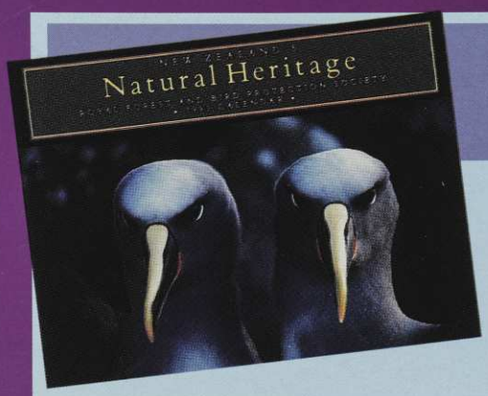
November 1992

Forest & Bird

who will save New Zealand's dotterels?
environmental labelling • saving a forest heritage
rivers: abused and neglected • new guide to environmental law



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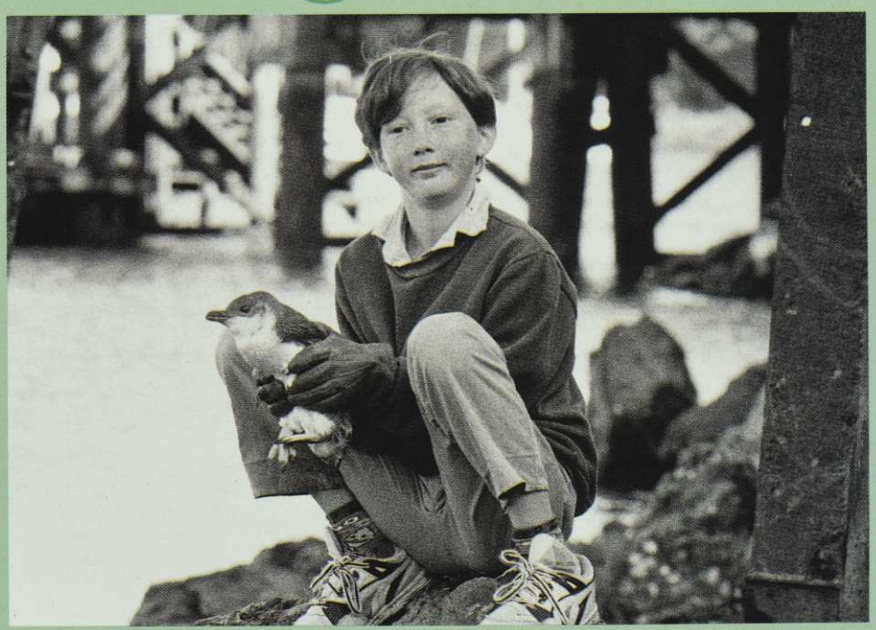

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COVER

Podocarp and broadleaved forest at Mangamuka in Northland. Intact lowland forest is now relatively rare in New Zealand and is a priority for protection by the Forest Heritage Fund (see story page 20).

ROB LUCAS

Test your Forest and Bird IQ. Try this easy quiz!

1 Which area contains the largest no-take marine reserve in the world?

a Great Barrier Reef Marine Park (Queensland)
b Kermadec Islands Marine Reserve
c Looe Key National Marine Sanctuary (Florida)
d Skomar Marine Reserve (Wales)

2 Which country produces the most waste per head of population?

a USA
b Australia
c New Zealand
d China

3 How many native species of land snails and slugs does New Zealand have?

a under 20
b 20 to 100
c 100 to 500
d more than 500

4 What does membership of Forest and Bird give you?

a participation in New Zealand's largest and most active grass-roots conservation organisation.
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e the right to stay at any of Forest and Bird's lodges throughout the country.
f all of the above.

Answers
1b,2c,3d,4f

see Membership Form in back of magazine

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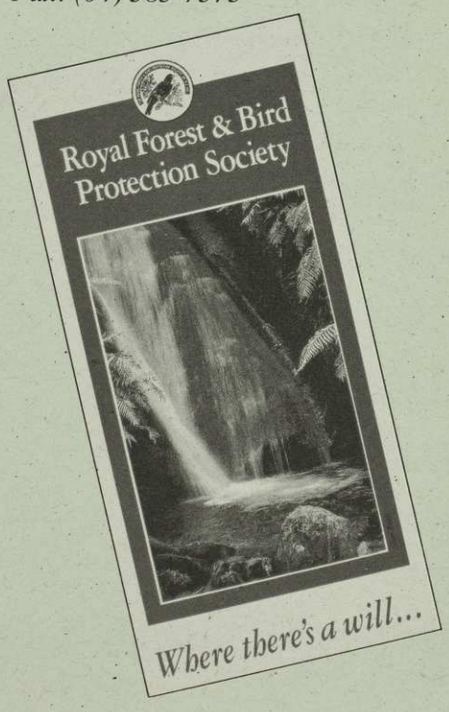

Issue Number 266
November 1992

Forest & Bird

70 years . . . 70,000 members

WHEN FOREST AND BIRD TURNS 70 next year it would be nice to celebrate with 70,000 members. Such growth would help maintain our leading edge among conservation groups as the grassroots movement which does most to preserve our wild creatures, special plants and natural habitats.

There are other groups which claim to be bigger but they don't have Forest and Bird's branch structure nor its active membership. Subscribing members are our strength. Gathered in 56 local branches and sections, they represent a very broad cross-section of New Zealanders. Their democratically elected branch councillors and executive councillors make policies responsive to that membership and guide the society's work.

When times turn tough we don't trim the ship by dropping issues overboard. Instead we find new ways of keeping up the largely voluntary efforts.

The campaign for 70,000 members may mean your asking a neighbour, a workmate, or someone from another social circle, to join Forest and Bird. Most New Zealanders have a soft spot for their outdoors and nature. Yet many don't know what they can do to protect their local environment, their fishing ground, beach or waterway, or a favourite holiday place. Forest and Bird membership provides them with a practical way of doing something.

Now is a good time for a personal effort to seek the support of such like-minded people. While disposable incomes may be falling Forest and Bird membership still represents great value. The magazine provides informative and attractive articles covering the whole field of conservation. It is now the only regular serious environmental journal in the country – sufficient inducement for many to belong.

There are local talks, field trips, youth groups, local conservation projects for those seeking a more active involvement. The society offers its members a cheap chain of excellent holiday lodges. Shortly we shall develop a discount system for the purchase of outdoor goods, building on our existing mail order service. Most of all there is the chance to do something, helping to save our environment and its special creatures, either actively, or simply by belonging.

It won't be easy to find 14,000 new members in these difficult times. Overseas and locally many conservation groups have suffered sorely through the economic downturn, dismissing staff and reducing their advocacy. Forest and Bird has had to tighten its belt too but we're continuing to keep up our conservation work, in large part because of our many volunteers and a loyal and generous membership.

Please try to persuade a friend to join the society in its urgent task of protecting the environment. It would be a nice gesture benefiting everyone to mark the society's 70 years in conservation.

Gordon Ell
National President

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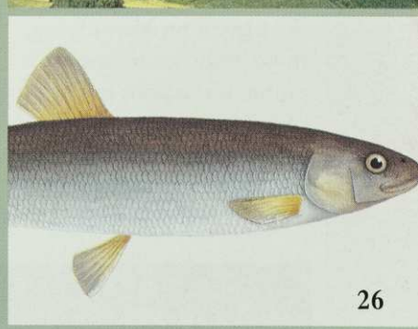

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The society's aims are to protect New Zealand's native species, natural ecosystems and landscapes and promote an appreciation of these.

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

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Conservation update

Under-reporting continues

THE DEATH of fur seals in the nets of foreign trawlers continues. And so does the trend of under-reporting by skippers. Claims by the Fishing Industry Association that all the seals which are caught are reported, defies belief. In the West Coast hoki fishery, which started in July, vessels carrying MAF scientific observers were ten times more likely to report fur seal deaths than those without an observer.

Unless you believe that seals can detect which vessels have observers on board and deliberately drown themselves in the nets of these boats, there is no reason to suppose that the total seal catch is not in direct proportion to the number of trawls observed.

This is the basis on which MAF Fisheries extrapolates the likely catch by the full fleet. Last year, for example, with observed vessels reporting 26 fur seal deaths and total observer coverage of just over 15 percent, MAF estimated that about 172 fur seals were killed over the whole fishery. Another 70-80 seals were killed in the hoki fishery off Puysegur Point, Fiordland.

SEAN WEAVER

A West Coast fur seal pup with an insecure future.

Observer coverage this year has been the lowest ever. On the West Coast, despite a promised coverage of 20 percent, only ten percent of trawler tows were watched by MAF observers. Recent research by MAF researchers and overseas scientists suggests that to get reliable figures on the by-catch of marine mammals and birds, observer coverage needs to be over 50 percent.

Forest and Bird estimates that in the season which finished in September, over 200 fur seals were killed in the West Coast and Puysegur hoki fisheries.

Another 60-120 seals were killed by trawlers earlier in the year in the squid fishery on the Snares shelf. The deaths in this fishery are a recent event, and have occurred in spite of the much-heralded industry code of practice. They bring the total of fur seals killed this year in New Zealand fisheries to nearer 300.

Barry Weeber

Open Bay Island leech

THERE IS GROWING interest in conserving New Zealand's invertebrates, especially those that are large and have restricted ranges. One of the biggest problems facing those enthused to save such rarities is the poor public image of our spineless cousins. No matter how much propaganda we spread about giant snails and weta they will never have the widespread appeal of kakapo and penguins.

COLIN MISKELLY

The Open Bay Island leech: its known range confined to one square metre.

Few people are aware that there are terrestrial leeches in New Zealand since these animals are usually associated with a mammal fauna. This country's two species are large, sanguivorous ("blood-eating"), ornithophilous ("bird-loving") and confined to small islands. Both can exceed eight centimetres when extended, and have been known to sample the occasional crop of human blood.

Ornithobdella edentula is confined to the Snares Islands and Little Solander Island, where it is usually recorded among penguin and mollymawk colonies. *Hirudobdella antipodum* has an even more restricted distribution – it is currently known from under one boulder on Taumaka, the largest of the Open Bay Islands.

The Open Bay Islands are about five kilometres offshore from Okuru, Haast. They are Maori-owned, and Taumaka has had a University of Canterbury research hut on it since the late 1960s. Almost all the research to date has focused on fur seals and Fiordland crested penguins.

The leeches were first recorded in 1903, when they were reported as common around the entrances of muttonbird burrows. Weka were introduced to the islands a couple of years later, and were long assumed to have exterminated the leeches. However, they were rediscovered in 1987 near water-logged penguin nests under a large glacial boulder. Subsequent searches relocated them in 1988 and in January this year – all in the same one square metre of habitat.

The Open Bay Island leech must be one of New Zealand's rarest invertebrates, but it may not be as scarce as the above records suggest. As next to nothing is known of its ecology and habitat preferences, no appropriate survey technique has been developed.

We do know that at the one site, the leeches are living in mud and penguin guano in almost complete darkness. It may be this last factor, along with their slow movements, that has saved a few leeches from the ever-watchful weka. Penguins nest in other muddy caves on the island, and there may be other isolated pockets of leeches hanging on in the inaccessible recesses.

New Zealand also has a dozen or so species of freshwater leeches which feed on fish and waterfowl.

Colin Miskelly

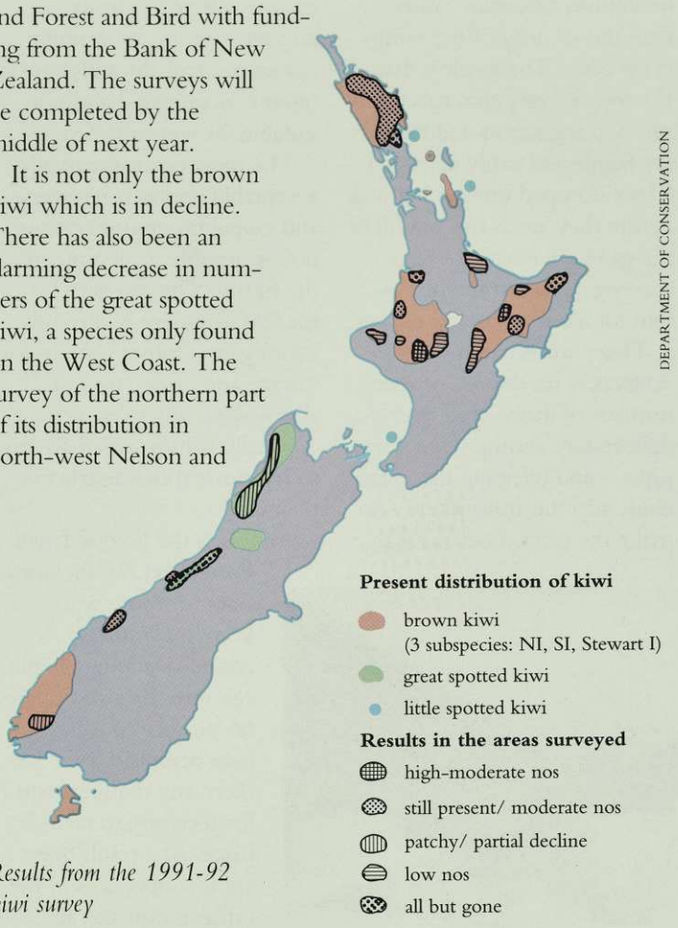
Kiwi decline

SURVEYS OF KIWI populations around the country over the past year have shown alarming declines in numbers and distribution, particularly those of the brown kiwi.

In Northland, long thought to be the stronghold of the North Island brown kiwi, there has been a clear contraction of the range in areas in the south-east where the birds were known 10-20 years ago. A similar story is emerging in Egmont National Park, Raukumara Range on the East Coast, Mamaku Plateau and Pirongia Forest.

The surveys were conducted by the Department of Conservation as the first stage of the five-year kiwi recovery programme launched last year (see *Forest & Bird* November 1991). The programme aims to maintain and boost kiwi populations throughout New Zealand and is a partnership between DoC and Forest and Bird with funding from the Bank of New Zealand. The surveys will be completed by the middle of next year.

It is not only the brown kiwi which is in decline. There has also been an alarming decrease in numbers of the great spotted kiwi, a species only found on the West Coast. The survey of the northern part of its distribution in north-west Nelson and the Paparoas showed patchy results, but in its southern distribution, in South Westland, only one bird was found.



DEPARTMENT OF CONSERVATION

Results from the 1991-92 kiwi survey

Only the little spotted kiwi, extinct on the mainland and now restricted to island sanctuaries, showed consistent well established breeding populations.

"There's now no doubt that kiwi are very severely at risk in the wild," said DoC's director of protected species Janet Owen.

The main threat to the kiwi comes from dogs. And possums, which compete for food, take over burrows and eat the eggs. Kiwi were also vulnerable to possum baits and poorly set gin traps.

DoC has advocated the shooting of dogs that kill kiwis. At present it is unable to do so. Forest and Bird, however, feels that this approach is too late and too limited, and has consistently argued that all kiwi habitat should be zoned as dog-free areas.

Why shoot the shoveler?

SHOVELERS are very unusual dabbling ducks. Unlike other dabbling ducks, they do not graze on grass or grain and are therefore entirely dependent on shallow swamps. Shovelers seem to be in decline and this can be largely attributed to the loss of these fertile wetlands to farming.

In the late 1970s, the population of this duck (an endemic subspecies of the Australasian shoveler) was estimated at 130,000 birds out of a total waterfowl population of more than five million. Since then much wetland habitat has been drained or degraded and many observers suspect that the shoveler population has dropped considerably.

This decline is certainly suggested in the official records of the waterfowl shooting season which are sourced from hunters' diaries. In practically every part of the country in 1990 and 1991, hunters' records and opinions suggest shoveler numbers to be down.

J. L. KENDRICK/DOC

Shovelers are dependent on shallow wetlands. Their bills are disproportionately large and spade-like, and edged with fine fringes to sieve tiny aquatic animals and seeds from amongst the raupo and rushes.

Murupara Forest and Bird member and keen shooter Andre Terpstra fears shovelers are continuing to decline drastically. On his farm where he and his wife Louise have sanctuary ponds and ponds for hunting, Andre has watched waterfowl for many years. He observes that shovelers are less wary than the introduced mallard, and respond readily to the decoys and calls of hunters. These techniques are much more widely used than they were ten years ago, so bagged shovelers might have been expected to increase, rather than decline as they have done.

It is not clear whether shooting is a factor in the decline of shoveler, but it obviously doesn't help. If shoveler were removed from the shooting list, a spin-off would be the enhanced protection of other small ducks. Shoveler are small and with their rapid flight can be confused with grey teal, a fully protected species. Many grey teal are shot by mistake for shoveler. If the latter were not targeted, this confusion should not arise, as hunting would focus on the much larger ducks – mallard, grey duck and paradise shelduck.

The loss of shoveler to most hunters would be slight. Over much of New Zealand shoveler contribute less than two percent to the hunter's bag (although in the Hawke's Bay and Wellington districts the figures are between five and six percent, and in North Canterbury and Otago, nine percent).

Already some hunters are choosing not to shoot shovelers. Perhaps it is time to consider greater protection for this endemic bird, and concentrate hunting pressure on the flourishing waterfowl species which have been introduced for this purpose.

Ann Graeme

CFCs: containment and recovery

THE PRODUCTION of CFCs may be coming to an end but there are still huge quantities contained in many existing appliances.

Concern at the environmental damage being caused by these ozone-depleting chemicals escaping from dumped refrigerators and freezers was the catalyst for a national Forest and Bird survey earlier this year investigating the management of CFCs and similar substances.

BRUCE CONNEW

Capital Power's Dennis Hansen attempts to retrieve CFCs from refrigeration units at Wellington City Council's Happy Valley landfill earlier this year. Many units were being damaged in the dumping process, with CFCs leaking out before they could be recovered. The council has since improved its collection procedures.

The results of the survey of management practices at landfills looked encouraging at first, as close to a quarter of all councils responded that they were either already removing refrigerants from dumped units or planning to do so soon.

But on digging a bit deeper we found that in many cases recovery was not occurring or that the recovery systems were failing to prevent most CFCs from being released into the atmosphere.

Because CFCs were originally thought to be inert (and still are at ground level), cooling systems were designed for maximum efficiency rather than the security of the refrigerant gases. The result is that the mass of very thin tubes and fins of refrigerators and freezers are fragile and easily damaged. Many dumped units either leak before they reach the landfill or the gases are released when scavengers dismantle the system for aluminium and copper.

There are even reports of retailers, who dispose of a large number of fridges and freezers, deliberately cutting condenser pipes – and releasing the refrigerant into the atmosphere – to make the units unserviceable.

At the drop-off site at Wellington's Happy Valley landfill less than 20 percent of units still retained some CFCs when the contractor arrived to drain them. In an innovative move the Wellington City Council is now consulting with retailers on the viability of a recovery scheme where units would be drained before delivery to the landfill.

Successful recovery requires appropriate equipment, trained staff, a secure drop-off site and public education, and even then the results are mixed. Unlike commercial refrigerators, freezers and air conditioners, the refrigerant from domestic refrigeration units comes in small amounts, and is often contaminated and not suitable for recycling or reuse.

The most environmentally acceptable option is recovery and containment until destruction is possible some time in the future. The Ministry for the Environment is currently investigating future options for storage and destruction of ozone depleting substances, especially halons which are up to ten times more destructive than CFCs.

Although the Ozone Layer Protection Act includes fines for those who knowingly release ozone-depleting chemicals into the atmosphere, no prosecutions have ever been laid. Nor are there any requirements for recovery to take place. As a result there are few operators in the refrigeration and air conditioning industries who have the equipment or the work practices to prevent CFCs from being released during servicing or decommissioning of units – despite a number of recovery units being available in New Zealand.

This situation makes a nonsense of both the legislation and a recently released government code of practice which aims to reduce CFC emissions during servicing. In Australia all refrigeration mechanics must attend a training course before their companies can be licensed to work on systems containing CFCs.

New Zealand does not produce CFCs but only imports them. Our ozone policy has a singular focus – the implementation of phase-out schedules for the importation of ozone-depleting chemicals. Since the policy was released in 1989 the government has consistently predicted that market forces would ensure that chemicals were not released into the atmosphere.

