streamsides, makes it easy to use and this is assisted by a full index.

But the book's claim to be "fully revised", or even revised at all, is rather far-fetched. The publisher has changed but this reviewer could not find any changes in the descriptions of the plants or the photographs used. The book does not include any recent revisions of plant names or taxonomy (the *Leptinella* and *Meliccytus* – formerly *Cotula* and *Hymenanthera* – revisions from the *New Zealand Flora* volume VI of 1988 are not included) nor does it refer to a number of recent texts. The book also continues to suffer from Salmon's annoying habit of inventing "common" names for plants, for example curved-leaf grass tree for *Dracophyllum recurvum*, and the lack of Maori names where they are well accepted and well known e.g. wild irishman (matagouri) and mountain cabbage tree (toi).

Mark Bellingham

Get into the great outdoors

if you want to participate in courses that are:

- EXCITING • VALUABLE • REWARDING • ACTIVE
- ENJOYABLE • OF BENEFIT TO YOU AND YOUR STUDENTS

Then we have the course for you!

Training in outdoor education skills provides exciting, valuable and rewarding experiences that you can share with your students on your return to school.

For more information on resources and training opportunities to enable you to experience and run quality outdoor education courses contact:

Kay Messerli
PO Box 2251, Wellington.
Ph (04) 472 8058



Hillary Commission
FOR RECREATION AND SPORT

New Zealand's Subantarctic Islands Antarctica • South Georgia



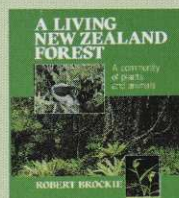
"The Southern Ocean is so vast, and the breeding places for birds and animals so few, that the concentrations of wildlife are both enormous and astounding." Conon Fraser *Beyond the Roaring 40s*

Exclusive small party ship-borne expeditions offering an unparalleled opportunity for superior coverage of the superb wildlife and scenery available in these remote regions. We operate over the summer season, January to March, with both sailing ship and motor vessels. Voyages are from 11 to 28 days, starting at \$1595 USD.

For free colour brochures and further details from the Southern Ocean specialists:
Discovery Charters (South Seas) Limited, PO Box 1182,
Dunedin, New Zealand. Phone/Fax (03) 453-6986.

A LIVING NEW ZEALAND FOREST

by Dr Robert Brockie



An illuminating new perspective on the bush and its inhabitants. This book will appeal to all who love the outdoors and natural history.

Our native forest, from canopy to forest floor, has been the subject of a landmark 25-year study by DSIR scientists. Now, for the first time, their discoveries are presented in plain language – the changes with the seasons; behaviour and breeding of birdlife, effects of possums, deer and goats upon the vegetation, and much more. The study, based in the Orongorongo range near Wellington, has led to many astonishing discoveries which apply throughout most of New Zealand.

192 pages with 32 pages of colour and more than 150 line illustrations. Retail price approx. \$95.00

Special Offer
to all members of
Forest & Bird
\$85.00 per copy

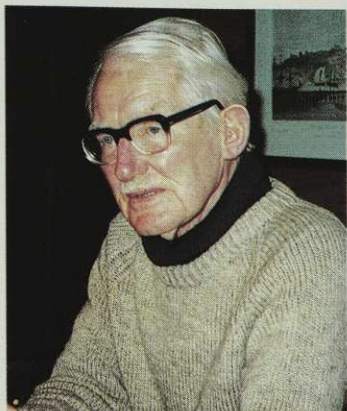
To order your copy of **A Living New Zealand Forest** at the special price of \$85.00 (including post & packaging), simply write to:

Forest & Bird
Mail Order Special Offer
PO Box 631
WELLINGTON

Be sure to include your membership number (on your *Forest & Bird* address label) and a cheque for \$85.00.

**Obituary: John Jerram**

JOHN VICKERS JERRAM died on 26 December aged 79.



He was the president of Forest and Bird from 1974 until 1976, a period of critical importance to the society. In 1974 the society had some 17,000 members. It operated from tiny premises in Wellington. It had for 19 years been run by a remarkable man, Roy Nelson, with the assistance of one full-time paid secretary.

The demands of the society and the urgency and increase of conservation issues meant great changes were to be inevitable. The task for John Jerram was to change the society from one run essentially by dedicated and gifted amateurs to one comprising a large section of our community served and directed by the fully professional organisation we know today.