The theory was that as import quotas diminished, the supply of CFCs would contract, prices rise and suppliers would adopt efficient management practices to conserve these chemicals. The reality is that the price of CFCs in New Zealand hasn't risen at all since quotas were introduced. Ozone-depleting imports have fallen by 67 percent since 1986 but much of this reduction is due to a ban on their use in aerosols and a major buy-up of CFCs before controls took effect in 1990. There is no evidence of the industry having made any significant attempts to recover refrigerants.

Rising international concern over the effects of continued depletion of the ozone layer and the slow pace of development of non-depleting alternatives is shifting the argument in favour of a very swift global phase-out of the production of CFCs. As we know, CFCs can persist in the atmosphere for up to 100 years, so ozone depletion will not cease when the production of those chemicals stops in two to five years. The worry is that unless governments and industry are prepared to move swiftly to implement mandatory recovery of CFCs and halons the damage will be greater and continue even longer.

Customers can help to persuade the industry to clean up its act by ensuring that companies have the equipment necessary to recover refrigerant before agreeing to let them work on refrigeration and air conditioning systems.

Any confirmed sighting of someone servicing units or deliberately cutting pipes without first attempting to extract refrigerants should be immediately reported to the Ministry of Commerce. In Western Australia a complaint from a member of the public to this effect led to the first successful conviction and fine and was instrumental in convincing the industry to take recovery seriously.

Chris Wratt

Life of a can

WHAT HAPPENS to your aluminium soft drink can after you place it in the community recycling bin? Chances are it could be reincarnated as a car part in Japan.

After collection, empty cans are transported to processing plants in Auckland, Wellington, Christchurch or Dunedin. Steel cans, nails and any other contaminants are separated before the aluminium is crushed into 25-kg bales.

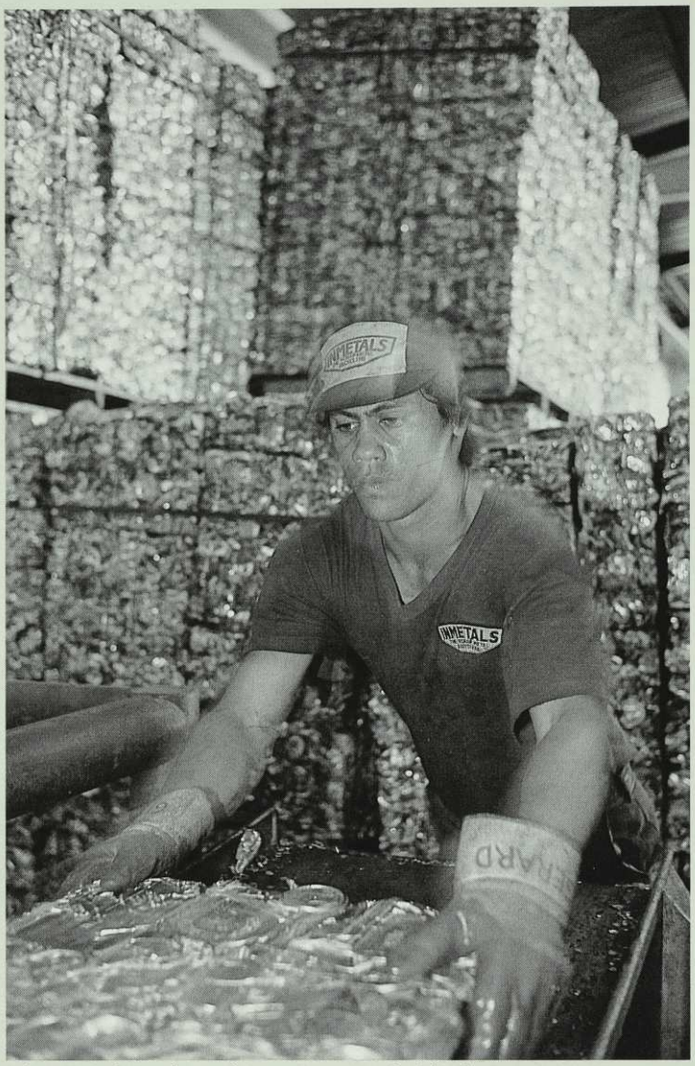
At present there are no facilities for recycling aluminium cans in New Zealand and the crushed cans are all exported. Comalco's Auckland agent Inmetals sends close to a third of its returns to an aluminium re-melt plant outside Sydney where any remaining impurities are removed and the metal melted down into aluminium sheet for processing into new cans.

The remaining aluminium is exported to the market paying the highest price – usually Japan where it is most likely to end up as car parts.

Aluminium can be remelted again and again with a metal recovery rate of about 88-90 percent. Producing aluminium from recycled material also requires 95 percent less energy than primary aluminium production. The energy efficiency of the recycling process increases with the volume of recycled cans.

The initial energy input required for the manufacture of aluminium cans is greater than tin-plate and glass, but the energy savings from transporting the lighter-weight cans – at one third the weight of their steel alternative and many times lighter than the equivalent glass container – are considerable. For aluminium cans the life-cycle equation is dependent not only on the level of recovery achieved, but also on energy used in collection and delivery of containers for reprocessing.

New Zealand's return rate for aluminium cans has jumped sharply since the launch of Comalco's recycling scheme in 1987 and is one of the fastest-growing voluntary schemes in the world. The link between the recycling programme and the kakapo recovery project has also helped boost the recovery rates. The current rate, around 46 percent, is still considerably lower, however, than return rates in the US (55 percent), Canada (65) and Sweden (85).



The Inmetals crushing plant at Penrose, Auckland.

But return rates may not be all that they seem. Recent research suggests that used aluminium cans retain beverage residue or moisture up to 20 percent of their empty weight. Therefore recovery rates calculated by comparing clean virgin cans coming into the market place with the weight of baled cans containing moisture and dirt may artificially inflate the return rates.

A new environmental worry has recently arisen in the aluminium industry. Two of the waste gases given off in primary production – tetrafluoromethane and hexafluorethane – have been identified as significant greenhouse gases. Although emitted in small quantities, molecule for molecule they are over 8,000 times more effective greenhouse contributors than carbon dioxide. Research is being done in Canada to see if the production process can be changed to avoid the creation of these gases. The gases are not produced when cans are recycled. Large amounts of carbon dioxide are also emitted in the production of aluminium.

Last year New Zealanders returned over 158 million cans for recycling. As well as the energy and resource savings achieved through the recycling, the increased recycling rate resulted in an additional donation by Comalco to the kakapo recovery programme of $25,000.

Chris Wratt

Mobile stoats

A STUDY of the behaviour and ecology of stoats in Fiordland has considerable implications for the control of these pests and the protection of endangered wildlife.

Elaine Murphy from DoC's Science and Research Division and John Dowding used radio-tracking equipment to follow the movement of stoats in the beech forests of the Eglinton Valley.

The study covered a stoat plague year (as occurs following a beech seeding year) with a follow up in 1991-92 when stoat densities were lower.

The stoats were well-travelled. One young female was found 65 kilometres away after only a month, and the stoats regularly moved over two kilometres in only two to three hours often, to the inconvenience of the researchers, crossing the Eglinton river in their foraging.

Much to the surprise of Murphy and Dowding, stoats were also found in comparatively high numbers in the year following the plague year, although with an older age structure.

Another finding was that the trapping of stoats was only effective for the duration of the trapping. The interval before stoats recolonised a cleared area was very short even in a non-plague year.

This has considerable implications for the management of sensitive localities containing endangered species such as Maud Island which is within stoat-swimming distance of the mainland. These localities are at risk not only in plague years, when many juvenile stoats are dispersing, but also at other times.

Source: Rare Bits (Department of Conservation)

Shore plover back on mainland

THIRTEEN New Zealand shore plover, one of the world's rarest wading birds, are being successfully reared at the National Wildlife Centre at Mount Bruce.

Early last century the plover was common on rocky coastlines and estuaries around the country but the spread of wild cats, ship rats and other predators soon led to its demise. By the 1880s the shore plover was extinct on the mainland and it is now limited to the remote, predator-free Rangatira (or South East) Island in the Chathams where less than 120 survive.

Seventeen shore plover eggs were transferred to Mount Bruce late last year in a bid by DoC to raise sufficient birds in captivity to establish a second viable population on a suitable predator-free island. Fourteen of the eggs successfully hatched and progressed well, although one chick died, apparently through stress.

Ideally, 20-30 pairs will be required to establish a new population as insurance against a disaster, such as the introduction of rodents, eliminating the single population remaining on Rangatira Island.

GARRY NORMAN

Juvenile shore plover at Mt Bruce. Adult birds are black around the face with an orange-red bill.

Previous attempts to transfer birds to Mangere Island in the Chathams during the 1970s were thwarted by the strong homing instincts of the shore plover. All transferees either returned to Rangatira Island – one was even back on the island before the Wildlife Service team returned – or disappeared, and it became clear that a new population would have to be raised in captivity.

Mount Bruce staff have experimented with shore plover eggs in recent years to gain the necessary expertise for this large hand-rearing exercise. Conservation officer at the Wildlife Centre Hilary Aikman believes the experience proved critical in two areas. "In the past we have tended to take eggs at an early stage of incubation. In that way the pairs would often re-nest so the population in the wild should be unaffected. But these eggs had a low success rate. We found the success rate was higher when we took shore plover eggs at a more advanced stage of incubation, and some pairs still re-nested."

The chicks were started on live aquatic invertebrates, before being fed other insects, mainly meal worms and wax moth larvae. Chopped and soaked "Go-Cat", and poultry feed were on the menu before the chicks took to the staple diet of waders at Mount Bruce, vitamin-enriched ox-heart, garnished initially with juicy maggots.

In less than a month the chicks had reached their adult body weight (60 grams) and were well feathered. A short time later they were released into outdoor aviaries.

At present the plovers are being observed to see whether any pairs form this spring, although pairing doesn't usually occur until the second year. Staff will take care to make sure that chicks from the same clutch do not pair up.

Hilary expects it will be five to ten years before the National Wildlife Centre breeding programme will have enough birds to establish the second population on a predator-free island.

Even mature birds are susceptible to predators. There was a grim reminder of that in the early 1980s when two mature shore plover, hatched and raised at the Otorohanga Zoo, were killed when a rat found its way into the aviary.

Shore plover once lived on rocky shores, beaches and river mouths throughout New Zealand, but on Rangatira Island the birds have also settled on salt-swept turf among herbaceous plants. The coastal habitats of predator-free islands will be closely studied before the establishment of a second population is considered. Possible candidates are Mana Island, or Motuora Island in the Hauraki Gulf.

Andrew Trevelyan

Curiosity killed the ... weka

THE EFFICIENT and humane Timms trap is killing possums up and down the country, but regrettably some weka are falling victim too.

The weka's inquisitive nature is its downfall; it sticks its head in the trap regardless of the bait. This is especially unfortunate for the declining North Island weka, now a threatened subspecies and the subject of Forest and Bird's captive breeding and release project.

If you live in weka country, please try to avoid trapping weka. Place the trap out of their reach, on a shed roof or secured in a tree. It will still be just as accessible to the possums.

Ann Graeme

World watch

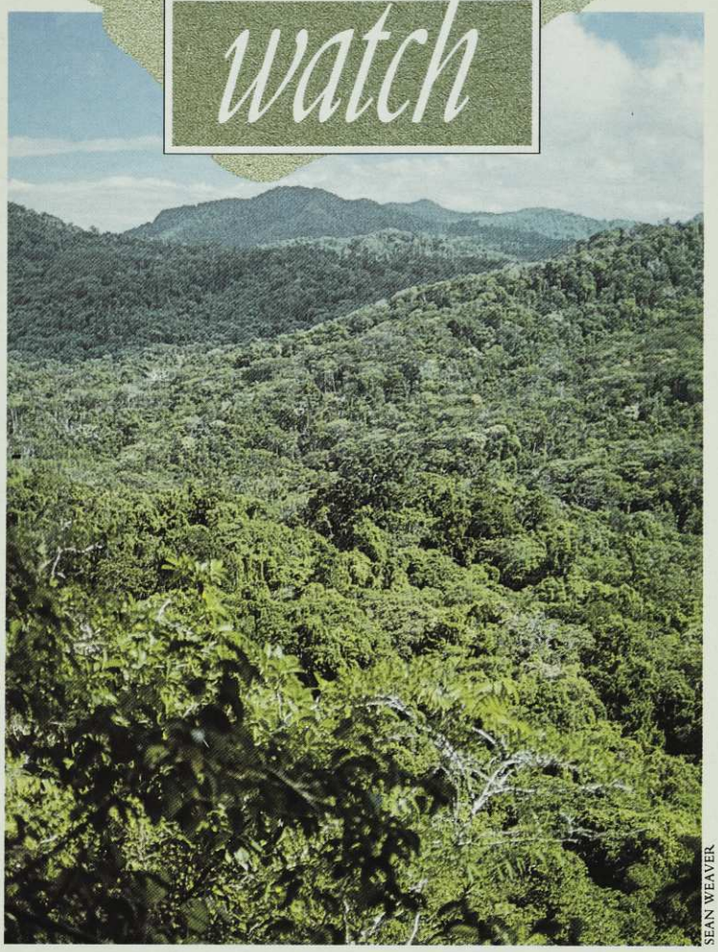
Fiji forests saved

FORMER FOREST and Bird conservation officer, Sean Weaver, has been instrumental in saving an extensive forested region in Fiji from logging.

Sean was a major player in a joint Forest and Bird and Maruia survey of Fiji's rainforests in 1988. As part of the survey a number of areas were proposed as reserves, including the forested Vunivia catchment on the north-eastern tip of the island of Vanua Levu (see *Forest & Bird* May 1989).

A survey putting forward reserve proposals is, however, only a beginning. Unique ecosystems are rarely protected with a mere stroke of a pen. The proposals must be developed and pushed through the planning process, and conflicts concerning resource allocation and land use need to be resolved.

Sean has continued to regularly visit Fiji in the ensuing years, working as an environmental consultant and doing research for his PhD.



SEAN WEAVER

Part of the Vunivia catchment. These forests of about 5,000 ha are the last area of lowland dry-zone forest in Fiji.

The conservation of the Vunivia catchment seemed fraught with difficulties. The Australian-owned Fiji Forests Industries Ltd (FFI) held a timber concession over the entire catchment and logging had already started. Gaining the protection of these forests, or at least advancing the reserve proposal enough to get the logging stopped, required some intense lobbying on many different fronts.

Firstly, Sean approached the landowners. Negotiating was not easy. The mataqali (clan) that owns most of the catchment is fragmented socially and geographically and the traditional social and political organisation had largely broken down. Finding consensus among the landowners required visiting almost every household spread throughout some 14 settlements in the area. An added complication was that the official chief had effectively abdicated and moved out of the area without leaving a successor. So, amid a swirling leadership battle the landowners also had to deal with a major land-use issue raised by a foreigner.

As FFI's contractors were actively logging part of the catchment, Sean had to urgently approach the company and attempt to gain their commitment to pull out of the area.

The Department of Forestry also needed to be convinced that the area was worth leaving alone in terms of large scale forestry, and sensitive enough to deserve the attention that it was gaining. The Native Land Trust Board had to be consulted as it controlled the administration of leases and licences for developments on native lands and also benefited from logging through a levy collected from landowners on timber royalties and leases.

Finally Sean had to convince the Fiji government's Environment Unit that the area was special enough to warrant spending any of its energy and resources on the planning aspects of implementing a reserve.

A tall order perhaps, but not insurmountable. Each party has now agreed that the unique forests of Vunivia should indeed remain standing. The logging machinery finally fell quiet in May. What now remains is the implementation of protected status for the forests and the establishment of development assistance for the landowners in lieu of their timber royalties.

Footnote: Another area proposed as a reserve in the 1988 survey, the Wabu Creek forest (see *Forest & Bird* February 1992), was gazetted as a nature reserve by the Fiji government in May.

Ian Close

Aeroplanes and greenhouse

AIRCRAFT contribute eight times as much per passenger kilometre to the greenhouse effect as cars, and 22 times as much as electric inter-city trains according to a British study. The government's Energy Technical Support Unit has made the calculations based on the effect of various greenhouse gases over a potential 50-year period.

The surprising conclusion is that the main greenhouse problem in relation to aircraft is not carbon dioxide but nitrogen oxides. During the 1970s and 80s aircraft designers concentrated on improving fuel efficiency by increasing engine temperature and pressure. This had the environmentally beneficial result of reducing emissions of carbon dioxide to only one third of an aircraft's total emissions, but only at the expense of increasing the amount of nitrogen oxides which now contribute the other two thirds.

Nitrogen dioxide breaks down in a photochemical reaction to form ozone, a greenhouse gas. At ground level nitrogen dioxide has three times the greenhouse potency of CO_2, but at the cruising altitude of most planes in the cooler air 10-12 kilometres above ground level, chemical reactions are slowed down and the greenhouse effect of relatively short-lived gases such as ozone is enhanced. Thus the heat-trapping potential of nitrogen dioxide emissions increases more than a hundredfold at these higher altitudes.

So even though aircraft produce only about three percent of the world's nitrogen oxide emissions, these emissions probably contribute as much to global warming as all the remaining output of nitrogen oxides put together.

Aircraft designers are now looking at ways of reducing engine temperature and thus the level of nitrogen oxides. The problem is that a "lean burn" engine with reduced emissions of all greenhouse gases, while safer for the environment, might not be as safe for passengers. Such an engine would be more difficult to restart in the cold air of the upper atmosphere.

Source: New Scientist

Hakata Bay – a threatened Japanese wetland

BIRDS RESTING during their annual migratory journey at Auckland's sister city in Japan, may no longer find a sister's welcome.

The city of Fukuoka is strategically situated on the northern tip of Japan's southernmost island of Kyushu, at the closest point to Korea and the Asian mainland, making its Hakata Bay wetlands an important recuperation spot for exhausted birds.

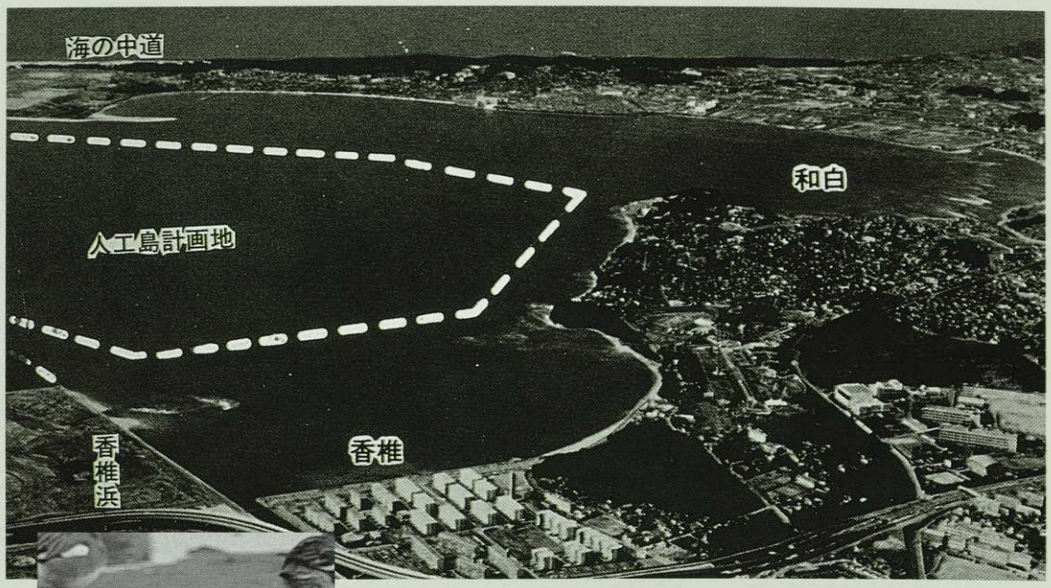
But Fukuoka is an expanding city and is now pressing ahead with construction plans for the bay area, which will consume and drastically disturb avian habitats.

The case is not an isolated one but it is all the more important because the problem recurs everywhere in Japan; at present the country has only four sites (none of which are tidal) that are protected under Ramsar, the international wetlands convention. The Japan Wetlands Action Network, formed in 1991 to link local groups struggling to protect patches of natural environment, chose Hakata as one of only four areas for priority protection.

Reclamation of land at Hakata Bay has been ongoing for over a century, but it is only since 1959 that major plans were put forward for the infilling of most of the bay. The current plan is to construct a huge artificial island with port facilities directly above the shellfish banks which sustain the birds.

This is the shallowest part of the bay and holds tens of thousands of birds each year including six internationally endangered species: the black-faced spoonbill, Saunder's gull, the Asiatic dowitcher, Nordmann's greenshank, spoonbilled sandpiper and Swinhoe's egret. These are not Fukuoka's birds, not Japan's – they are the world's.

Hakata Bay is currently designated a "Wildlife Protection Area" – a title with no practical meaning. In spring the tidal flats are thronging with people searching for shellfish and the birds are continually disturbed. An Environmental Impact Assessment for the scheme is being conducted by a company which is under the umbrella of the city government, the proponent of the construction. EIAs in Japan are notorious for their findings that wildlife can always find somewhere else to go.



NIAL MOORES

Aerial photo of Hakata Bay: the dashed line shows the size of the proposed island. Inset: Saunder's gull, now reduced to a world population of only 2,000 birds, is one of six endangered species that winter in the bay.

Residents' opposition has taken the form of environmental study days, clean-ups, picnics and a "birdathon" – a bird-watching day in which 113 species were noted within five kilometres of the bay. The Hakata port authorities have responded by proposing a "bird park" and artificial tidal flat on the island.

The scheme is widely seen as a product of pride and greed. The present docks are only working at 30 percent of capacity. Neighbouring Kita-Kyushu is only 50 kilometres away and is also a port town in the race to expand and to become the "gateway to Asia". The proposed cost for the whole scheme is $NZ4-6 billion.

Ironically, construction is set to start in mid-1993 just as Japan hosts the 5th World Ramsar Conference, at Kushiro in the north. Although Auckland City Council has written to Fukuoka City expressing concern for the wetland, New Zealand is unlikely to formally criticise what is seen as a Japanese internal matter. Opposition, however, remains strong and the people of Fukuoka believe that international opinion can save the city's life-giving wetland from destruction.

Please help by writing to either the Japanese Embassy in Wellington or the Consulate in Auckland asking that Japan set an environmentally responsible example and save this important wetland.

Sarah Lowe

New species of owl

A NEW SPECIES of Scops owl has been discovered on the island of Anjouan in the Comoros, a group of four islands between Africa and Madagascar.

The discovery was the culmination of a search, initiated by a mystery call, that involved ornithologist Roger Safford, supported by ICBP, in three visits to the island over two years. Safford traced the call to a Scops owl. The call and close examination of the individuals confirm that it is a species quite distinct from the more widely-distributed Madagascan Scops owl.

The Anjouan Scops Owl is about 25 cm long, mainly cork brown in colour, and has both a whistle and a screech call, the whistle being completely unlike any other Scops Owl species. It lives in primary forest above 800 metres, nesting in large tree cavities, and is thought to be insectivorous.

The people and wildlife on Anjouan are facing a crisis. Both depend on the forest; human population density is very high, and the extent of primary forest is declining extremely fast (from 8,260 ha in 1972 to 1,109 ha in 1987). Although a thorough population estimate of the owl was not made, it is thought that there are probably not more than 100 pairs left.

Other species dependant on Anjouan's dwindling forest are the mongoose lemur, one of the most endangered lemurs in the world, and Livingstone fruit bat, one of the world's most endangered, and largest, bats. Conservation action is urgently needed.

Source: International Council for Bird Preservation

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

Branching out

Reports on some of the campaigns and conservation projects undertaken by Forest and Bird branches and field officers.

A better life for Oamaru penguins

SINCE 1985 the Waitaki branch of Forest and Bird has been helping to improve the habitat of the Oamaru blue penguin colony by planting native vegetation and providing nest boxes.

The birds have been particularly at risk from dogs and cars. In July this year a 30-metre fence funded by Canon was put up to keep dogs away from the area and nest boxes were installed with the help of finance from Hastings/Havelock North Forest and Bird.

Waitaki District Council will now develop part of the council quarry (which has many nesting penguins) into a reserve area. Forest and Bird and the Department of Conservation are on the planning committee and many groups have rallied in support. Waitaki Forest and Bird has provided nest boxes, the council has supplied plants and removed industrial rubbish, the Oamaru Licensing Trust has provided finance and Waitaki Power has volunteered to assist with lighting.

There are plans to create some no-go areas at sensitive parts of the quarry colony, for lighting in the area to be better controlled and for special viewing areas to be set up so that the penguins have more security and protection but are still visible to visitors.

While most mainland blue penguins colonies are under severe threat from predators, habitat loss, set nets and human persecution (see *Forest and Bird* February 1992) there is growing cause for optimism at Oamaru where the colony still has about 1,200 birds with numbers possibly increasing.

LORRAINE ADAMS

Oamaru penguins killed by dogs in July last year.

Penguin habitat restoration on the Oamaru foreshore. The quarry being restored as a reserve is in the background. Fencing, planting, and nesting boxes will help secure the future of the colony.

Tip no waste!

THIS WAS the message that Tauranga school students left around the intakes to the stormwater drains of the city during Conservation Week in August.

Forest and Bird field officer Ann Graeme who organised the stencilled warnings said that many people were unaware that stormwater drains in the area led directly into the harbour and they continued to tip pollutants such as paint solvents and sump oil down them.

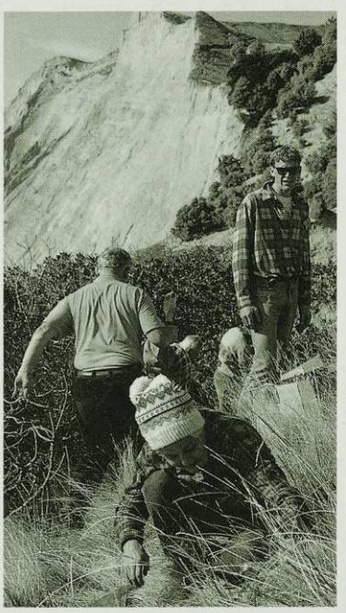
Ann has organised other school groups, local KCC members and the Conservation Corps to continue the sidewalk spraying as an ongoing project. Students will also organise a survey among fellow students to gauge the effectiveness of the signs.

BAY OF PLENTY TIMES

Ann Graeme and students leave their mark on Tauranga footpaths.

Trees at Cape Kidnappers

YOU MAY remember the story of young Hastings/Havelock North member Tim Hay who last year organised a fun run around Cape Kidnappers to raise money for a revegetation project on the cape (*Branching Out* August 1991). Well this year Tim repeated the exercise and raised another $600 which was again matched by his branch.



Recently retired branch chairperson Ruth Dinnan during the planting out. Cape Kidnappers is in the background.

Cuttings taken from the cape have been grown at the Department of Conservation's Taupo nursery over the past year. This winter, branch members planted out over 750 ngaio, taupata and karaka trees on the cape with the help of DoC and Conservation Corps staff.

Who will save the dotterel

ANOTHER ENDEMIC IN TROUBLE

In the past few years, public awareness of the plight of the New Zealand dotterel has grown considerably. Many protection programmes now operate each season at important breeding sites in the North Island and these are resulting in more chicks fledging. But there are two distinct populations facing different problems. JOHN DOWDING reports his alarming findings about the dramatic decline of the Stewart Island dotterels while ANDREW CUMMING, PETER JENKINS AND JOHN HAY describe their recent research on the northern population.

RECORDS from the mid-19th century show us that New Zealand dotterels (*Charadrius obscurus*) were widespread through out the country; in particular they seem to have been common in the South Island, breeding on the braided river beds and in the Southern Alps, then forming winter flocks on the east coast.

Maori knew the birds as tuturiwhatu pukunui, referring to their plump bellies and sedate habits, although there is little evidence in middens of extensive hunting. In the last hundred years the species has declined steadily in range and numbers and there are now two populations, apparently isolated from one another and separated by more than 1,000 km.

The total population is currently less than 1,500 individuals. About 95 percent of these are found on the coast of the North Island but a few still survive on Stewart Island. The exact reasons for their disappearance from the South Island are hard to determine now, but it seems likely that introduced predators played a significant part.

Early miners, sealers and whalers preferred larger birds such as kaka, kakapo, pigeon and ducks, although dotterels were considered a delicacy by early settlers in Canterbury and Otago.

JOHN DOWDING

JOHN DOWDING

Possibly because of Stewart Island's isolation, there has been very little work on the species there and few clues are available to the size of the island's dotterel population in the past. In 1955 Ross McKenzie of the Ornithological Society, who was studying the species in the North Island, paid a brief visit to Stewart Island. He counted a single flock of more than 218 birds and for over 30 years the few population estimates published were based on that figure. The size of the flock, far larger than any remaining in the

The remote flock site at the western end of Cooks Arm lies in the shadow of Gog and Magog, among the spectacular granite landscape of southern Stewart Island. In 1969 there were at least 40 birds in the flock here – this year just three are left.

s?

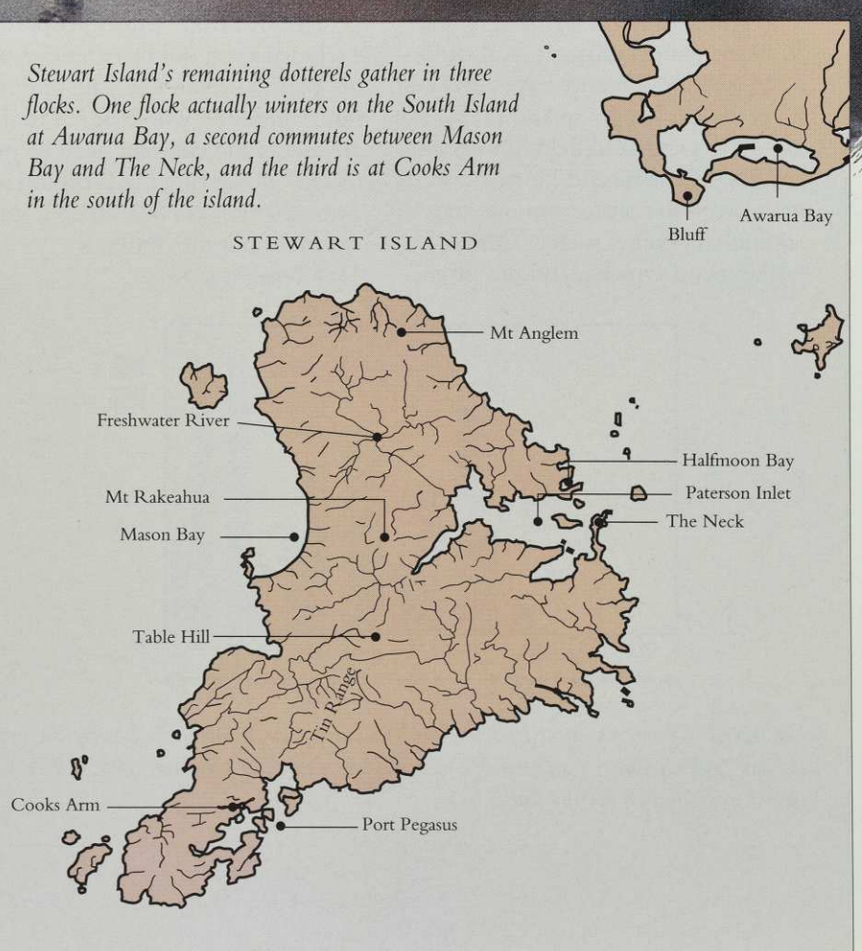
A lone New Zealand dotterel on Mt Rakeahua with the distinctive reddish underparts of breeding plumage. When Dowding's study began in 1988, three pairs were breeding here – now there are none.

North Island today, suggested a healthy population and there was no reason to suspect that it faced any major problems.

During the past 20 years, however, numbers of New Zealand dotterels in Southland each winter have been monitored – by Maida Barlow and others – and have shown a steady downward trend. This decline, and the fact that a complete census of the Stewart Island population had never been undertaken, suggested that a study of the southern New Zealand dotterels was overdue.

continued page 14

Stewart Island's remaining dotterels gather in three flocks. One flock actually winters on the South Island at Awarua Bay, a second commutes between Mason Bay and The Neck, and the third is at Cooks Arm in the south of the island.



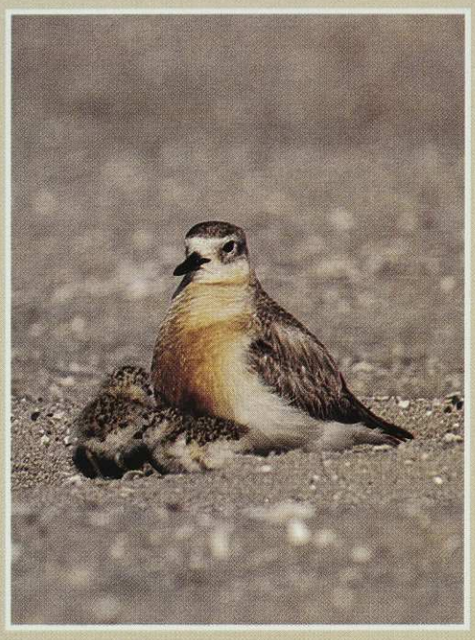
Disturbing dotterels – problems in the North Island

by ANDREW CUMMING, PETER JENKINS, and JOHN HAY

WATCHING NEW Zealand dotterels trying to nest on a popular bathing beach is like watching a hedgehog trying to cross a busy road. Success is not expected.

At Ohui beach, Coromandel Peninsula, four pairs of this threatened dotterel were doing their best to breed on the flat open sand adjacent to the creek mouth. They weren't having much luck. Seen from a hide in the sand dunes, group after group of beachcombers, picnickers, fishers and swimmers strolled, drove or ran through the dotterel nesting area. Each disturbance drew the same response from the birds.

The incubating dotterel surreptitiously left the nest, then with legs winding frantically, raced across the sand in front of the oncoming people, attempting to lead them away from the nest. The beach-goers glanced at the bird, now doing its broken-wing and rodent-run displays, but continued past its nest, an unnoticed scrape in the sand containing three well-camouflaged eggs. The dotterel continued to run in front of the people until they were 100 metres or so further along the beach. With the danger gone, the bird was then able, finally, to return to its nest and its delicate eggs. This time no apparent damage had been done. But next time an incautious foot, an accompanying dog or the wheel of a trailbike could spell disaster for those same eggs.



BRIAN CHUDLEIGH

The nests of the northern dotterel populations are often no more than a depression in the sand lined with bits of grass or shell.

SUCH HUMAN disturbance during breeding may be the most serious problem currently facing the northern populations of this endemic plover. Like most adult shorebirds, adult dotterels appear to suffer little predation because they roost and nest in the open where most approaching threats can be seen and avoided. However, threats that cannot be seen, such as fishing set nets and shotgun pellets, can take their toll. Two adult dotterels recently died at Waipu after becoming entangled in a stray fishing net.

Although dotterels are vulnerable to deliberate hunting, the major human impacts in recent times are reduction of nesting habitat and disturbance during breeding. Northern populations of dotterels prefer to nest on sandy beaches in open areas where vegetation is low and sparse. Such areas are often formed by the erosion of mobile sand dunes or are areas at the mouths of streams and estuaries subject to periodic flooding during high tides and storms. Thus the typically open tips of sandspits and the verges of stream mouths are the sites favoured by nesting dotterels.

Erosion of mobile dunes is also caused by the wind, which may form open areas within the dunes and blowouts in the foredune. Again, these areas are preferred nesting sites.

Regrettably, the mobile dunes at most New Zealand beaches are far from pristine. Visiting the beach is one of the most popular New Zealand recreations. Consequently many dune areas have been developed or at least modified. Holiday homes and resorts have sprung up along the coastline, particularly since the 1950s and 60s. Dunes have been stabilised with introduced marram grass to protect coastal

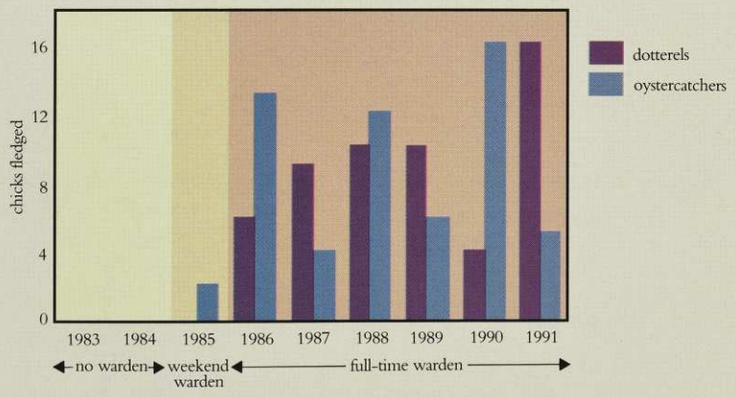
Minding the dotterels

DOTTEREL breeding areas are very vulnerable to human disturbance but they are also relatively easy to protect. The first breeding area to be protected with a fence and a warden was in 1985 at Opoutere on the Coromandel Peninsula (see *Forest & Bird* August 1989). The protection was financed by the Waikato branch of Forest and Bird.

Protection schemes have also been successful at Waipu Spit and Ruakaka, and Forest and Bird field officers Ann and Basil Graeme and Fiona Edwards have taken the protection methods to additional beaches such as Ohope, Maketu and Omaha sandspits often getting local schools and members of the community involved. Protection can be organised in different ways: by demarcating nesting areas with string or wire, posting educational signs, marking access paths or providing a warden to keep people and vehicles away.

The area from which people are excluded need not be extensive nor the period prolonged. The birds do not require the whole beach to themselves and the colonies need be protected only during the breeding season. The schemes also help to educate visitors about the dotterels.

Mark Bellingham



The success of protection areas for shore breeders can be seen in this table showing the numbers of New Zealand dotterels and variable oystercatchers fledged at Opoutere 1983-1991. The two species regularly nest side by side.

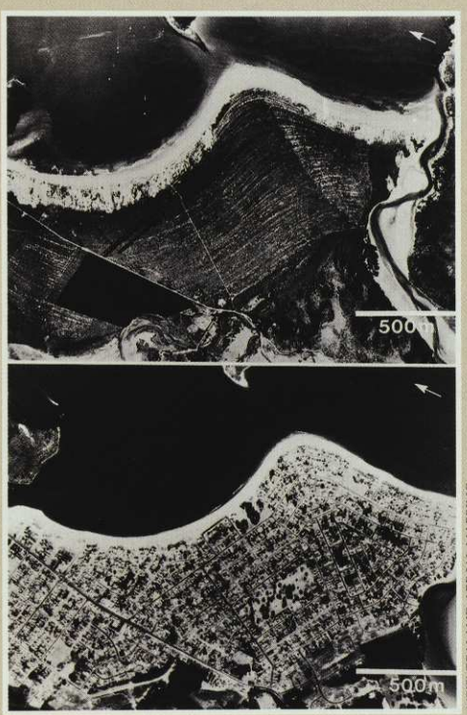
land and property. Vast areas of sand dune country, for example Ninety Mile Beach, have been planted in pine forest. As development reduces the availability of breeding habitat, the dotterel is being squeezed out. In what nesting habitat remains, breeding dotterels are at risk of human disturbance.

Human disturbance is thought to affect shorebird breeding in two ways. Eggs and chicks may be directly destroyed (for example crushed by off-road vehicles) or disturbance can impinge indirectly by interrupting incubation or feeding of chicks. Typically, an incubating or brooding dotterel responds to a perceived threat by leaving the nest or chicks and trying to distract the intruder when it is still some distance away.

The impact of directly crushing a nest or chick is obvious, but the effects of interrupting normal parenting may be just as serious. Repeated absence from eggs or chicks due to frequent or sustained disturbance may result in their chilling or overheating (depending on weather conditions). The number of people on beaches is probably greater on sunny days when eggs may overheat in as little as 20 minutes. When the birds are forced to make frequent trips to and from the nest there are also more opportunities for scavenging birds or other predators to detect footprints or abnormal movements, and prey on unattended eggs. Black-backed gulls, which have increased in numbers with the increase in food supplies from landfills, meatworks and fishing operations, are known to take dotterel eggs or chicks.

BRIAN CHUDLEIGH

Victims of coastal development. This dotterel sticks gamely to its nest during the building of a container terminal at Tauranga.