John had all his life been a committed conservationist. He had been chairman of the Auckland Branch Committee, an active member of the campaign to save Lake Manapouri and a member of the Coromandel Forest Park Advisory Committee from 1970 to 1975.

John had a wide knowledge of the world and of business. Born in Wellington, he studied at Victoria University and joined the merchant house of Bing Harris Limited, of which he was to become a director. His interest in local body politics led to terms on the Eastbourne Borough Council and he became deputy mayor in 1950 to 1952.

By the time he became president he had retired to Taupo. This placed an added burden on

his energies, as much time had to be spent in Wellington. One of the major issues that greeted him was the emerging government Indigenous Forest Policy proposed at the Forestry Development conference held on the West Coast. The preservation of the West Coast beech forests was then to the forefront. It still is.

The society's first technical officer, to become the national conservation officer, was appointed. A large sum was raised to purchase Maud Island as a bird sanctuary. John's hope was that conservationists could speak with one voice on the great issues. He had a pretty pen and his editorials in *Forest & Bird* were written from the heart.

Forest and Bird was fortunate indeed to have had John Jerram to lead it at that critical time. He lived to enjoy retirement with his family and fishing. His passing is a loss to us all and we extend our sympathy to his family.
A.A.T. Ellis

Help save the Rarotongan kakarori

GOING FOR A HOLIDAY in Rarotonga? Then you could help save the endangered kakarori.



MARK BELLINGHAM

Tereapo from the Cook Islands Conservation Service needs volunteers for the kakarori programme.

The Cook Islands Conservation Service needs volunteers for their programme to save this endangered bird. The pre-breeding survey is in August, and nest protection work will run from September to January. The kakarori is an endemic

flycatcher whose population has been reduced to a few dozen.

Tereapo and Eddie who run the programme need volunteers for at least a week at a time. The service runs on a shoestring and they cannot offer transport or accommodation. But they will give you an experience of a lifetime in the Rarotongan forests. Please contact the service (Box 371, Rarotonga; phone 21256) before you go so they can fit you into their programme.

Fleming Conservation Scholarships

FOREST AND BIRD provided \$10,200 this year for scholarships for research and conservation projects on native plants, animals and habitats. Twenty-one applicants received grants ranging from \$200 to \$700.

Waikato Branch conservation grant

APPLICATIONS ARE invited for a grant of approximately \$4,500 to support or assist with a conservation project during the summer of 1992-93.

There is no restriction as to the type of project eligible 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: direct practical work such as acting as a wildlife warden or fencing bush; research relevant to conservation, whether in the field, laboratory or through the literature; an enterprise of an educational, journalistic or legal nature aimed at promoting good environmental principles; any combination of these or any other conservation-orientated activity.

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

J.S. Watson Conservation Trust

THIS TRUST, administered by Forest and Bird, invites applications from individuals or conservation groups for financial assistance for conservation projects over the 1992-93 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 may be awarded to one or more applicants, or held over for a subsequent year.

For further details and application forms, write to the National Secretary, PO Box 631, Wellington. **Applications close 30 July.**

Ron D. and E.A. Greenwood Environmental Trust

THIS TRUST provides financial support for projects advancing the conservation and protection of New Zealand's natural resources, particularly flora and fauna, marine life, geology, atmosphere, and waters including the promotion of a wider care and understanding of such resources. More information is available from the trust at PO Box 10-359, Wellington.

Back issues of Forest & Bird

WHILE WE KNOW that most members treasure their old copies of the magazine, there may come a time when you don't want them cluttering up the spare room. Back issues are useful to us so if you don't want them please send them to the Membership Secretary, PO Box 631, Wellington.



CLASSIFIEDS

FAREWELL SPIT Gannet Colony and Lighthouse Safaris & Wader Watch

Departure times vary according to tidal conditions. Farewell Spit is a Wetland of International Importance and a Bird Sanctuary of World renown.

For information, write to:
Collingwood Safari Tour Ltd
PO Box 15, Collingwood
or Phone 03-524 8257

Cape Kidnappers

Tourist

Motels

Gannet
Trips

10%
Discount



Beachcrest Motel
Te Awanga 06-875-0170

THE SURVIVOR

**Microbiologically pure water
Giardia free**

Pencil sized tube purifies through carbon/iodine pentapure directly to mouth.