NEW ZEALAND AERIAL MAPPING

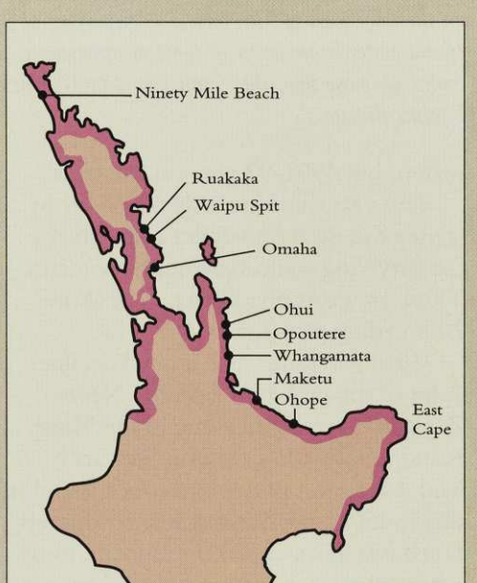
Aerial photos of Whangamata, 1944 (top) and 1983, document the dramatic changes and habitat loss that are associated with the expansion of human activities along attractive coastal areas. The former wide expanse of dune – prime dotterel nesting habitat – is now covered with housing.

During the 1989-90 season comparisons of New Zealand dotterel breeding success were made between ten beaches subject to low levels of human disturbance and ten subject to high disturbance. Dotterels at high disturbance beaches fledged, on average, only half as many chicks per pair (0.31) as did dotterels at low disturbance sites (0.62).

BUT THERE IS good news. Breeding dotterels are relatively easy to protect from human disturbance by simply keeping people out of nesting areas (see panel). Habitat protection, however, is more difficult because it requires us to conserve some beaches in their natural state rather than developing them. Important New Zealand dotterel sites were identified in the October 1989 and February 1990 population censuses coordinated by the Department of Conservation. The conservation emphasis at these sites must be on protecting habitat before it becomes degraded. Pristine dune systems are now very rare. Those remaining should be protected from development by law.

A public education campaign is required. DoC's forthcoming recovery plan for the New Zealand dotterel should include liaison with regional councils (which administer coastal areas), local councils, schools, environmental groups, community groups and the general public. Local communities, which have made tremendous efforts to clean up litter in "Adopt a Beach" campaigns, must be encouraged to expand their efforts to also take responsibility for their local wildlife.

The New Zealand dotterel is unique to New Zealand. Let us be determined to see this delightful bird continue to grace our beaches, now and into the future. ❖



Distribution of northern New Zealand dotterels and locations mentioned. Interestingly, it is only in the last two breeding seasons that dotterels have nested south of the previously noted limit at East Cape.

Andrew Cumming is a policy analyst at Waitakere City Council, Associate Professor Peter Jenkins is recently retired from the Zoology Department of the University of Auckland and John Hay is Director of Environmental Science at the University of Auckland. *Their study was supported by grants from the New Zealand Lottery Grants Board and the Ornithological Society of New Zealand.*

"Red-Yellow-White", a large chick caught on Table Hill in December 1988, about to be released after banding. It spent its first two winters as a juvenile at Awarua Bay in Southland, returning to Stewart Island in 1990. It bred for just one season on the Tin Range and is now missing, presumed dead.

IN LATE 1988, my wife Elaine Murphy and I began a comprehensive survey of the Stewart Island birds. We systematically searched the open mountain tops for breeding sites, checking one or two new areas each season. We also began banding chicks and adults; from our band sightings and aided by a few previous records, we found that after each breeding season the birds gather in three flocks. One of these is not on Stewart Island but at Awarua Bay, near Bluff. Band sightings there confirmed what had been suspected for some years – that the Awarua Bay flock actually consists of Stewart Island birds that cross Foveaux Strait to winter on the mainland.

Our banding also revealed that the largest flock, based around feeding grounds in Paterson Inlet, was highly mobile. Each day the birds fly across to Mason Bay on Stewart Island's west coast and roost in the sand dunes there, but at night they cross to the east coast and roost at The Neck. They are therefore commuting from one side of the island to the other and back, a round trip of some 60 km, every 24 hours. The third flock feeds and roosts on the remote tidal flats at the head of Cooks Arm, a shallow reach extending west from Port Pegasus at the southern end of the island.

By adding the numbers of birds in these three flocks each autumn and allowing for a few juveniles wandering elsewhere, we can now make an accurate annual estimate of total numbers. In 1990, the whole southern population was about 100-105 birds, a marked decline since Ross McKenzie's count 35 years earlier. The more we looked, the worse the situation became. We had hoped that the population might have stabilised at about 100, but in 1991 it was down to 80. Trying to be optimistic, we suggested that it might just have been an unusually bad season, but 1991-92 was just the same.

This year there are only 60-65 birds; some of these are juveniles and some of the surviving adults may not have mates. There are probably, in fact, only about 20 breeding pairs left.

What is causing such a rapid decline? A lot of the problems faced by New Zealand dotterels breeding in the North Island simply don't exist on Stewart Island. Like most of the birds once found in the South Island, Stewart Island dotterels breed inland on exposed mountain tops, where there is virtually no disturbance by people, dogs, stock or vehicles. There is also plenty of suitable habitat available. However, our banding studies show that considerable numbers of adult birds are disappearing each season; this and other evidence suggests that predation is the main problem.

As there are no ferrets, stoats or weasels on Stewart Island, we think feral cats are the main predator, probably taking adult birds on the nest, although ship rats could be a problem too. Why this is happening now is something of a mystery. Cats and rats have probably been present on Stewart Island for 150 years or more – if they had been killing dotterels at the present rate for long, the population should have disappeared many years ago. Has the density, distribution or diet of cats on the island changed in the past 40 years? We simply don't know. Whatever the exact reasons for the decline, it can't go on much longer.

One of the main problems in trying to manage these birds is that their breeding grounds are widely scattered, in difficult terrain and there are few birds at each location. Protecting more than a few pairs is now feasible only at one site – around Table Hill, at the northern end of the Tin Range. Our findings suggest that if nothing is done to help the Table Hill birds within the next two seasons, the whole population will be past the point of no return – it will simply be too difficult and expensive after that to protect enough birds to ensure that the population survives.

JOHN DOWDING

JOHN DOWDING

The New Zealand dotterels in some remote parts of Stewart Island are often very confiding – this bird on the ridge west of Mt Anglem is displaying at the photographer's feet, defending its nest. The Stewart Island dotterels are larger in some measurements, considerably heavier and usually have noticeably darker plumage than the North Island birds. These are all features to be expected in a population from a colder climate.

WHAT WOULD WE LOSE if the New Zealand dotterels on Stewart Island died out? While the genetic work that would decide whether the Stewart Island birds are a separate sub-species has not been done, our study has shown that there are considerable differences between northern and southern birds. Most biologists and conservation managers agree that we should make every attempt to preserve such diversity, whether the differences are due to genetic or behavioural variation.

There is another important consideration – if we lose the southern population there will be a drastic reduction in the overall range of the species. A few New Zealand dotterels are seen wandering the South Island coast each year and some of these birds even reach Farewell Spit. Our banding studies suggest that these are juveniles from Stewart Island. If that population is allowed to die out, there will probably be no New Zealand dotterels south of Cook Strait.

What can we do? The draft recovery plan for the New Zealand dotterel suggests that the highest priority for work on the species should be to try and reverse the decline of the Stewart Island population. Our only practical option seems to be to control feral cats around Table Hill, the last remaining major breeding site. We know that some juveniles are still produced each season, suggesting that if we can reduce the adult mortality, the population will be able to recover. With this in mind we put forward a proposal to ring the area with poison bait stations to try and keep cat numbers in the vicinity as low as possible during the breeding season. This involved the use of a new long-life bait, developed specifically for DoC by the Forest Research Institute.

In September came the welcome news that DoC had decided that the cat-control programme should go ahead this season. We will be monitoring its effec-

The trials of fieldwork

Stewart Island is often spectacularly beautiful but conditions are not always ideal for fieldwork.

First there is the problem of access. There are no roads outside the area surrounding the village of Halfmoon Bay and the only practical and quick way of getting to remote parts of the island is by boat. Even then, many of the tops do not have tracks to them and progress through the dense manuka, leatherwood and inaka scrub is often slow.

After heavy rain, the going is likely to be even slower. Once on the tops, a lot of patience may be necessary, waiting for favourable weather.

Westerly gales and thick cloud swept Table Hill during a trip in December 1991, making surveys possible on only four of 17 days. Much of the time, visibility was less than 50 metres and the wind was strong enough to blow us over. There is little point in searching the tops in these conditions – any dotterels that don't have eggs or chicks to look after simply won't be there.

JOHN DOWDING

JOHN DOWDING

▲ *Table Hill (foreground) is the last stronghold of the species on Stewart Island, with eight or nine pairs attempting to nest during the past season. Birds have steadily disappeared from other parts of the Tin Range (background) during our study. Unlike their northern counterparts, who usually nest on sandy beaches, the dotterels on Stewart Island nest in stunted sub-alpine vegetation, often among rocky outcrops.*

◀ *Unlike nests in the North Island, which are usually simple scrapes in the sand, New Zealand dotterel nests on Stewart Island are lined with tussock leaves and lichen. Normally only three eggs are laid and this unusually large clutch probably resulted when two females laid in the same nest.*

tiveness closely and, at the same time, taking small blood samples from a few birds so that genetic tests can be made. These will allow us to check for differences between the Stewart Island and North Island populations.

Earlier this year, a memo on management priorities emerged from the Protected Species Policy Division of DoC, recommending that certain listed species "are candidates for reduced level of activity". In effect, this suggested that DoC conservancies around the country spend less time and money on them. The New Zealand dotterel is on that list. Presumably because the department is short of money, the whole species is now designated as one of conservation's second-class citizens. Already, DoC has stopped the direct funding for the full-time warden at Opoutere this coming season (see page 12) as a direct result of this reduced status.

To those of us involved in trying to help the New Zealand dotterel, this is a particularly ill-timed blow. Just as the species is starting to get some of the belated public attention it deserves, just as the draft recovery plan is completed, the rug is pulled from under our feet. In spite of the critical situation on Stewart Island, the Protected Species list makes no distinction between northern and southern populations, although the approval for the cat-control programme suggests that the priority of the southern birds may now be under review.

The New Zealand dotterel may be endemic, threatened and declining. It may be down to less than 1,500 individuals, with one of its two populations critically endangered, but all this is no longer enough – there are too many species in the same boat. DoC simply does not have the financial resources to act. Currently, New Zealand prides itself on being a world leader in threatened-species conservation, but its hard-earned reputation in this field will not last long under these conditions.

This lack of money means that the dotterel, like other species, will probably have to rely heavily in the longer term on sponsorship, volunteers and public involvement for its conservation. How can we raise the New Zealand dotterel's public profile? It's not easy. In most people's eyes, a small brown shorebird simply can't compete with media stars like the yellow-eyed penguin, in spite of the fact that there are nearly five times as many of the penguins.

Those who know the New Zealand dotterel find it a fascinating, attractive and endearing animal. The sad fact is that like much of our endemic fauna it is ill-adapted to cope with today's problems – the predators, disturbance and habitat destruction; this is hardly its own fault of course, but it does need our help to survive. I believe it would be reprehensible and tragic if these distinctive Stewart Island birds were allowed to become extinct without a determined effort being made to save them.

Acknowledgements

Sincere thanks to DoC staff (past and present) on Stewart Island for a great deal of support, and to Maida Barlow for data from Southland. Thanks also to DoC (Science and Research Division), the New Zealand Lottery Grants Board and the Ornithological Society of New Zealand, who all provided funding for various parts of the Stewart Island study. ❖

Dr John Dowding is a research biologist based in Christchurch. His main interests are in our endemic birds and their predators. He has been studying New Zealand dotterels in the North Island for six years and recently wrote the draft species recovery plan for DoC.

ENVIRONMENTAL CHOICE THE GREEN DILEMMA

IN OUR ENLIGHTENED consumer society, ingredients and chemical additives are stated by law, on the container. No longer can you unwittingly poison yourself or your environment. As a consumer with a green conscience, that should make you happy. But does it?

The flyspray can states clearly that it contains "no fluorocarbons". Greenie points there. But on closer inspection you find that it contains tetramethrin, d-phenothrin and piperonyl butoxide.

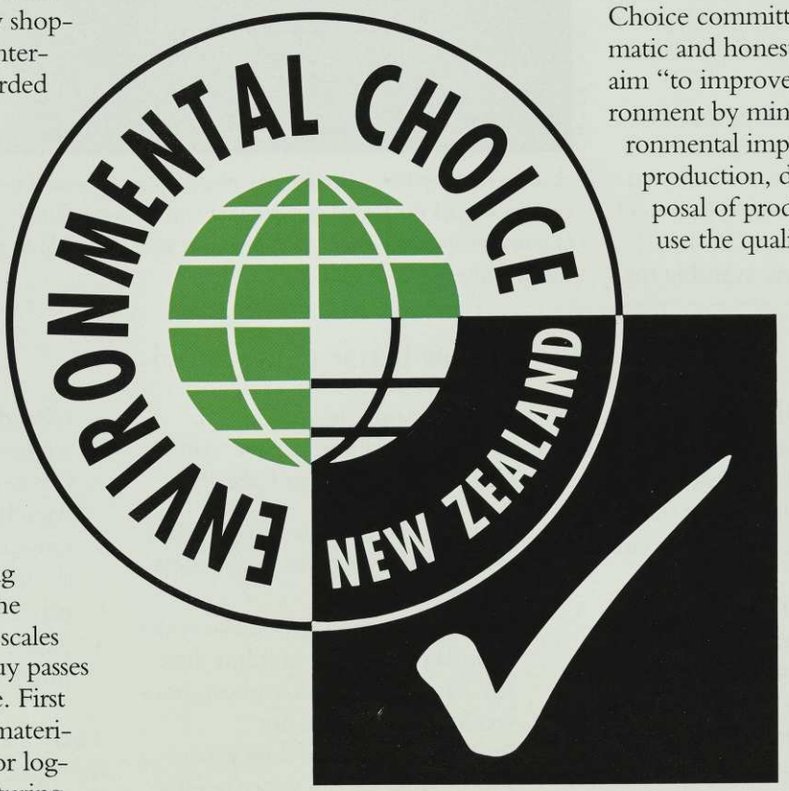
What do they do? According to the label they kill flies, ants, pets, birds and goldfish – so will they stunt the children, give you migraines, or poison the garden? No consumer can possibly be knowledgeable about all the effects of these chemicals.

Information is only useful if you can understand and judge it, and many shoppers yearn for the certainty of an interpreting and trustworthy label, awarded by an impartial body.

So it was with high hopes that I joined the government-sponsored Environmental Choice Management Advisory Committee (ECMAC) set up to advise and advance a labelling system for "green" merchandise. Two years later, sadder and wiser, I report.

MEASURING environmental costs is like peeling the scales of an onion. The more you peel the more scales are revealed. Every product we buy passes through many stages during its life. First there is the collection of the raw materials, which often involves mining or logging. Then there are the manufacturing processes, the transport and sale of the product, its use, and finally its disposal. At every stage impacts occur which may pollute the soil, water or air, and degrade ecosystems.

The process of assessing all these environmental costs is called *cradle-to-grave assessment* or *life-cycle analysis*. The process is enormously difficult, time-consuming and expensive, and the moral judgements it poses make the eyes water. The unpalatable truth revealed, unfortunately, is that the label "environmentally friendly" is dishonest, and every manufactured product has an environmental impact. Even the best independent life-cycle analysis depends on a choice of modelling assumptions and methodology. In the end it eventually comes down to value judgements about the comparison of dissimilar impacts.



New Zealand shoppers will soon have some help in choosing products on environmental grounds. ANN GRAEME, Forest and Bird representative on the committee set up to devise an environmental labelling scheme, looks at some of the problems and pitfalls.

There can also be a problem in determining how much waste is produced in making, for example, a particular washing machine because of the complexity and commercial secrecy of some of the manufacturing processes.

Another issue is that with many products it is not the manufacture of the product itself but the use of it during its lifetime that has the greatest environmental impact. Research on washing machines and dishwashers in Britain indicates that the environmental effects of energy, water and detergent use outweigh any other problems. Thus it is less important what resources are used and what waste generated in the manufacture of washing machines than how energy-efficient they are over their lifetimes.

After a bout of indigestion caused by a surfeit of ideals, the Environmental Choice committee has settled for a pragmatic and honest approach to our stated aim "to improve the quality of the environment by minimising the adverse environmental impacts generated by the production, distribution, use and disposal of products". To this end we use the qualifying label of "environmentally *preferable*".

As the Environmental Choice task groups, comprising members of the committee and co-opted experts, set out to investigate the chosen product categories, it became apparent that, far from an exhaustive life-cycle analysis, we were concentrating on the most obvious environmental feature of each product. In the case of recycled paper and recycled plastic products, the chosen feature was the percentage of recycled material. In the case of lead-acid batteries, the chosen feature was the percentage of recycled lead in the battery.

Critics will argue that this leaves layers of potential environmental impacts unexplored. So it does. But the committee does not have the resources to carry out full life-cycle analyses. Instead we aim to label honestly what we judge to be aspects of products offering the potential for some significant environmental gains to New Zealand.

Lead-acid batteries provide a good example of the committee's philosophy. These batteries account for about 80 percent of the inorganic lead used in New Zealand, and they are far from environmentally "friendly". Their production involves the mining and smelting of lead,

which can pose a significant hazard to human health and the environment. So too can the manufacture and disposal of the sulphuric acid in the batteries.

At present, however, there is no other way of starting a car that is as relatively reliable, simple and economical, and environmentally acceptable. Therefore promoting the use of long-life batteries and those that contain high percentages of recycled materials, is currently the most practical way of minimising the adverse impacts of lead acid batteries on the environment.

The Environmental Choice specifications require that the batteries contain at least 80 percent recycled lead, and that lead-recycling facilities be provided for spent batteries. This is only a beginning. We also intend to consider the recycling of the sulphuric acid in the batteries when this specification is revised in 1993, when it is expected that such recycling facilities will be available.

It is a slow process defining specifications in different product categories and, before being adopted, each is advertised for public comment. As well as lead-acid batteries, the Environmental Choice committee now has criteria available for

GNB NEW ZEALAND

A dumped car battery. Before these products can carry an Environmental Choice logo they will need to contain at least 80 percent recycled lead and the manufacturer will have to provide lead recycling facilities for spent batteries. And after next year this could be extended to the sulphuric acid in the batteries also.

Is paper better than plastic?

THE ONGOING DEBATE over the relative environmental failings of paper and plastic illustrates many of the dilemmas that exist in establishing environmental standards.

This magazine, for example, is despatched in a plastic wrapper and we get queries from members about the wrapper and its supposed lack of environmental friendliness. To be honest, there are some pretty good non-environmental reasons for using the plastic: it costs us less which leaves more money for the society's conservation programmes. It also protects the magazine better: you get less damaged and wet magazines, we get less complaints.

If it was just a matter of saying that paper is a renewable resource and is relatively easy to recycle, while plastic is made from petroleum which is not renewable and is more difficult to recycle, then the decision would be easy. But a good cradle-to-grave analysis has more to it than that. What about some of the less visible environmental impacts such as the relative levels of pollution in manufacture? Or the energy used in transporting the raw materials and the finished products?

Here are some issues to think about in determining the environmental costs of paper and plastic:

- paper is a renewable resource but doesn't always come from renewable forests.
- paper production generally creates more air pollution (sulphur dioxide, nitrogen oxides, carbon monoxide and dust, but not hydrocarbons) than does plastic production. In fact paper manufacture is one of the least environmentally friendly industrial processes known. The paper recycling process is less harmful.
- plastic bags require only half as much energy to produce as the equivalent-strength paper bags.
- paper manufacture produces a lot more waste water than plastic manufacture and also a higher chemical pollutant load.
- plastic is lighter for the equivalent-strength paper thus saving significantly on the energy needed for transport and distribution.
- plastic is very slow to degrade and is hazardous to wildlife if it ends up in waterways or the ocean.
- paper degrades more quickly but in the compacted airless condition of landfills produces methane – a greenhouse gas. Sometimes it barely degrades at all and there have been cases of decades-old newspapers being dug up which are still readable.
- paper can be recycled and often is.
- plastic can be recycled but not much is.