Survivor 100	lt. cap	\$37.50 inc. GST
	14.5 cm	21.5 gms
M1	375 lt. cap	\$81.00 inc. GST
	16.5 cm	41.0 gms
M2	575 lt. cap	\$104.25 inc. GST
	14.0 cm	62.0 gms

M1/M2 can be used in squeeze bottles. Larger Faucet/pump models available.

Rowen Crawford, Cost Services Ltd.,
PO Box 905, Auckland.
Ph/Fx (09) 733-064.

Gipsy Point Lodge



At the head of the beautiful Mallacoota Inlet, the Lodge provides a relaxing, comfortable base from which to explore a unique, unspoiled area rich in bird and plant life. Package holidays for bird observers and field naturalists.

First class, all-inclusive accommodation.

Gipsy Point Lodge
Gipsy Point, Victoria 3891
Australia

Telephone: (051) 58 8205

A B MINI TOURS

Tours/Adventures in southern NZ by luxury mini coach, emphasis on wildlife & natural areas. Itineraries include - Catlins Coast, Stewart Island, Fiordland: including day walks from Milford & Borland Roads including Hollyford Valley. Lakes Mavora Mt Nicholas & Walter Peak Stations. Dunedin wildlife & Taieri railway. Kepler Track: helicopter to Luxmore slopes, caves, bushwalk to Lake Te Anau sail across lake all in a day. Choice of cabin/motel/hotel accommodation. Be guided by Allan Boyer an experienced guide, his knowledge will add to yours.

Write to:
Box 153, Gore, Ph (03) 208-7704.

NEPAL TREK

Join us on a special journey of discovery into a little known and seldom visited region of the Nepal Himalaya.

Rowling Valley - Mar 6-28 1993
two week trek into this remote region including Tso Rolpo Lake & Traum Bau Glacier.

Stopovers - Singapore, Kathmandu, Hong Kong.
Fully escorted.

**KARAVAN ADVENTURE
TREKS** associated with

**GREG MILLER
HOLIDAY SHOPPE**

117 Harris Cres,
Christchurch 5
Phone 03 352-2177
Write now for bookings
and information.



Special Escorted Tours 1992

• Culture • Wildlife •
• Art Treasures •

•Kakadu • Borneo • Africa •
• Argentina • Tasmania •
• Antarctica •

Send today for more details:
**Venturetreks, Freeport 147,
P.O. Box 37 610, Parnell,
Auckland. Ph: (09) 799 855**



WILD BIRDS DOWN UNDER

TOURS FOR BIRDOS 1992/93
New Guinea June 14 - 28

NORTHERN AUSTRALIA
The Kimberleys July 2 - 16
Darwin & Kakadu July 17 - Aug 1
Cairns/Atherton Tableland Aug 15 - 29
Cairns to Cape York Sept 4 - 19

NEW ZEALAND -
Southern NZ & Stewart Is. Oct 9 - 18
Wild Birds NZ-wide Oct 31 - Nov 14

THE ENDS OF THE EARTH
Stewart Island Dec 13 - 19
Chatham Islands Jan 18 - 26, 1993

AUSTRALIA -
The South East Mar 6 - 21, 1993
Sydney & The Bush Mar 27 - Apr 11

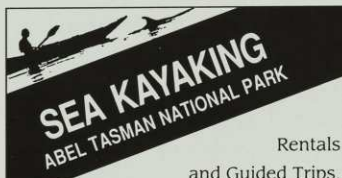
Send for individual itineraries to:-

WILD BIRDS
DOWN UNDER Andy Anderson
Box 1, Tarras Ph 64-3-445 2825
Otago, New Zealand Fax 64-3-443 8876

Native Bush Blocks

**Mangawhai - Northland
For Sale**

2 x 10 acre mature native bush blocks. Access road + power. Stream, ponds, native birds, rural views + secluded house sites. 1 1/2 hours north of Auckland + 5 minutes from Mangawhai Heads Beach.
\$58,000 + \$85,000. Phone or fax (09) 431-4729.



SEA KAYAKING
ABEL TASMAN NATIONAL PARK

Rentals

and Guided Trips.

Write for our brochure

Ocean River Adventure Co

Marahau Beach, R.D.2, Motueka
Ph (03) 527-8266, Fax (03) 527-8006

MARIGOLD COTTAGE Lake Hawea

Charming, peaceful retreat with every modern convenience and comfort. Sleeps four plus. All seasons accommodation, close to fishing, skiing, close to Haast Highway for West Coast travellers. Long or short stay.
Please ring or FAX 03 443 1002.
Rosie and Tom Parsons will welcome your enquiries.
Fairwater, Lake Hawea.