There are more issues to consider in the equation. The technology used in the paper manufacture can vary considerably in its environmental impact, depending on whether the paper is bleached with oxygen or chlorine agents. Also, paper made in New Zealand will cause less air pollution than paper made overseas because more of the energy used is from hydro rather than thermal sources. There will also be less energy transport costs.

Confused? It is not obvious whether paper or plastic is the clear-cut environmental villain. Both have their uses. The answers lie in using less, reusing and recycling more, and ensuring that environmentally efficient technologies are employed in manufacture and distribution.

Ian Close

CONSUMERS' INSTITUTE

Environmental "friendliness" is a relative concept only. All manufactured goods create an impact on the environment. The Environmental Choice scheme will give consumers an independent assessment of whether over the life of a product these impacts have been kept as benign as possible.

recycled plastic products, laundry, hand and machine dishwashing detergents, and torch and hearing-aid batteries. By the end of the year, criteria will be developed on paper, paints and re-refined oil. Products carrying the environmental choice logo will hopefully soon be available in the shops.

OVERSEAS, the Japanese Eco-Mark Scheme, launched in 1989, has given 850 labels to 31 kinds of products. Canada's Environmental Choice has been awarding labels since 1990, mainly to recycled and low-pollution products. So far it has licensed about 60 products in 18 categories. The longest-running scheme is Germany's Blue Angel. It has been awarding labels since 1978, and a 1988 poll found that 79 percent of German consumers recognised the label.

As the pioneer system, Blue Angel has attracted a lot of criticism. For instance, it gives eco-labels to aerosol deodorants which do not contain the ozone-depleting CFCs, yet not to the roll-on kind. Wine bottle labels made of recycled paper wear the Blue Angel, prompting concern that the bottle and the wine inside may receive undeserved kudos.

The New Zealand scheme is trying to avoid such pitfalls and learn from the apparent mistakes. Manufacturers of plastic containers, for example, will not normally be able to use the logo on the container unless the contents are also licensed.

The New Zealand programme is adopting generic criteria similar to those of the Canadian Environmental Choice programme. It was hoped that a system compatible with Australia could be developed, but recently Australia has set out on quite a different tack. Instead of setting product standards and inviting manufacturers to reach them, Environmental Choice Australia intends to check out the truthfulness of environmental claims made by the manufacturers themselves. This may be useful to the consumer, but does not meet the New Zealand aim of *raising* standards.

The Environmental Choice committee is very conscious that mistakes would damage the credibility of the scheme, so we are progressing with caution. Certainly, New Zealanders will not see a flood of eco-labels, and that is a good thing. If the labels are to raise product standards, they need to be awarded sparingly. But, on the other hand, if too few products qualify, or too few product categories are involved, we risk losing the interest of manufacturers and consumers.

Another dilemma to face is the many products that fall into the "too hard" category. For example recyclable materials offer more obvious environmental criteria – and attract more eco-labels – than household cleaners. Indeed some schemes exclude all such cleaning products on the grounds that even the best cause too much harm. Yet it is precisely these products – detergents, washing powder and cleaners – that shoppers worry most about. Therefore a scheme that shies away from the difficult issues will be of limited service to consumers and less use to the environment.

So we engage in a balancing act. Encouraging manufacturers to raise their standards, without putting them off with impossible goals, yet not debasing the scheme with "jelly baby" standards. Endorse too few products and lose public identity. Endorse too many and lose credibility.

Whatever the committee resolves will attract criticism. I don't think this makes the environmental labelling programme worthless. We are all consumers, and a modest, pragmatic, ethical scheme, even if controversial, is better than no scheme at all.

Per person, Australians and New Zealanders consume about 17 times as much of the world's resources as people in the poorest nations. While nobody wants to be poor, there is no escaping the fact that we are the world's big spenders and that the world cannot sustain Western consumptive habits for ever.

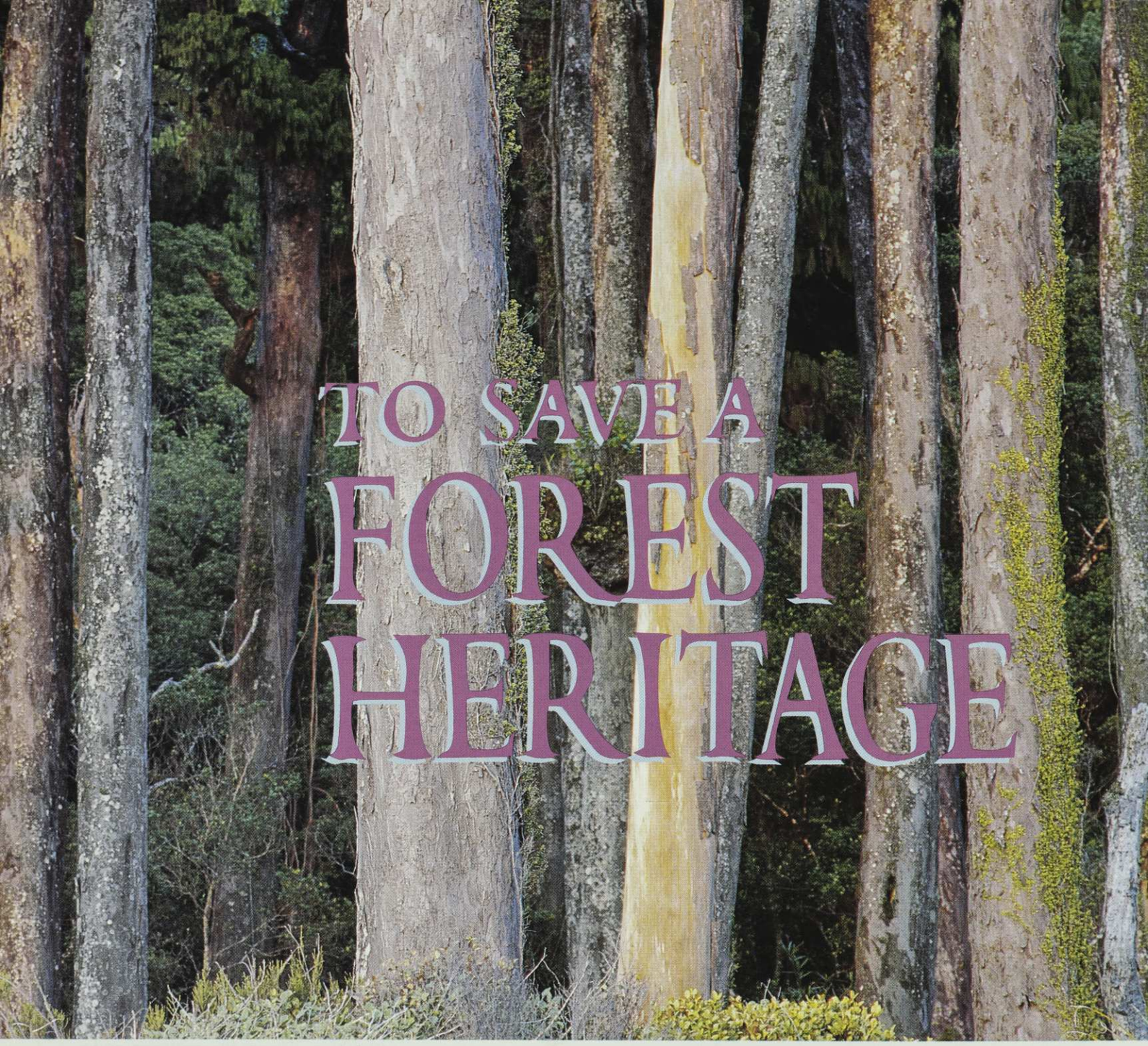
The more I enter into the minefield of environmental assessments, the more I realise that the greenest consumer is a modest consumer. Tread lightly in the market and your tread will be lighter on the environment. ❖

Ann Graeme is Forest and Bird's education officer and is based in Tauranga.

How it works

ENVIRONMENTAL Choice is a product certification programme run by Telarc (the Testing Laboratory Registration Council of New Zealand) which was set up by the government in 1972 to ensure that the highest possible technical standards are met in the industrial and commercial sectors.

The Environmental Choice scheme is voluntary. Manufacturers and importers may apply to Telarc to have their products measured against the appropriate specification. If the product measures up it will be licensed to carry the Environmental Choice logo for up to three years. Telarc will run spot checks to ensure the product remains up to standard, and the licence may be revoked if necessary.



TO SAVE A FOREST HERITAGE

In the 1970s and early 1980s a circled sketch of two kahikatea was the grimly ironic logo of the Forest Service, a government department responsible for clearfelling and burning large areas of New Zealand's unique native forests. In the 1990s these same kahikatea are a more appropriate symbol for the Forest Heritage Fund, a body established by government to work for the voluntary protection of native forest on private land. EUGENIE SAGE looks at the fund and its achievements.

THE LOGO may have been recycled but the resemblance with the Forest Service ends there. In its first two years of operation the fund had arranged the protection of nearly 48,000 hectares of forested land. The forests ranged from kauri stands in Northland to rimu and matai forest on Southland's Hokonui Hills, and they were protected at a cost of only $8.6 million or an average of $179 per hectare.

Less than a third of New Zealand's original forest cover remains. One sixth of this, an estimated one million hectares, is in private or Maori ownership. Much of it is vulnerable to grazing by stock and logging for timber, firewood or conversion to pasture.

The Forest Heritage Fund was set up by the former Labour Government in 1990 as part of what was to have been a comprehensive Indigenous Forest Policy. A companion body, Nga Whenua Rahui, was established to work with Maori landowners (see panel story). Forest and Bird applications were among the first grants approved by the fund in 1990. The funding covered fencing and survey costs associated with covenants to protect six areas totalling 350 hectares on the Chatham Islands.

The vision or kaupapa of the fund is "to protect through acquisition or agreement remaining indigenous forests and associated vegetation, particularly those containing old growth forest and forest of high ecological value". The kaupapa recognises the need to safeguard heritage values and preserve genetic diversity in flora and fauna. It also recognises the integral part that nature conservation on private land plays in a sustainable land ethic.

Both agencies have an independent

committee which meets at least quarterly. The Forest Heritage Fund Committee is chaired by Canterbury landscape architect and Conservation Authority member, Di Lucas. Other members include Masterton farm forester, Jim Pottinger, beech ecologist and forester, Dr John Wardle of Oxford, and nature tourism operator and former Forest and Bird conservation director Dr Gerry McSweeney.

The committee advises Conservation Minister Denis Marshall on whether funding should be allocated to assist with survey, fencing, legal and other expenses associated with putting covenants on forested land so that landowners are not burdened with the costs of protection, or to help DoC or another agency purchase the land. Protection can also be achieved through voluntary leases, management agreements, accords and land exchanges.

The fund's definition of "indigenous forests" includes vegetation of any canopy height where some forest tree species are present, and significant successional vegetation on land previously burnt or logged which has a relatively continuous canopy and where regeneration is occurring.

Forest associations and areas linking forest and aquatic or coastal systems are recognised by the fund. At Pateke, near Awana Bay on Great Barrier Island a covenant has helped to protect 143 hectares of land which includes a freshwater wetland associated with nearby broadleaf forest and stands of kauri rickers. The wetland is home to an estimated 13 per cent of the world's wild population of endangered brown teal.

FOREST AND BIRD'S conservation director, Kevin Smith, says one of the fund's major achievements is that "it has not been blackmailed into paying extortionate prices for land. Often the worst people to negotiate land purchases are people like Forest and Bird members because we make decisions with our hearts. We are not real estate agents trying to get the best bargain."

The committee's hard nosed pragmatism has seen several Forest and Bird branches disappointed when the fund has declined applications to buy particular forested areas because the asking price has been too high. Committee members are determined not to distort rural land values by paying inflated prices. "Every block we purchase influences the price of every other block because land valuation is so closely tied to previous sales," says Gerry McSweeney.

Nor, it appears, will committee members succumb to landowners revving chainsaws and threatening to log forest unless the fund coughs up the asking price. The committee recently walked away from negotiations over the purchase of a forest block in the Catlins because the sale price was unreasonable. It was later logged.

"We are here to protect as much high-quality forest as we can for the minimum dollars. We are not here as a social welfare department for farmers or foresters who have generally done pretty well out of government in New Zealand," says Gerry McSweeney. "Decisions are made on the ecological significance of an area, not just the immediacy of the threat to it."

The committee uses a range of ecological and commercial criteria to assess each application and weigh up the national and regional importance of the forested land against the costs involved in its protection. The forest's ecological significance (its rarity, representativeness, diversity, and distinctiveness) is a major factor.

"We don't want the lone kahikatea in the cow paddock, but we are interested in areas of remnant forest which are viable, have a diverse range of species and are distinctive ecologically," Di Lucas says.

Top priority goes to applications where forest is being gifted as a reserve or protected through a covenant with no financial benefit to the owner. Covenants are registered against the title but ownership remains with the landholder. A management regime for the protected land is agreed on and set out in the covenant document. This usually involves a ban on any logging, grazing, earthworks, cultivation, top-dressing and chemical spraying. Noxious plants and pests such as rabbits must be controlled.

Where outright purchase is the only option the fund is more likely to approve a grant towards the purchase price when local authorities or community organisations such as conservation groups are also contributing. The support can also be in the form of practical help such as a commitment to maintain access tracks or revegetation work if this is necessary.

Nga Whenua Rahui

THE KAUPAPA or vision of Nga Whenua Rahui is wider than that of the Forest Heritage Fund. Maori cultural values such as the spiritual or symbolic significance of an area, the tribal landmarks it contains, or its use as a source of cultural materials or medicinal plants weigh equally with ecological criteria when its committee considers applications for funding to help with protection costs.

The $2.1 million annual budget of Nga Whenua Rahui has been less than half that of the Forest Heritage Fund although a major proportion of privately owned forest, including many of the larger, more ecologically valuable areas, are on Maori land. In its first 18 months Nga Whenua Rahui had commitments to protect some 10,000 hectares of forest with proposals to protect another 10,000 hectares in the pipeline. One of the more significant has been the agreement with the Pohueroro Trust and Te Whanau A Apanui to covenant 5,615 hectares of tawa, rimu, hardwood and tanekaha forest near Te Kaha on the East Coast.

Purchase is not an option for Nga Whenua Rahui because it undermines tino rangatiratanga (sovereignty). Reserves under the Maori Affairs Act 1953 are used instead, or, more commonly, covenants that include a review of conditions and objectives after 25 years.

"Some people have criticised the review provision but it's all a question of trust and of giving future generations a part in decision making. It allows iwi to exercise rangatiratanga," says executive officer Mike Mohi of Ngati Kahungunu. "After all, the forest has been protected by its Maori owners up till now and the Crown is often only committing itself to putting up a fence which will last 30 years."

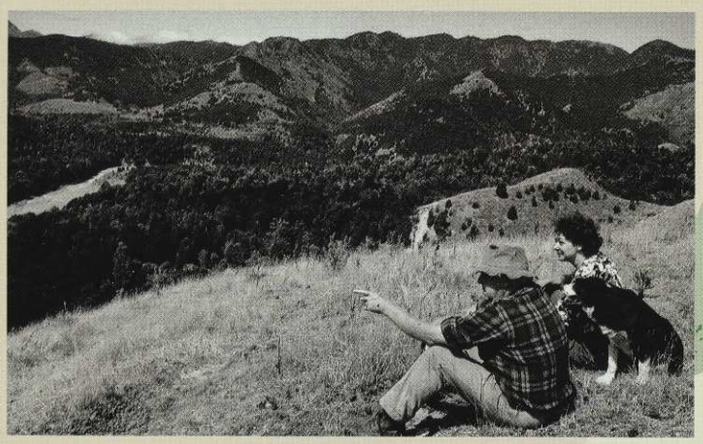
Committee chairperson, Tumu Te Heuheu of Tuwharetoa says he is proud of and encouraged by, the flow of applications to Nga Whenua Rahui. "There has been criticism from some quarters that Maoridom is being denied use of their resources. But the number of applications shows that people are interested in the long-term protection of their taonga, providing their identity and beliefs are kept intact." The observance of tikanga Maori in the committee's meetings and procedures and the recognition that negotiating with several hundred owners takes time, is helping Nga Whenua Rahui to overcome the legacy of distrust among some iwi from previous dealings with the Crown over land.

Protecting the bush

Case 1

A MAJOR PURCHASE by the Forest Heritage Fund has been the preservation of 92 hectares of matai and beech forest at Ngaroma beside North Canterbury's Conway River. Sheep farmer Neville Hyde has milled a number of native trees in his time but confesses to being "a bit of a greenie". He and his wife Ronelle Marie agreed to sell 47 hectares of kahikatea and matai forest, uncommon in Canterbury, then generously gifted an adjoining 45 hectares of podocarp and beech forest.

Neville Hyde says the price paid for the first block "wasn't within a bull's roar" of what he could have expected to make from taking an estimated 300 cubic metres of matai and kahikatea timber off the block. But he is pleased that the forest will continue to provide a home for tui, kereru, South Island robin and other birdlife, and that his efforts over the last 42 years to control possums and wild pigs have not been in vain.



EUGENIE SAGE

Neville Hyde and fund chairperson Di Lucas survey the 92-hectare Ngaroma block purchased by the fund. Where land such as this is bought with the fund's help it usually becomes part of the conservation estate and is managed by the Department of Conservation unless another organisation exists with suitable management expertise and some assurance of continuity.

Case 2

FOREST AND BIRD and the Maruia Society began campaigning to protect silver beech forest in the Waipori Gorge near Dunedin in 1988. It is the most significant remaining area of silver beech forest in the eastern South Island north of the Catlins and links two existing scenic reserves. Pledges for $50,000 were received to help with the purchase and offers of compensation were made to the landowner. The campaign was unsuccessful and logging continued but in May this year Denis Marshall was able to announce that 265 hectares of the forest had been purchased using the Forest Heritage Fund.

Case 3

IN 1991 the Forest Heritage Fund brought Hugh Wilson's and the Maurice White Conservation Trust's dream of a "summit to the sea" reserve on Banks Peninsula within reach. A grant of more than $100,000 helped the Trust to purchase some 900 hectares of Otanerito Station which adjoins its existing 109 hectare Hinewai reserve. The purchase is important because many of Banks Peninsula's "pocket handkerchief" reserves are too small to protect the whole range of biota and landscapes in the Banks ecological region. The Otanerito valley has a wealth of climatic variations and vegetation types, from the sub-alpine and montane vegetation of Stony Bay Peak to filmy ferns and nikau palms closer to sea level.

Case 4

THE FOREST Heritage Fund has provided welcome assistance to community and environmental organisations working on conservation projects in their localities. Their limited budgets can make protection through land acquisition a heart-breaking task because the sums involved are so huge.

The fund's purchase of Awakiki Bush, near Balclutha, was assisted by a $7,000 donation from Forest and Bird's South Otago Branch. The forest had been part of the Dent family farm since the early 1900s and John and Elaine Dent had declined several approaches to mill it. With more than 330 totara and 100 matai trees, the 31-hectare block is the largest and most intact remnant of totara-dominated podocarp forest in the region. It is also a valuable landscape feature in an area where fertile rolling downlands have been largely developed for farming.

NEVILLE PEAT/DOC

Department of Conservation staff Carl Chaplin (left) and Chris Bennett put in a fence round the Awakiki Bush Scenic Reserve. Behind them is the dense totara forest now under protection.

GEORGE MCMILLAN

Almost 900 hectares of mixed podocarp hardwood forest at Takaputahi, East Cape, were purchased by the fund late last year. The blocks had been under threat from logging.

IN ITS FIRST YEAR of operation the fund spent only half of its $6.75 million allocation because of what Denis Marshall has called "the commendably cautious way it bought property". The committee considered applications totalling $11 million in 1990-91 but "insufficient proposals were put before us to protect high-quality land at a price we considered to be fair," says McSweeney.

The under-spending was criticised by some but, says Kevin Smith, "conservation dollars are harder to get and scarcer than any other dollar in government and it has given the fund a lot of credibility with Treasury and other ministers that the committee hasn't blown its budget".

The National Government reduced the fund's allocation by $1.75 million to $5 million for the 1991-92 financial year. Committee members claim the fund escaped lightly given the current economic climate and cuts in other areas of government spending. Forest and Bird has called for the budget for the fund and Nga Whenua Rahui to be increased to $10 million.

Establishing the Forest Heritage Fund as a separate entity rather than just topping up DoC's land acquisition budget has had its advantages.

"In the land acquisition area DoC is often no different from conservation groups. Staff set their hearts on particular areas which may not be the key ones, or they are prepared to pay too high a price," Kevin Smith says. "Having a group of people with a national overview who recognise that there is a limited pool of money means applications are assessed on the basis of national priorities, unaffected by the personal ambitions of particular regional conservators or senior managers."

The fund operates as a contestable bank except that it is in the business of grants rather than loans. Every application placed before the committee competes on an equal basis with every other, regardless of the individual or organisation making it.

Voluntarism, with a willing seller or covenanter, is central to the fund's operation but applicants do not need to own the forested land at the centre of an application. So professional and community-based organisations, local and regional authorities, government departments and

Queen Elizabeth II National Trust

THE QEII NATIONAL Trust has been in the business of protecting landscape features, forest remnants, wetlands and archaeological and geological features since 1977. The protection is through open-space covenants signed with private landowners. Grants from the Forest Heritage Fund have enabled the trust to clear a backlog of covenant applications which it had been unable to process because of a lack of resources to assist with fencing, survey and legal costs, and also to continue processing new covenants.

Since its establishment the trust has registered over 570 protective covenants covering 23,000 hectares, with another 470 proposals for 60,000 hectares proceeding towards registration. Most of the protected areas are in the developed – and more visible – lowland regions of the country which are poorly represented in the Crown conservation estate.

The main benefit to a landowner of an open space covenant is that while the land is protected in perpetuity, the owner retains title to the land. "As far as the community is concerned," says trust manager Tim Porteous, "the main benefit is cost-effective conservation – covenants cost considerably less than purchase – and that the owner is an on-site 'manager' for the protected area".

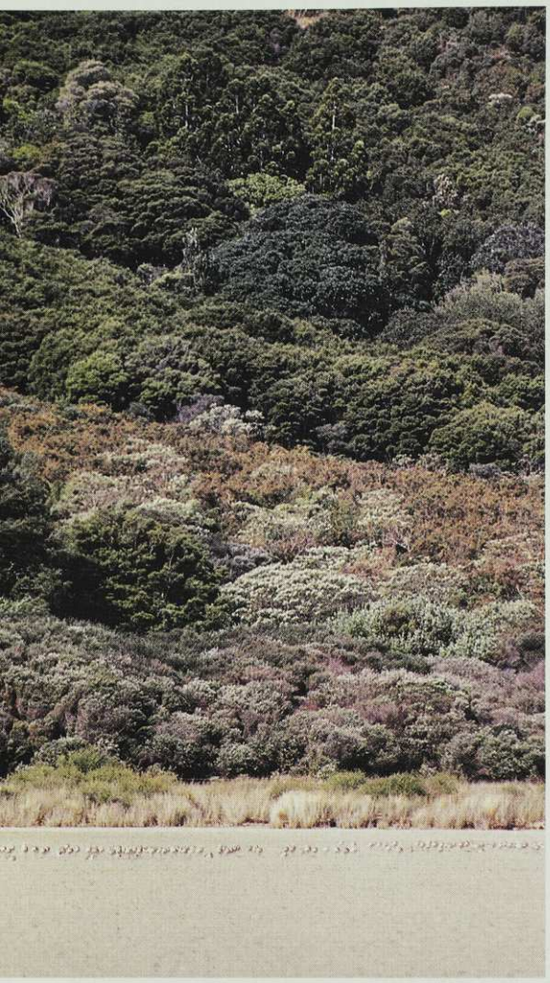
The trust, like the Forest Heritage Fund, is never short of potential applicants. "Despite the recession and falling farm incomes, the demand for covenants continues to grow, perhaps as a flow-on effect from an increased public awareness of the need for conservation, or because more family farms are being put on the open market rather than passing automatically to the next generation," says Tim Porteous.

The trust has lobbied government for an increase in its annual base allocation of $1 million. The level of this allocation is such that all forest covenants approved by the trust require funding from the Forest Heritage Fund.

The double-handling involved in securing support from the fund is a source of frustration for the trust even though the approval rate has been in excess of 90 percent. Once approved by the trust, cases are submitted to the fund's committee resulting in delays and extra paperwork.

The trust is quick, however, to acknowledge the usefulness of the fund. "Without it the trust would be in the awkward position of turning down virtually all landholders," says Porteous. "Voluntary protection is a powerful conservation tool and has developed a considerable momentum over the last ten years. To stifle that goodwill through insufficient funding would be most unfortunate."

Increasingly, branches of Forest and Bird are giving valuable financial assistance by contributing to the costs faced by a landholder in fencing areas off to exclude stock. In many cases this support has allowed a proposal to proceed which otherwise would have faltered.



The fund purchased 53 hectares of salt marsh sandspit and bush at Te Matuku Bay, Waiheke Island. The mixed kauri, tanekaha and kanuka forest contains some large pohutukawa and a kowhai stand.

agencies, national umbrella organisations, as well as private landowners can all bid for assistance.

One of the challenges facing the fund is to be proactive in identifying opportunities for protecting significant forested areas, instead of relying on what the mail bag brings. DoC is considering a proposal by the fund that reconnaissance-style accelerated assessments be done of private forest within each conservancy. These surveys would be less comprehensive but faster than those involved in the Protected Natural Areas programme. Di Lucas says they would put the fund's committee in a better position to judge the significance of individual applications.

THE PERFORMANCE of the Forest Heritage Fund to date in removing around 48,000 hectares of forested land from the effects of grazing by stock and the blades of bulldozers and chainsaws has been impressive. It has faced an extraordinarily difficult working environment with the Indigenous Forest Policy in limbo until the Forests Amendment Bill was introduced last July.

By announcing in November 1990 that it would move to control clearfelling and then doing nothing until mid-1992, National breathed life into a dying native timber milling industry and unleashed an orgy of forest destruction. Logging contractors were quick to approach private landowners scare-mongering about lost opportunities for a financial return unless cutting rights were sold smartly.

The fund's resources have been stretched because landowners have based their asking price on what they would earn by clearfelling whole blocks for timber. Under a regime of sustainable forest management the costs of protection to the fund would only be the loss of the sustained yield. The Forests Amendment Bill purports to establish such a regime. But at the time of writing, loopholes such as allowing landowners to appeal to clear coupes of up to 20 hectares of beech forest, mean the legislation falls well short. A comprehensive ban on the export of sawn native timber, as well as sawlogs and chips, is also vital. Without it the fund is effectively competing with overseas interests in the market for native forests as timber.

It is unrealistic to expect the fund to be able to answer all the problems which exist in protecting our dwindling forest legacy. When the Resource Management Bill was being debated, Forest and Bird's calls for the Indigenous Forest Policy to be linked to the Bill were ignored. The legislation treats water but not native forests as a public resource. Any individual or organisation wanting to discharge into water or take or divert water from a river or lake requires the consent

Tena koutou nga uri o Tanemahuta, kahikatea
Mai rano i tu koutou i tenei takiwa o Tainui
I runga i te kopu o Papatuanuku
I tu koutou ko o tuakana, o teina hoki, ara pukatea, matai, pokaka,
totara me era atu
Engari – i tenei ra
Tu ana koutou – mokemoke ana
Nga morehu o taua wa
He tauira mo matou nga tangata
No reira kahikatea – tenei te mihi atu
E tu E tu E tu

(Denis Marshall, Minister of Conservation, at the dedication ceremony for the purchase of Yarndleys Bush, 17 July 1992)

Yarndleys Bush, Te Awamutu, a 14.5-hectare remnant of emergent kahikatea forest which once clothed extensive areas in the Waikato Basin. It was purchased from the Yarndley family by the Waipa District Council and the Forest Heritage Fund and is the first application from a local authority approved by the fund.

Greetings kahikatea – descendants of the God of the Forest
Long ago you stood in your thousands in this area of the Waikato
On the belly of Papatuanuku
You stood with your other relatives pukatea, matai, pokaka, totara
Alas – in these times
There you stand – a lonely reminder
A few survivors of those wonderful times
A glimpse (of that spendour) for mankind
Therefore – kahikatea – I pay homage to you
Greetings

of a regional council, through a regional plan or a permit application. Yet in many parts of New Zealand if forest cover is not required for soil conservation purposes, a landowner can log 100 hectares of native forest without going near a district or regional council for permission.

To enable the fund's resources to be fully effective the Resource Management Act should be amended to require landowners contemplating logging indigenous forest to seek a resource consent from a local authority and any logging to be part of a sustainable management regime.

A MORE COST-EFFECTIVE method of defining covenant boundaries for land registration purposes must be found if a large chunk of the fund's budget is not to be swallowed up paying for survey costs. In 1989 Tasman Forestry decided to protect 16,000 hectares of Bay of Plenty forest including an area of prime kokako habitat. But when DoC and Tasman came to tie up the legal details of the Tasman Accord they found themselves faced with a likely $40,000 bill for surveying land the company owned to identify the 16 covenant areas. The fund recently agreed to pay the major proportion of these costs.

Some district land registrars are prepared to accept a survey plan of covenant boundaries drawn from an aerial topographic photograph but others require more extensive field work. The issue needs to be worked through with the surveying profession and the Departments of Justice, and Survey and Land Information.

Rating relief for protected land would provide an incentive for many private land owners to retain forested areas, particularly in areas such as Northland and on the East Coast where farm incomes are often low. The recent Rating Powers Amendment Act gives local authorities the option of rates relief but does not go far enough.

"Nobody should be rated on natural habitats or undeveloped and unserviced natural land because you end up with a 1950s reason for clearing forests to pay rates bills," says Kevin Smith.

In the final analysis the fund reflects our continuing, though understandable, preoccupation with forests. However generously the fund committee defines indigenous forest, its mandate does not extend to protecting wetlands, tussock grasslands, coastal dunelands and shrublands in their own right. Applications for funding to protect a "superb" high country wetland and a coastal sandspit have been declined because of the minimal amount of associated forest.

If the fund's kaupapa and budget were widened to become a Natural Heritage Fund it could help protect the full array of biological treasures on these islands of Aotearoa. ❖

THE CLOSING DATES for applications to the Forest Heritage Fund are 10 February, 30 April, 31 July and 31 October. Application forms and further information are available from Department of Conservation offices or the Secretary, Forest Heritage Fund or the Executive Officer, Nga Whenua Rahui, PO Box 10-420, Wellington. Telephone (04) 471-0726.

The address of the QEII National Trust is PO Box 3341, Wellington. Telephone (04) 472-6626.

Eugenie Sage is a freelance journalist based in Christchurch.

LINKING THE MOUN

CONSERVING NEW ZEALAND'S RIVERS

One of nature's most awe-inspiring spectacles must be a river in full flow cascading through a gorge or down a waterfall. And one of nature's sharpest contrasts must be the same river at low flow meandering peacefully through pools and riffles. But, as KEVIN COLLIER explains, intact and unmodified river systems are becoming increasingly rare.

CLEAN, FRESH WATER flowing from seepage to stream to lake and river and finally into the sea not only evokes emotions of awe and tranquillity, it also gives life to many species of native aquatic plants and animals.

The well-being of this native life, however, is often in conflict with the way in which we regulate and use rivers. Rivers are seen as convenient sources of water and electricity, as drains for the disposal of waste, and as natural hazards that need to be controlled. The role of rivers as habitat for native communities of plants and animals, and as part of the natural landscape of New Zealand, is one of the least recognised of their values.

RIVERS FUNCTION like huge trees, but instead of climbing towards the sun, they grow in size as they approach the sea. Small streams feed the main stem of the river like fibrous roots providing energy and life. As with the fine root hairs of trees, wetlands and seepages keep the small streams alive. The intact sequence of wetland or seepage, stream, river and estuary is vital for the natural functioning of river ecosystems.

The existence of these intact linkages between different parts of a river is particularly important for many native fish. These are the fish which spend some of their lives in the sea and require access up and down rivers to complete their natural life-cycles (see page 30). Too often, humans do things that affect one part of a river or catchment without examining how this will influence life in other parts of the system. Dioxin and PCPs have leached into groundwaters in the Rotorua area, for example, and the insecticide dieldrin into Southland streams.

Close links with the land mean that the ecological health of rivers is greatly dependent on the state of the catchment and vegetation on the banks. The natural shape of river systems means that they have very long boundaries relative to the actual area of water. Consequently, there is much greater scope for damage to rivers compared with forest blocks which have similar areas but shorter boundaries. Activities in the catchment such as mining, subdivision and farming can cause sediment, nutrients and toxic effluents to enter waterways. On the West Coast, for example, there have been recent problems with the discharge by mining companies of settling pond effluent into Inangahua River and Fletcher Creek.

The ability of rivers to dilute waste and transport it downstream has often been seen as a solution to pollution. This can create problems, however, because the pollutants move with the water and their effects on aquatic life can spread over long distances downstream. The Manawatu River has long suffered from the incremental effects of catchment erosion, industrial waste and sewage, farm runoff and the dewatering of tributaries. The result is that the lower section of the river is severely degraded, although a management plan to clean it up is now being developed by the regional council.

Native vegetation on the banks of rivers can help stabilise soil and prevent erosion, reduce nutrient runoff, and keep water temperatures down by providing shade. Many of our native aquatic plants are adapted to shaded conditions and have disappeared from streams where riverside forest has been removed. Plants alongside rivers also provide shelter for the adults of many aquatic insects, cover for native fishes and food in the form of leaves and terrestrial invertebrates that fall into the water. At least 14 native species of plants living on river banks are considered endangered, vulnerable or rare.

Riverside vegetation

Native vegetation alongside rivers, lakes, swamps and estuaries is important to the natural functioning of aquatic ecosystems. It:

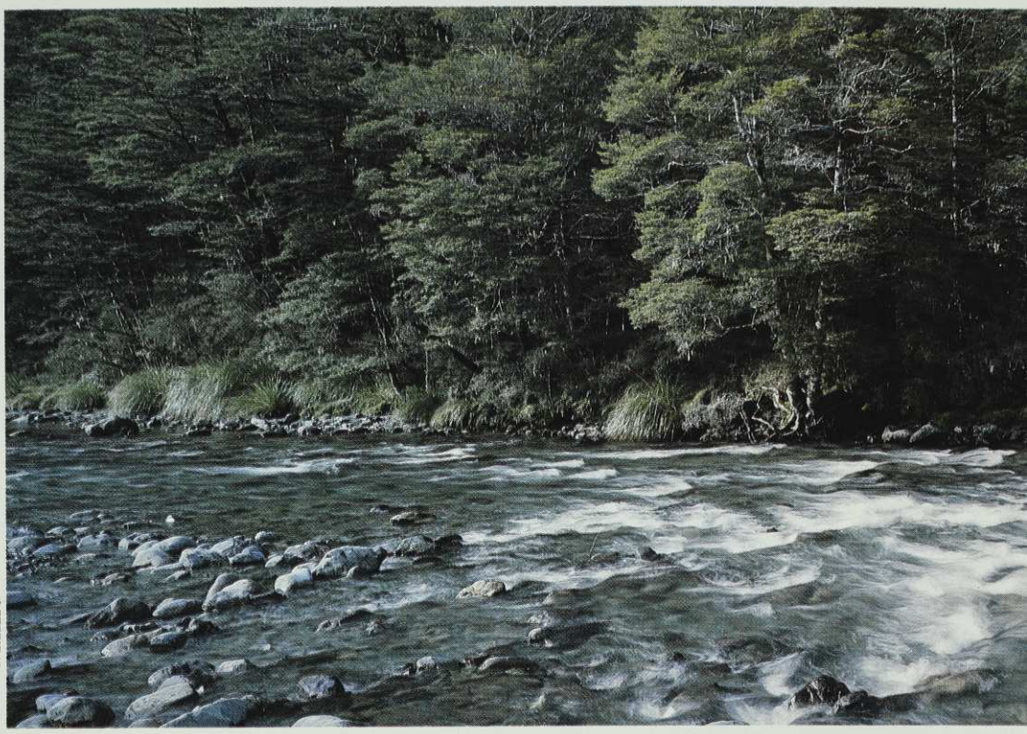
- maintains soil stability and reduces loss of land through streambank erosion
- regulates water flow by increasing the time water spends in the ground and the amount of water lost by plants
- maintains water quality and clarity and protects aquatic habitat by reducing sediment and nutrient run-off to waterways
- reduces maximum water temperatures and minimises daily temperature fluctuations by providing shade
- influences energy dynamics by affecting the quality and quantity of light for the growth of algae and inputs of terrestrial organic matter for invertebrates
- provides cover and habitat for aquatic invertebrates and fish (in the form of leaf accumulations and woody debris), and for terrestrial plants and animals (e.g. bats)
- provides breeding and resting areas for many native birds (e.g. blue duck) and breeding areas for fish (e.g. whitebait).

The mosaic of a modified landscape: the plain of the Waiau River, north Canterbury. The large aquifers that exist under braided rivers can become polluted from agricultural leachate, and irrigation of adjacent land can severely affect natural water flow.

CRAIG POTTON/DAC COMMUNICATE NZ


TAINS TO THE SEA

BECAUSE RIVERS are contained within their watersheds and many freshwater species do not disperse easily over land, the distributions of some animals can be very localised. In a recent analysis, I identified 178 species of freshwater and groundwater aquatic invertebrates which are presently known from three or fewer ecological regions in New Zealand. Aquatic habitats on Banks Peninsula, for example, are home to five invertebrate species that are found nowhere else in the world. Then there are at least 37 species of aquatic invertebrates which are known only from off-shore islands. The native plants and animals living in our fresh waters make an important contribution to the biodiversity of New Zealand.



T. LILLEBY

A free-flowing river in a natural catchment: the Travers River in Nelson Lakes National Park. Native riverside vegetation stabilises the banks and provides an important natural corridor for the movement of animals and plants up and down catchments.

WE ALL KNOW that introduced species can modify habitats and adversely influence the native communities of plants and animals. There are many species of introduced aquatic and riverside plants in New Zealand; the algal water net *Hydrodictyon* is one that has recently been causing major problems in some North Island waters. Several invertebrates have also been introduced to our freshwaters, either accidentally from fish tanks or intentionally as trout food. One species of introduced snail is believed to be forcing a native snail, *Glytophysa variabilis*, out of many lowland rivers and lakes. In addition, 20 species of introduced fishes – almost as many species as native fish – are now found in New Zealand waterways.

Fortunately, most of these introduced fish still have localised distributions. The most widespread are brown and rainbow trout which are the basis of an important sports fishery. In terms of their recreational value, trout can be thought of as the freshwater cousins of deer in native forests. And like the deer in our forests, the presence of trout in our rivers is not without ecological consequences. An increasing body of evidence indicates that trout adversely affect many native fishes and some invertebrates through predation and competition. There is a strong case for stopping any further spread of trout and other introduced sports fishes into relatively unmodified catchments.