CROSS-COUNTRY SKIING

**based at private
mountain hut**

Alpine Recreation
PO Box 75, Lake Tekapo
Ph: 03 680-6736
Fax: 03 680-6765

GALAPAGOS ISLAND PANTANAL MEGA-MARSH AMAZON JUNGLE

4 Weeks
Fully escorted tour
by Naturalist/Author
BRIAN PARKINSON
Departing October 1992
Ph: 09 625 7140
or write to Brian Parkinson
PO Box 12, Auckland



Roz Heinz and Cynthia Roberts
**Naturally different holidays
from our Westland Lodge**

Write for our free brochure
53 Dyers Pass Road,
Christchurch 2.

Holiday House Available, Weber

near Dannevirke, sleeps 14, crockery, cutlery, cooking utensils supplied; electric stove, fridge and hot water. 130 acre bush reserve on property, variety of walks, from short walks round the farm to a full day's hike, including river gorge and views to Ruahine Range.

For further information and bookings
Ph. Greg Bennett (06) 374-3658.

Coromandel Cottage

Accommodation on 100 acre farm, idyllic location, bush and river, shorter or longer walks. 15 bunks. \$12 per night. Just bring bedding and food. Honey and eggs available. Write to 309 Honey, RD1, Whitianga or ph (0843) 65151.

Repairs to Binoculars & Telescopes

Are your binos as good as they used to be?

For a complete overhaul send to:
Optical Instruments PO Box 27-365
457A Richardson Rd,
Auckland, 4. Ph 09-626 4758

And a complete range of new binoculars.

Holiday Cottage Marlborough Sounds

In a secluded bay - sleeps 6-8. Enjoy scenic walks through native bush, visit Captain Cook's monument at Ship Cove. Organised tours - scenic trips to your points of interest arranged - realistic rates.

Contact:
Compass Charters Picton Ltd
PO Box 334, PICTON
Ph. 03 573-8332. Fax 03 573 7716.

RUAPEHU COTTAGE AND LODGE

**Skiing & Family
Holidays**

**Reduced rates outside
ski season**

Comfortable cottage for 6-8 with excellent facilities, or lodge-style accommodation in our house, in beautiful, peaceful surroundings at Horopito, 2km off S.H.4 half way between Auckland and Wellington, 16km both Ohakune and Raetihi. The 3.2 hectares on the boundary of Tongariro National Park includes bush, streams, pond and magnificent view of Mt Ruapehu. Perfect location for family, tramping and adventure holidays, skiing or just relaxing. For leaflet and bookings contact Conon and Jackie Fraser, Matapuna Rd, Horopito, RD6 Raetihi. Tel: (06) 385 4495

JOIN FOREST AND BIRD

We need your support and the support of your friends to fight for New Zealand's natural heritage.

Being a member of the society means being a part of New Zealand's most effective conservation lobby.

You can be active in conservation campaigns ... join others in national or local trips and walks ... or simply take pleasure in knowing you are playing an important role in helping to preserve our priceless natural heritage.



And of course, you receive 4 copies a year of *Forest & Bird*, the Society's superb natural history magazine.

JOIN A FRIEND

We need your friends and relatives to join Forest & Bird. Show them through *Forest & Bird* magazine the wonder of our natural heritage and why it should be protected.

Our key campaigns for the future are:

- Private forest clearance
- A network of marine reserves
- High country tussocklands
- South Pacific rainforests
- Ozone layer
- Antarctica
- Climate change
- Fisheries
- Pollution



WWF

SALES OF RE RIGHT SUPPORT
WORLD WIDE FUND FOR NATURE
IN NEW ZEALAND

FOREST & BIRD -

working together for our natural heritage

PRINTED ON RE RIGHT 100% RECYCLED PAPER

the friendly places to stay

The YHA provides a unique way to explore New Zealand by using a network of hostels, each with its own character, yet maintaining the consistently high standard of YHA.

You will find our hostels in over 50 prime locations throughout New Zealand - many of them boasting "million dollar" views.

So you're not a youth - doesn't matter. If you are young at heart, travelling on your own, with your family or as a group, out to see the world or your own country, YHA HOSTELS provide you with a friendly, relaxed atmosphere where you can meet like-minded people from all over the world.

☒ YES PLEASE SEND ME MORE INFO ON YHA HOSTELS AND MEMBERSHIP BENEFITS

Name _____

Address _____



THE ROYAL FOREST AND BIRD PROTECTION SOCIETY MEMBERSHIP APPLICATION

☐ Yes, I want to join! Please enter a membership in the category checked below.

Name: _____

Address: _____

Telephone: _____

GIFT MEMBERSHIP: If you are giving this membership as a gift, please enter *your* name and address *below*:

Donor name: _____

Address: _____

Telephone: _____

GIFT MEMBERSHIPS will be sent with a special gift card in your name.

☐ Please tick if you would like to be billed for renewal of this gift membership next year.

MEMBERSHIP CATEGORIES

	1991/92		1991/92
<input type="checkbox"/> Family		<input type="checkbox"/> Kiwi Conservation Club (separate newsletter)	
<input type="checkbox"/> Single		<input type="checkbox"/> Single	\$10.00
<input type="checkbox"/> Group	\$40.00	<input type="checkbox"/> Family, Schools and Groups	\$20.00
<input type="checkbox"/> Senior (single)	\$30.00		
<input type="checkbox"/> Senior (family)	\$30.00		
<input type="checkbox"/> Student, Schools and libraries	\$25.00		
<input type="checkbox"/> Corporate	\$275.00		
<input type="checkbox"/> Life	\$475.00		

Send your cheque to: THE SECRETARY
ROYAL FOREST AND BIRD PROTECTION
SOCIETY, P.O. BOX 631 WELLINGTON

DONATION _____
I found this journal application at _____

THE ROYAL FOREST AND BIRD PROTECTION SOCIETY MEMBERSHIP APPLICATION

☐ Yes, I want to join! Please enter a membership in the category checked below.

Name: _____

Address: _____

Telephone: _____

GIFT MEMBERSHIP: If you are giving this membership as a gift, please enter *your* name and address *below*:

Donor name: _____

Address: _____

Telephone: _____

GIFT MEMBERSHIPS will be sent with a special gift card in your name.

☐ Please tick if you would like to be billed for renewal of this gift membership next year.

MEMBERSHIP CATEGORIES

	1991/92		1991/92
<input type="checkbox"/> Family		<input type="checkbox"/> Kiwi Conservation Club (separate newsletter)	
<input type="checkbox"/> Single		<input type="checkbox"/> Single	\$10.00
<input type="checkbox"/> Group	\$40.00	<input type="checkbox"/> Family, Schools and Groups	\$20.00
<input type="checkbox"/> Senior (single)	\$30.00		
<input type="checkbox"/> Senior (family)	\$30.00		
<input type="checkbox"/> Student, Schools and libraries	\$25.00		
<input type="checkbox"/> Corporate	\$275.00		
<input type="checkbox"/> Life	\$475.00		

Send your cheque to: THE SECRETARY
ROYAL FOREST AND BIRD PROTECTION
SOCIETY, P.O. BOX 631 WELLINGTON

DONATION _____
I found this journal application at _____

Please
rush this
to

NO
STAMP
REQUIRED

FREEPOST 314

The membership manager
Youth Hostels Association
P.O. Box 436
CHRISTCHURCH

Pioneer tour to Tangarakau

WHERE IS TANGARAKAU?

It's on the NZ Heritage Trail!
Join MACANZ TOURS WANGANUI for

2-5 day tours of discovery into our scenic historical and wild back-country. All electric accommodation and easy day trips.

Suitable for all age groups.
For further information:



MACANZ TOURS
PO BOX 36, Wanganui. Ph 06 3444194

DUSKY SOUND

In the wake of Captain Cook

Six day historical Captain Cook cruises to remote and beautiful Dusky Sound. New Zealand's earliest European history. Regular cruises operating throughout the summer.

For details telephone or write
Cliff & Irene Barnes
Fiordland Cruises Ltd
PO Manapouri
Tel (03) 249-6609

"The Adventure Seekers of the Southern Fiords"

TRAVEL SOAP

WILL LATHER IN FRESH & SALT WATER

TRAVEL SOAP AND TRAVEL WASH ARE IDEAL COMPANIONS FOR TRAVELLERS, CAMPERS, YACHTSMEN, BACKPACKERS, ETC BEING SUPPLIED IN A CONVENIENT, NO MESS, SPACE SAVING PACK.