P. MORRISON/DOC

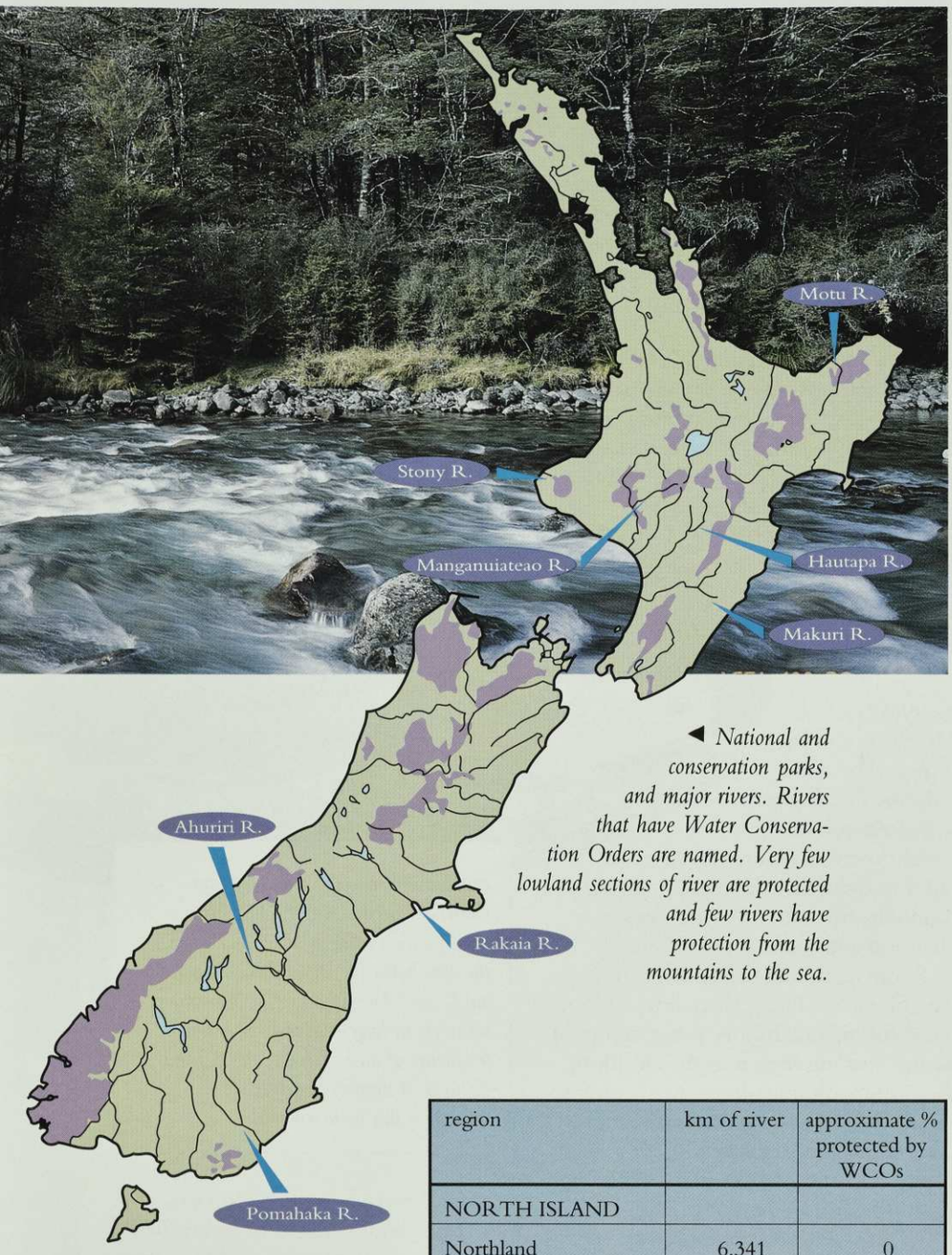
A catchment cleared of beech forest in the 1920s at Tokomaru Bay. The land has been destabilised, increasing the amount of sediment carried by the river and changing the habitat of aquatic fauna.

What has been lost?

factors contributing to the degradation of freshwater habitats in New Zealand

- 85% of lowland forest cleared
- 90% of wetlands drained
- almost half the length of larger North Island rivers in catchments with modified vegetation cover
- more than 62 hydroelectric projects
- at least 200 introduced wetland plants
- 5 species of introduced freshwater snails
- 3 species of introduced frogs
- 20 species of introduced freshwater fishes

IT IS ESTIMATED that two-thirds of world river flow will be regulated by the year 2000. In New Zealand over 62 hydroelectric schemes are our contribution to this loss of wild fresh water. Hydroelectricity should not be seen as a low-impact form of energy. The construction of dams and subsequent altered river flows, sediment levels and water temperatures can have significant effects on native plants and animals and natural river processes. The recent power crisis has shown us just how much energy



◀ *National and conservation parks, and major rivers. Rivers that have Water Conservation Orders are named. Very few lowland sections of river are protected and few rivers have protection from the mountains to the sea.*

region	km of river	approximate % protected by WCOs
NORTH ISLAND		
Northland	6,341	0
Auckland	3,013	0
Waikato	15,374	0
Bay of Plenty	8,244	0.7
Gisborne	6,448	0.8
Hawke's Bay	11,397	0
Taranaki	6,094	0.4
Manawatu/Wanganui	17,215	0.9
Wellington	6,327	0
North Island total	**80,453**	**0.4**
SOUTH ISLAND		
Nelson/Marlborough	15,471	0
Canterbury	27,723	2.5
Westland	19,392	0
Otago	22,914	0.5
Southland	20,394	0
South Island total	**105,894**	**0.8**
NEW ZEALAND TOTAL	**186,347**	**0.6**

Lengths of major rivers in different regions of New Zealand showing the proportion of the total length currently protected by Water Conservation Orders (WCOs). This does not include the smaller river channels that were indiscernible from 1:250,000 maps. Lengths of multiple channels on braided sections of river are included.

can be saved through conservation measures, a much better alternative to the construction of more dams.

With such an abundance of rivers and lakes, most people would never believe that New Zealand could become short of water. However, increasing demands from agriculture, industry and urban communities mean that some areas of the country like the east coast of the South Island, parts of Otago, the Waimea Plain in Nelson, and the eastern side of the North Island ranges may face long-term water supply problems. Over-allocation of water to orchards in the Moutere catchment near Nelson means that many streams dry up over summer and water quality in the main river is very poor.

New Zealand households use 210 billion litres of water every year, and probably over one third of this could be saved by implementing water conservation measures. The solution to potential water shortages is not to abstract more from rivers or to build more reservoirs, but to use what we have in a more efficient way.

Because of the degradation, small native-forested streams and seepages draining the lowlands or coastal hill country are now difficult to find in most parts of New Zealand. Furthermore, there are no large river systems in the North Island or on the east of the South Island with catchments that are wholly unmodified from their headwaters to the sea. We have to go to north-west Nelson, Westland, Fiordland and Stewart Island to find large river systems in unmodified catchments, and even then their plant and animal communities can contain introduced species. Introduced fishes are not known in the rivers of Stewart Island and they may also be absent from other areas of the country such as parts of north-west Nelson. These areas are, therefore, particularly important for river conservation.

NEW ZEALAND has well over 186,000 kilometres of rivers (see table). So far, only eight rivers, representing less than one percent of the total river length, have been protected by Water Conservation Orders, although several other orders are pending or under appeal. But the importance of natural value has played only a secondary role in river conservation to date. Of the 23 Water Conservation Orders applied for between 1982 and 1991, 18 came from Acclimatisation Societies (now Fish and Game Councils) primarily to protect the introduced sports fisheries. Although protection of trout and salmon habitat can also be beneficial to native species, greater importance needs to be placed on the

NATIVE FISH

NATIVE FRESHWATER fish, like many other small and cryptic creatures in New Zealand, have received relatively little attention from conservationists. Most people have heard of the kakapo, tuatara and kokako, but few know of the plight of the short-jawed kokopu, Canterbury mudfish or dwarf inanga.

New Zealand has 26 native fish species in seven families, excluding the extinct grayling and several undescribed species in Otago. Twenty-three of the 26 are endemic.

Native fish, like other indigenous animals, depend on good quality habitat. The protection of fish habitats containing representative or distinctive fish communities for their own sake has been poor. Fortunately, fish are often helped by the protection of habitats (wetlands, rivers and estuaries) for other conservation reasons.

It's all very well setting aside fish habitat. However, for more than half of our native fish this may not prevent local extinctions. Sixteen of the 26 species are *diadromous*, which means that they routinely migrate between freshwater and seawater.

These diadromous species include lampreys, eels, smelts, several galaxiids (whitebait species) and bullies, torrentfish and black flounder. They all have complex combinations of movements upstream and downstream involving larval, juvenile or adult fish. For these fish, it is essential that pathways to and from the sea are available. Therefore, measures aimed at conserving native fish communities involving diadromous species must be considered on a catchment-wide basis.

Most of the migrating species have young that move upstream after spending their early larval lives in the sea. A good example is the spring-time whitebait runs, which comprise the juveniles of up to six species of native fish.

Unfortunately, artificial barriers and river alterations have made thousands of kilometres of habitat inaccessible to many native fish. Migration can be impeded by dams, culverts, flood-control structures and tide gates, water diversion and removal, rapid or drastically fluctuating flows, channelisation and, in some cases, chemical and thermal pollution.

Some migrating native fish can negotiate obstacles. Those wonderful shots on television natural history programmes of salmon leaping high into the air during their upstream migrations often come to mind. While the large and powerful salmon can jump, some of New Zealand's small native fish (often at this stage only 15-55-mm-long juveniles) have evolved a different strategy. These fish are not strong swimmers, but are excellent climbers. Using surface tension, their small light bodies can stick onto moist surfaces allowing them to wriggle up almost vertical planes.

Young eels, several of the whitebait species (koaro, banded kokopu and short-jawed kokopu) and red-finned bullies can all climb and make their way past quite formidable barriers. Provided the surface is kept moist and is not too high, unassisted passage is possible, although it may be delayed.

For most of the other species, a vertical wall of any height prevents passage. Some species may even be stopped by swiftly flowing water. Many native fish require a relatively gentle flow, moderate gradients and plenty of resting areas to pass upstream.

Unaltered rivers without barriers will obviously provide the best migration routes. But for those rivers and streams with existing barriers, or where future developments are proposed, there are some methods available to help fish over or around the blockages.

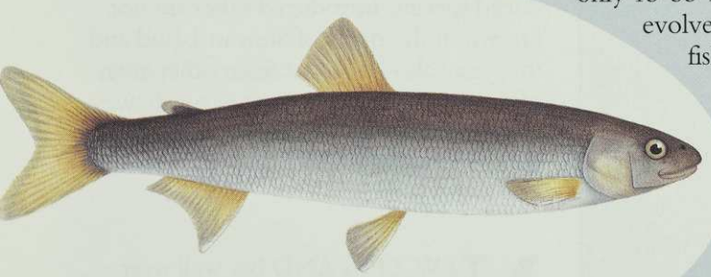
For climbing species, fish passes can be constructed from relatively low-cost, low-maintainance materials. Passes for swimmers are more difficult, but recent design developments are showing promise. Elver passes made from large PVC pipes containing "bottle-brushes" or gravel-coated interiors are being tried out at a number of lake control gates and hydro dams in Taranaki, the Waikato and Bay of Plenty. Plans are in place for similar passes on major dams in the Waitaki catchment. Improved design and management of flood and tide gates can provide for times of fish migrations. Culverts can be designed with reduced velocities, better entry, and irregularities for fish to rest in.

Not all the problems of fish passage are easily dealt with and the Department of Conservation has identified fish passage as being a "priority threat" to native fish conservation which must be addressed. The awareness of water managers and development agencies to the needs of native fish has increased in recent years but significant progress has yet to be made.

Marcus Simons
Department of Conservation

R.M. MCDOWALL

Banded kokopu, the smallest of the whitebait species. Adults lay their eggs on vegetation in fresh water and when the eggs hatch the larval fish are carried out to sea. The juvenile fish later migrate up rivers in large numbers. A common frequenter of bush streams, this fish has declined in numbers as riverside vegetation has been removed.

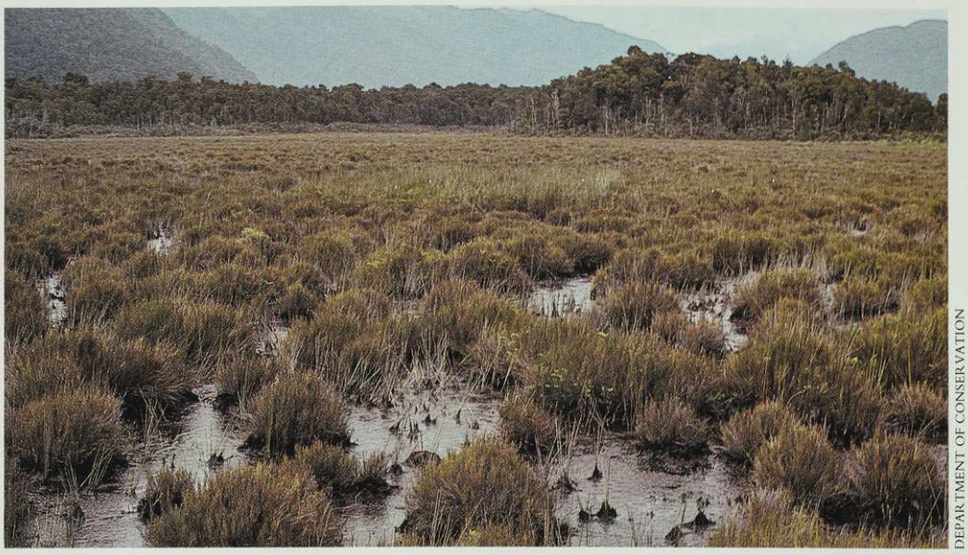


P.M. MORSE/R.M. MCDOWALL

The grayling was described by W. J. Phillipps as "certainly the most beautiful" of New Zealand fishes and was widely distributed throughout the country. It began to disappear soon after European settlement, probably as a result of catchment clearance and predation from trout. It became extinct about 1930 and remains the only member of New Zealand's freshwater fish fauna to have disappeared since European settlement. Rather laughably it was given official protection in 1952.

natural values of rivers, especially those where there are no introduced animals.

Many other rivers are protected indirectly because they drain land that is in a park or reserve. This does not necessarily protect their flow or the quality of their water, however, nor does it protect the lower parts of rivers because most of our parks encompass inland, mountainous areas. It is on the lowlands where the major river conservation problems lie. The lengths of rivers can make conservation a very complicated process because they cross the land of many different property owners on their way to the sea.



DEPARTMENT OF CONSERVATION

▲ *The slow release of water from freshwater wetlands helps to even out flow throughout the catchment, filter sediments and maintain natural water chemistry.*

ALAN REITH

◀ *Blue ducks, or whio, are river specialists and are one of the few birds in the world that have evolved to live in difficult fast-water habitats. The species is declining due to its dependence on unmodified river systems; the wild mountain rivers of the West Coast and central North Island are now its main stronghold.*

THERE ARE MANY different types of rivers in this country, and examples of all types should be represented in our network of parks and reserves, where possible from their source to the sea. For instance, rivers in Northland kauri forests have different combinations of species than rivers flowing through South Island beech forest. Rivers emanating from lowland springs are different from mountain-fed rivers, and single-channeled rivers with bouldery substrates are different from rivers with braided channels and gravel beds.

The conservation challenge is to identify and protect the most representative and least modified examples of the different river types around the country, to manage these so that their natural value is not diminished, and where appropriate to restore the channel and riverside environments. Protection will require commitment from politicians, local bodies and landowners, and research will be needed to devise and evaluate effective restoration techniques.

There has been considerable recent progress overseas in river restoration, and this has been aimed mainly at linking up degraded sections of river to sections of high natural value in order to restore their overall functioning. This work has included the re-planting of natural riverside vegetation, the restoration of channel meanders where these have been removed by river straightening, and the introduction of suitable riverbed materials for aquatic life where sedimentation has occurred. In some countries, passage for migratory fish and natural river processes have been restored through the removal of outmoded dams or through the construction of effective fish passes. New Zealand should ensure that development projects on rivers build in restoration options and costs at the planning stage so that the problems are not left for future generations.

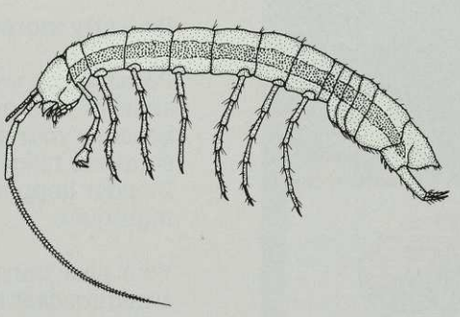
Most river systems are longer than mountains are high. However, because

Underworld living

UNDERGROUND rivers (or alluvial gravel aquifiers to give them their proper name) that are found under plains such as the Canterbury, Waiau, Waimea and Heretaunga, are home to a unique and bizarre community of animals (mostly snails, beetles and crustaceans) quite distinct from those found in surface waters.

These invertebrates exist worldwide and are very ancient. Species in different continents are more closely related to each other than they are to adjacent surface-dwelling species. They are true aquatic organisms and live on decaying organic matter. Although their existence has been known for over a century, very little is understood about their life cycles or ecology.

The health of groundwaters are important to the condition of surface waters. As well as being influenced by the condition of the catchment, water quality and river flow are affected by groundwater which can percolate to the surface.



LESTER SINTON/SOIL AND WATER 2:1985

Most aquifer invertebrates are blind, unpigmented and have a lot of well-developed sensory hairs. This 17-mm isopod crustacean, Phreatoicus typicus, *was found at Templeton near Christchurch.*

PHILIP POINTING

Stonefly larva: a widespread invertebrate in New Zealand rivers and an important component of the diet of native fish. The adult insects live on land, so habitat changes within the catchment as well as in the river can affect these animals.

Charter for New Zealand's rivers – a plan of action

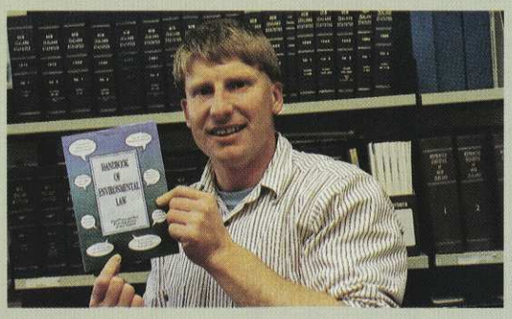
- At least 10% of rivers to be protected by water conservation orders.
- Priority given to protection of threatened native wildlife dependent on rivers.
- No further dams on wild rivers.
- Extension of Queen's Chain to the margins of all river courses to provide for unfettered public access and protection of riverside vegetation.
- Urgent development of a national policy statement on rivers under the Resource Management Act that ensures their ecological health and biological and genetic diversity from source to sea.
- Rivers not to used for the discharge of industrial or agricultural waste, or sewage. Present unavoidable discharges treated to ensure no adverse environmental impacts.
- No new barriers to the upstream passage of migrating fish. Where feasible, removal of existing barriers or creation of fish passes.
- Priority given to the control of riverine weeds and the restoration of minimum flow levels, water quality and riverside vegetation of degraded waterways.
- Introduced freshwater species to be contained to present range. Liberation of new species prohibited.

Kevin Smith

they are etched into the land and occupy more of a horizontal than a vertical plane, they often appear less impressive than mountains to the human eye. Their degradation therefore seems less obvious, and an out-of-sight out-of-mind philosophy prevails. The same is true for many native aquatic plants and animals which are slimy, secretive or inconspicuous, and do not enjoy a high level of public interest. Nevertheless, they have the same right to survival as other more visible and appealing species. Greater protection needs to be given to our different types of river systems and the aquatic life in them so that relatively unspoilt examples remain for the natural wonder of future generations. ❖

Kevin Collier is a freshwater ecologist with the Science and Research Division of the Department of Conservation.

Environmental law made easy...almost.



DON POLLY

The Resource Management Act had its first birthday last month. Forest and Bird celebrated the anniversary by publishing a guide to conservation and environmental law in New Zealand. The editor of the book, CHRISTOPHER MILNE, explains how it came into being.

THE NEED for a *Handbook of Environmental Law* was suggested about 18 months ago by Forest and Bird's field director, Mark Bellingham. Head office has always provided technical advice for branches on a wide range of issues but over recent years this has become more difficult and time-consuming. So many of New Zealand's laws and institutions have changed that even Forest and Bird staff have had trouble keeping up to date.

As the culmination of many years of upheaval, the passing of the Resource Management Act last year represented a rare opportunity for the society to publish a working guide to clearly explain the new laws and how they could be used.

My involvement as editor came about through a potent blend of enthusiasm and naivety spiced with a dash of idealism. I was later to discover a fourth and essential element, fortitude, and I grew to understand why books are usually dedicated to the author's spouse.

Returning to New Zealand early last year after several years overseas I was looking for something a little different while settling back. Short-staffed at a critical moment, conservation director Kevin Smith needed someone to sit in on the final select committee hearings for the Resource Management Bill. Soon after, as the Bill progressed towards Act, Kevin suggested that something ought to be "cobbled together for the branches". After a blackboard session in which the proposed contents were debated the concept of a more comprehensive publication emerged. As time went on it grew larger and better.