TRAVEL WASH

FOR YOUR TRAVEL AND HOME HANDWASH

AVAILABLE FROM LEADING PHARMACIES, BOAT CHANDLERS, TRAVEL AND OUTDOOR SPORTS STORES.

UNIQUE

UNIQUE PRODUCTS LTD. PO BOX 25424 ST. HELIERS, AUCKLAND, PH 575 4141, FAX 575 3334.

ABEL TASMAN NATIONAL PARK ENTERPRISES

4 DAY GUIDED WALK \$645 Adult.

Join us to cruise, walk and explore intimate bays with startling blue waters and golden sand. Lush native trees and ferns create a sub-tropical impression along these historic shores. Features:

WE CARRY YOUR PACK, all meals provided, our own private Lodge, Bus to and from Nelson.

New 5 Night/6 Day Golden Bay & Abel Tasman Tour Available



LAUNCH SERVICE: Independent Trampers we service all bays from Kaiteriteri to Totoranui. Join our 6½ hours Day Cruise if you have only a day to see the area.


For further details and brochure contact:

Old Cedarman House
Main Rd
Riwaka. RD3. Motueka. NELSON.
Ph (03) 528 7801 Fax (03) 528 6087

Please Specify approx. date interested.


SUBANTARCTIC ISLANDS OF NEW ZEALAND

Wildlife abounds on these remote, isolated Islands, which can be numbered among the last unspoilt environments on earth. Cruises visit Stewart, Snares, Aucklands, Campbell, Antipodes, Bounties, Chathams and Macquarie Islands. Join one of five expedition cruises aboard *Pacific Ruby* this summer. Enjoy the advantages of this 140' ocean going ship with a small group (max 20 passengers). Each cruise accompanied by professional naturalists, maximum time ashore where landing is allowed and zodiac cruising at others.




For more information contact:
Southern Heritage Tours
P.O.Box 22, Waikari
North Canterbury
Tel. (03) 314 4393
Fax. (03) 314 4137

Please send details to:
Mr, Mrs, Miss, Ms _____



KAIKOURA TOURS Limited



"WHALE WATCH"

3 HOUR BOAT TOURS DAILY

SPERM WHALES & OTHER MARINE LIFE PRESENT ALL YEAR

For information and Bookings
Telephone/Fax (03) 319-5045

FOREST & BIRD LODGES AND HOUSES

Ruapehu Lodge, Whakapapa Village, Tongariro National Park

Set in a privileged position within the national park this lodge is available for MEMBERS ONLY, and is an ideal location for tramping, skiing, botanising and exploring.

The comfortable lodge holds 32 people in four bunk rooms, and provides all facilities except food and bedding. Private parties are restricted to 10 members.

Bookings and inquiries should be made to PO Box 631, Wellington (04) 385-7374. The lodge is very popular, and bookings may be made six months in advance, if secured with a 20% deposit. The rates are reasonable, and fluctuate seasonally.

Full payment is required four weeks prior to occupation, after which time there is no refund for cancellation.

Turner Cottage, Stewart Island

This three-roomed dwelling accommodates six people.

For details send a stamped, addressed envelope, to: "Turner Cottage", C/- Mrs M. Tait, PO Box 48, Stewart Island, (03) 219-1396.

William Hartree Memorial Lodge, Hawke's Bay

The lodge is 48 km from Napier on the Puketitiri Road and 8 km past Patoka, amid the 14-ha William Hartree Memorial Scenic Reserve.

The Lodge accommodates 10 people. Extra mattresses and pillows are available to sleep up to 20. The lodge has a fully equipped kitchen.

Visitors supply their own linen and cutlery. The nearest store is 8 km away. No animals are permitted.

For rates send a stamped addressed envelope to the Booking Officer, Mrs Colleen MacKay, 89 Rodgers Road, Bayview, Napier, (06) 836-6836.

Tautuku Lodge

Tautuku State Highway 92, South East Otago. Situated on Forest and Bird's 550 ha Lenz Reserve 32 km south of Owaka. A bush setting, and many lovely beaches nearby provide a wonderful base for exploring the Catlins. Three well appointed buildings, the Lodge, the Coutts cabin and an A-frame sleep 10, 5 and 2 respectively.

For information and rates please send a stamped addressed envelope to the caretaker: Miss M. Roy, Papatowai, Owaka, RD2. Phone (03) 415-8024.

Tai Haruru Lodge, Piha, West Auckland

A seaside home situated in Garden Road, Piha, 38 km from central Auckland. Eight minutes' walk from the Piha store and close to bush reserves and walking tracks in the Waitakere Ranges.

The lodge is fully equipped and sleeps six to eight people. It has a large lounge with open fire, dining area, and modern kitchen.

You will need food, bed linen, towels, and tea-towels.

Different rates apply for winter and summer. For rates send a stamped, addressed envelope to the Booking Officer, Mrs B. Marshall, 160 Valley Rd., Henderson, Auckland, (09) 838-5859.

Waiheke Island Cottage, Onetangi, Waiheke Island

The cottage has comfortable bunk accommodation for eight people and has a stove, refrigerator, and hot water. Adjacent to a 49-ha wildlife reserve, belonging to the Society it is in easy walking distance from shops and beach. It is reached by ferry from Auckland City (two or three returns daily) and by bus or taxi from the island ferry wharf. Everything is supplied except linen and food. No animals are permitted.

Different rates apply for winter and summer. For rates send an addressed envelope to the Booking Officer, Mr D. McLean, 55a Queens Drive, Oneroa, Waiheke Island, (09) 726-494.

Bushy Park Lodge

Kai Iwi, 24 km northwest of Wanganui on sealed road off SH 3.

Historic homestead, fine grounds and 89 ha of virgin bush with tracks and trees identified.

Accommodation for 16 in six bedrooms, single and double beds, electric blankets, heaters and vanity units. Six extra folding beds. Bedding, linen and towels supplied. Showers, drying cupboard, kitchen with electric stoves, microwave, refrigerator, deep freeze, cutlery and crockery. Bring own food. Milk may be ordered.

Open 7 days a week; reduced off-peak rates.

A bunkhouse for 12 is available for group bookings. It has kitchen facilities, mattresses and pillows. Toilets and showers are in the adjacent stables building.

Bookings and information leaflets: Manager, Bushy Park Lodge, Kai Iwi, RD8 Wanganui, (06) 342-9879.

CLEARLY SUPERIOR



**Enlarge your vision of the world
with Minolta Binoculars**

Whether you're experiencing life's exciting moments at the stadium, the theatre or the rugged outdoors, Minolta binoculars can bring you so close to the action, you'll feel part of it. From the dependable all-weather performance of the Weathermatic to the Ultra-compact Pocket model, Minolta Binoculars deliver sharp precise images, with the kind of reliability you've come to expect from Minolta. The advanced optics, and user-friendly design of Minolta binoculars makes owning a pair... clearly worthwhile.



Advanced optics
Minolta use prisms made of special optical glass which correct colour aberrations and improve image clarity.



MINOLTA



DISTRIBUTED BY: Salmond Smith Biolab. P.O. Box 1332, Auckland, Phone: 0-9-579 9155

Ad Pac MIN0047



(Hector's Dolphin. Endangered species "Cephalorynchus hectori")

OUR COMMITMENT IS TO HELP PROTECT THE HECTOR'S DOLPHIN.

The dolphin species you see here is found only in New Zealand coastal waters.

It's one of the world's smallest, reaching just 1.4 metres in length. The total population is similarly small: 3,000 to 4,000. As you might expect, such limited numbers are vulnerable to man's activities*. Research has shown that they are prone to the pollution flushed into the ocean from nearby rivers.

But there are other hazards. In recent years many Hector's Dolphins have perished from

entanglement in fishing nets.

The result is their mortality rate is higher than their birth rate.

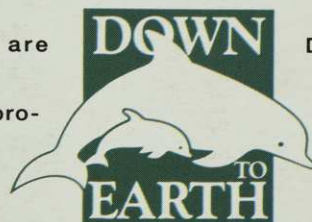


If this continues they will eventually become extinct.

But thankfully their plight is not being ignored. Dr Stephen Dawson and Dr Elizabeth Slooten of Otago University are researching ways to protect and save the Hector's Dolphin. ...a cleaner home and a cleaner world.

Reckitt & Colman, makers of Down To Earth, are sponsoring this project. Our commitment is to help preserve this endangered species, and you'll be supporting us in this whenever you use Down To Earth products.

Together we can take action to help save the Hector's Dolphin for future generations. If you would like to know more about Hector's Dolphins, contact 'Save the Hector's Dolphin Project', Private Bag, Symonds Street, Auckland. Telephone (09) 358 3022.



* PCB/DDT