Being a grass-roots organisation, Forest and Bird maintains contact with a wide range of practitioners, academics and activists. It was time to see if the immense amount of research required could be short-circuited by persuading some of these people to contribute.

Fortunately the publication met with enthusiasm. Chapter authors were soon signed up. Amongst them were Robert Buchanan, a former senior investigator at the Office of the Ombudsman, who covered official information, and Richard Boast and Bill Hastings, lecturers in law at Victoria University, who wrote on the Treaty of Waitangi and international treaties respectively. Public access to land, one of the trickier subjects, was handled by Bruce Mason of the Public Lands Coalition.

Drawing on his years of experience, Whanganui River battler Keith Chapple contributed an inspiring chapter on effective advocacy, Judy van Rossem covered freshwater and Jon Jackson explained the technical area of subdivisions and reclamations. Remaining subjects such as coastal and marine protection, mining, historic places, hazardous substances and pests, air and noise pollution and the protection of land, plants and animals were written by myself and head office staff members Barry Weeber and Mark Bellingham.

Sir Geoffrey Palmer, sponsor of the Resource Management Act, wrote the foreword.

The objective was always clear: to provide a user's guide to all New Zealand's environmental laws. The handbook had to be in plain English and had to provide sufficient information for readers to act without much recourse to other material. Wherever possible, procedures were committed to flow-charts and practitioners were consulted to provide practical tips. Knowing where to pitch the text was always difficult but feedback was never in short supply. Most of it was positive, occasionally ecstatic, like the day a chapter came back from Kevin Smith with a scribbled note: "this is brilliant copies to all head office staff immediately."

We were aiming at a moving target. In June the government announced its long-awaited indigenous forests policy and the Historic Places Bill was introduced, in July the Building Act came into force and even as the book was going to print policy changes were being proposed for the Queen's Chain. All these developments had to be analysed and the text updated. Originally planned as a 200-page book it grew finally to over 300.

It was clear that the handbook was going to be useful for a wide readership, since there was no competing publication to match it in breadth and depth. To advance one of the society's key objectives, public education, it was priced cheaply. Without any active promotion, orders trickled in from all directions: government departments, law firms, surveyors, activists, universities and polytechnics and local councils. The Law Faculties at Auckland and Canterbury Universities are using it for their planning and environmental law courses and the Stout Trust have purchased 650 copies for schools and libraries nationally.

Forest and Bird has long been New Zealand's leading environmental advocate. Now the *Handbook of Environmental Law* enhances the society's reputation and establishes its intellectual leadership while consolidating its activist roots. As a valuable reference guide the book should become a standard text and all members should make sure they have access to a copy. ❖

The Handbook of Environmental Law *is available from Forest and Bird mail order, PO Box 631, Wellington for the discount price of $26.95 plus $2 post and packing. It is also available from bookshops.*

LIFE IN THE FIELD

As a large national conservation organisation, Forest and Bird maintains four regional offices. EUGENIE SAGE talked to our Christchurch field officer, Mike Harding.

SEAN WEAVER

Mike Harding on a vegetation survey of the Lower Kowai River. "One of the things I enjoy most is observing the natural environment, just working out the ecology of it."

PICTURES OF BLUE DUCK and the golden tussocks of the Lindis Pass decorate the walls of Forest and Bird's Christchurch office, an eyrie in the rambling stone buildings of the Arts Centre. The purple flowers of an orchid cascade down the bookshelves while tomes on forest ecology and alpine vegetation jostle for space with a large collection of maps. All hint at the preoccupations and passions of Forest and Bird's South Island field officer, Mike Harding.

While working at Arthur's Pass in the late 1980s for the Departments of Lands and Survey and then Conservation, Mike earned the sobriquet "Mother Duck". Almost daily he would pedal an old mountain bike up the incline to the Pass to check on the local blue duck or whio population in the Otira River valley.

"They got no private life, those poor ducks," says a friend. "Mike used to spend hours wandering up and down the riverbed observing them every evening after work and in his weeks off when he job shared." The research project which Mike began out of personal interest in 1987 has provided useful insights into the survival and distribution of high-country whio.

BORN AND RAISED in Wellington, Mike has been a Mainlander since migrating to Dunedin for university studies in 1980. Stimulated by summer holiday work at Mt Cook and a stint overseas, and having gained a basic understanding of botany, zoology and geology, he switched from science to the parks and recreation management course at Lincoln.

Most of his scientific method and expertise has therefore been self taught. It has been inspired by a deep curiosity about the natural environment and endless hours tramping and wandering in the mountain lands of the Southern Alps.

In the 1970s and 1980s natural history research was a low priority at Lands and Survey's Arthur's Pass field centre. Mike's enthusiasm and hard work during his three years there saw flora and fauna work gradually given more funding and staff time.

Friends recall Mike organising people to spend bone-chilling winter nights listening for kiwi calling near the township. "Locals knew there were kiwi in the valley but no one knew where they were, how many there were, and what they did," Mike says. The project was a first in providing information on population size and distribution.

Mike found himself becoming increasingly involved in the politics of the South Island high country. While living at Arthur's Pass he regularly fronted up at planning hearings in a personal capacity to object to local forestry proposals. These threatened to mar the tawny landscapes and character of the upper Waimakariri Basin, the dramatic prelude to the national park. "The high country's a fantastic place to spend time in," says Mike. "It's expansive and has a wilderness character of its own because it has relatively few human structures."

IT WAS THIS INVOLVEMENT in high country issues which led to his coming to work for Forest and Bird in 1989. But exchanging mountain vistas and the damp smell of beech forest for Christchurch's cultivated landscapes and malodorous winter smog was a difficult decision.

Of slight build, quietly spoken and with a modest and unassuming manner Mike is respected by South Island conservationists and bureaucrats for his tenacity and well researched arguments.

The high country has continued as a theme in Mike's work for Forest and Bird. He has been the driving energy behind the proposed Torlesse conservation park near Porters Pass, currently being investigated by the Department of Conservation (see *Forest & Bird* November 1990). He lobbied successfully to expedite protection of one of the few remnants of Hall's totara and the woodlands which once covered the drier slopes of the Mackenzie Basin on Ruataniwha Station (*Forest & Bird* February and *Conservation News* July this year) and coordinated the society's work on DoC's thar management policies.

The meagre number of protected areas in the vastness of the high country rankles. "The few mountain tops, pocket handkerchief reserves and the odd more extensive ones which have been set aside are inadequate, not just for nature conservation but also for providing a baseline against which changes can be measured".

He points to the difficulties scientists and researchers, investigating the relationship between soils and the introduced and rapidly spreading hawkweed (*Hieracium* spp.), had in finding an area of high country soil which had not been grazed by either sheep or rabbits.

Though resident in Christchurch, Mike thinks of Arthur's Pass as home – a place of physical and mental rejuvenation and a base from which to continue his whio research. A population of *Ra-*

nunculus godleyanus in the Hawdon Valley has also come under Mike's watchful eye with regular visits over the last four years.

Alarmed by the fact that no government agencies are currently monitoring any plant species in the central Southern Alps, Mike began keeping tabs on this palatable plant to reassure himself that it was not disappearing from the area because of browsing by chamois.

AS FOREST AND BIRD field officer his "patch" extends from Nelson and Marlborough south to Timaru and includes the West Coast. Sue Maturin, based in Dunedin, looks after Otago and Southland. Efficient use of time means much of Mike's work is Canterbury-based but he is available to assist other branches when help is requested as in the Kaikoura marine reserve campaign.

He says the position involves a "real juggling game" – responding to members' requests, keeping Forest and Bird's public profile high, representing the society at numerous local government and central agency meetings and working on national campaigns such as the review of the marine mammal sanctuary for Hector's dolphin. "You could work 80 hours a week and still not get the job done."

Scheduling time for field work is essential he says. "You cannot be an office-based environmentalist and maintain your credibility forever. You've got to get out and establish the conservation values of an area, look at the specific elements, and take some photographs to show others."

The Resource Management Act, with its increased emphasis on public participation in the planning process, is proving a burden as well as a blessing for both branch members and field staff. Regional and district councils and DoC are immersed in preparing regional policy statements, coastal plans, district plans and regional conservation management strategies. "Everyone wants or is required to have some environmental comment in what they are doing. You could spend all your time being a voluntary adviser to councils."

Mike believes regional and district councils will have to recognise that "if they want effective comment from groups they may have to provide some assistance. This could be in the form of travel expenses or a contribution towards costs."

EUGENIE SAGE

"You could work 80 hours a week and still not get the job done."

He says he is motivated to put in the hours needed to keep all the balls in the air by the lasting rewards of seeing areas set aside for protection through his and others' efforts. "What really fires me up is the threats to protected areas and most of them are unnecessary threats – things done for expedience or greed rather than survival."

Grazing in national parks is a particular dislike. "We don't need to do it. The economic returns are infinitesimal yet it has enormous impacts on the forest fringes and on the tussock communities."

Tourism in national parks provides more dollars but also has a downside. The New Zealand Tourism Board is seeking to increase overseas visitors to three million annually by the end of the decade. Mike foresees conservationists having to pay greater attention to the demands tourism and recreation make on parks and other protected land and the threats of over-use and inappropriate use.

"I have a clear philosophy about what national parks are for, as do many Forest and Bird members. They are here to protect indigenous flora and fauna and natural cycles, not to provide a resource to get something more from. Yet a sector of the community, particularly people involved in tourism, have quite a different perception."

He predicts that if the practical implications of the three-fold increase in overseas visitors are not anticipated and some bottom lines set, New Zealand will become a "has been" on the tourist circuit. With our national parks compromised by over-crowded tracks, gondolas, hotels, condominiums and similar "developments" the visitors will head off for Antarctica – "the last frontier".

A field officer's position is not one for popularity seekers. The job often brings the incumbent into conflict with staff in government agencies at the local, regional and national level, whether it's publicising a district council's failure to act against a ski field developer bulldozing ski runs without the necessary resource consents, or highlighting DoC's tardiness in moving on areas recommended for protection under the PNA programme.

"You have to be diplomatic because you are confronting people all the time, asking why are you doing this, saying they should be doing that, or we believe these things are important."

Good organisational and writing skills are useful, as is the old-fashioned virtue of thrift when working for a non-government organisation with limited resources. In the Christchurch office this extends to conscience pangs when note pads recently replaced odd scraps of paper for taking telephone messages.

As traffic slicks by on the wet tarmac outside, the fax shrills and another press release reaches its target, the city seems only a temporary abode for Mike Harding. Before long the mountains are likely to reclaim this student of nature's mysteries. ❖

Eugenie Sage is a Christchurch-based journalist.

Book reviews

Beyond the Limits

by Donella and Dennis Meadows and Jorgen Randers (Earthscan Publications) $29.95.

This is the most significant book I've come across for a long time. Twenty years ago the authors wrote *The Limits to Growth*. This examined the long-term consequences of economic and population growth and, because the conclusions pointed to a collapse of the world that we know, it caused a furore. It also sold nine million copies in 29 languages.

Now the authors have returned to the fray. They believe that their earlier conclusions are still valid: human population and the use of resources are approaching the limits of a finite earth. In fact for many resource and pollution flows the limits have already been passed. In many areas it is not necessarily depletion of resources which define the limits, but rather the ability of the planet's natural systems to process the wastes. Hence global warming and the ozone hole.

They argue, using a range of assumptions and computer models, that without reductions in the throughput of material and energy the next century will see a dramatic decline in food supplies and industrial production.

There is a choice for a sustainable future, however, but the difficulties in such a transition are not underestimated by the authors: "We think it is technically and economically possible, maybe even easy, but we also know it is psychologically and politically daunting. So much hope, so much of the modern industrial culture, has been built on the premise of perpetual material growth."

It is also worth noting the foreword by Nobel laureate Jan Tinbergen: "Market economies are obviously in need of some intervention in order to provide public goods, to avoid too much inequality, and to approach sustainability".

The message in the book is particularly relevant to New Zealand with its new Resource Management Act. There are some hard fights ahead for Forest and Bird and sister organisations – this could be just the weapon you need.

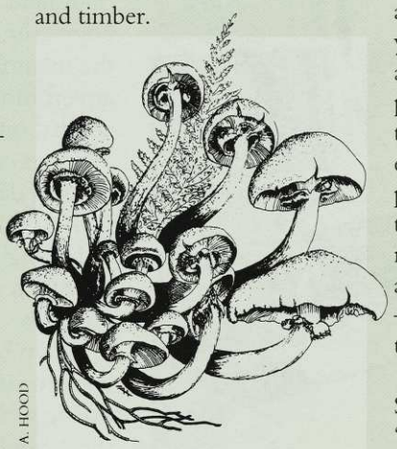
Donald Scott

An Illustrated Guide to Fungi on Wood in New Zealand

I.A. Hood (Auckland University Press) $39.95

Fungi are an essential part of the recycling processes that occur within forests, breaking down the wood of living and dead trees, releasing the bonded carbon and chemical energy for their own use and leaving the residues to decompose into the soil and sustain the living forest.

Most of our native wood fungi are also found in Australia, Papua New Guinea and the South Pacific, and a few also in South America. Some native fungi attack exotic trees, but are not found in the northern hemisphere where these trees originate. Naturally some exotic wood fungi have arrived in New Zealand with exotic trees and timber.



I. A. HOOD

Armillaria limonea *is a common white to lemon-yellow toadstool. Along with other* Armillaria *fungi it is an important decay agent of native forests and, known as harore, is still eaten by Maori. Fresh* Armillaria*-decayed wood is bioluminescent and can be seen eerily glowing along bush tracks on dark nights.*

This book is an introduction to tree and wood fungi, for those of us who have progressed beyond Marie Taylor's *Mobil Guide to Mushrooms and Toadstools*. To use the book you will need to master the key, but don't despair, the text is well-illustrated (170 line drawings and 48 colour illustrations) featuring the more common species and noting their hosts. Perhaps some more diagrams might have helped in the key, for those who are totally fungi-ignorant. At 400 pages this book is good value.

Mark Bellingham

Rights of Nature, a history of environmental ethics

by Roderick Nash (Primavera Press)

This may be the most important conservation book you ever read. Roderick Nash's work is an exhaustive investigation of the origins of the rights of nature through its development in the American legal and philosophical system.

This book is not light reading, but it is readable and thorough.

It traces the development of the greening of philosophy and religion and examines particularly the rights that have been claimed for minorities, animals and nature over the past 300 years. The broader ecosystem approach to nature has had a profound effect on the recognition given to the non-human elements of the planet. This approach has helped mould the transition through minority rights, anti-animal cruelty and animal rights to rights for nature – the plants, the air and even the rocks.

Nash quotes Christopher Stone's 1972 landmark essay "Should trees have standing? Towards legal rights for natural objects":

"I am quite seriously proposing," he states, "that we give legal rights to forests, oceans, rivers and other so-called 'natural objects' in the environment – indeed, to the natural environment as a whole".

There is a need for a complement to *Rights of Nature* exploring the development of these concepts in the British legal system, and in New Zealand and Australian philosophy and law. New Zealand is relatively advanced in this area and some of our environmental legislation already recognises the "intrinsic values of ecosystems". The sea, however, remains the major realm in this country where life is viewed simply as resource for people.

This book can be ordered from good bookshops or through The Wilderness Society, 7-9 Hosier St, Melbourne, Victoria 3000, Australia for $A26.95.

Mark Bellingham

Sierra Club: 100 years of protecting nature

by Tom Turner (Harry N. Abrams Inc) $139.00

This beautifully presented book is a fitting tribute to an extraordinary organisation, America's oldest and largest – over 650,000 members – conservation group, the Sierra Club. To anyone with an interest in the natural wilderness areas of America the book will provide an endless source of pleasure.

Begun in San Francisco in 1892 by John Muir as an advanced walkers' group of like-minded people, the club's main aim was "to explore, enjoy and protect the wild places of this earth". The name derives from one of their favourite areas, the High Sierras of the Pacific coast.

Things began to change as this active set of people became aware of some of the threats to their beloved wilderness areas. One of the first in a series of many battles was fought over the creation of the Yosemite National Park. The club was enthusiastically lead by Muir, the first president and perhaps the first modern "conservationist", at a time when conservation was considered a lunatic fringe idea.

Today the Sierra Club sees itself as "the most radical of the mainstream organisations". It has over 250 national staff and its roles range from political lobbying and supporting green congressional candidates to promoting recreation and outdoor pursuits and publishing superb photographic records of the natural world.

As for the next 100 years, David Brower (celebrated mountaineer and former president) in addressing the centennial celebration issued the following challenge to all environmental groups, indeed all Americans: "We need to stop and take time to clean up the mess".

Felicity Gifford

Learning about native plants

BRUCE TREEBY at The Open Polytechnic of New Zealand has developed an innovative course on New Zealand native plants. Its aim is to encourage and enable people to be active in restoring and protecting areas of native vegetation and to manage them sustainably.

The course which is the most comprehensive of its kind ever put together covers: the importance of native plants, their ecology, protection and propagation; planting and revegetation; cultural landscapes and economic aspects. The resource material for the course contains 570 pages of text, 540 photographs and numerous graphics and woodcuts (by John Moore).

You can start the course at any time of year and work at your own pace. Fees are currently being finalised.

For more information contact Bruce Treeby on 0800-650-200 or write to TOPNZ, PB 31-914, Lower Hutt.

Waderbirds

EACH YEAR, over two million wading birds attempt a journey of over 13,000 kilometres from New Zealand and Australia to Siberia and Alaska. There they breed before returning to their feeding grounds in the southern hemisphere.

Northern New Zealand is the most south-eastern point of this East Asian Australasian Flyway.

And each year in February, flocks of far-eastern curlew – the largest of the world's wading birds to make this trip – hover in the skies above Manukau Harbour, getting ready to join the flight path.

Waderbirds – Odyssey of the Wetlands is an Australian-initiated environmental arts project which will tell the migration story, using the far-eastern curlew and its wetland habitat as its focus, to encourage a greater awareness of the crucial importance of preserving the world's remaining wetlands.

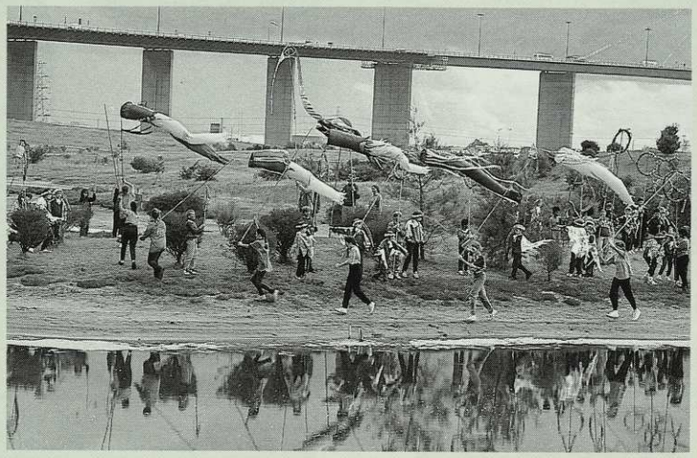
Forest and Bird, the Ornithological Society of New Zealand and the Department of Conservation are among the official supporters of the project which will include education and scientific components.

The odyssey begins with an outdoor theatre performance using fire sculptures and giant puppetry in Mangere Bridge Reserve adjacent to Manukau Harbour on 13 February before heading on to Melbourne, Western Australia, Hong Kong and Japan. The timing of each performance is scheduled to coincide as much as possible with the flight of the birds.

Communities along the flyway route from Manukau Harbour, Port Phillip Bay (Victoria), Broome (Western Australia), Mia Po marshes (Hong Kong) and Kushiro (Japan) are being invited to take part. At each location, the story of the vast flight will start with a torchlit procession at dusk and it is expected the performances will attract audiences of up to 10,000 at each place.

The final event will be staged in Japan at the international wetlands convention (Ramsar) in June next year.

For more information about *Waderbirds* contact Sandi Morrison or Joy Foote on (09) 307-7640 or (09) 520-1921.



Local children launch the Waderbirds project under Melbourne's Westgate bridge earlier this year.

Doubtful Sound by boat

THE DEPARTMENT of Conservation is running boat trips in the summer on Doubtful Sound. Based at the Deep Cove education centre, participants will be taken to remote parts of the sound as well as the open coast. Specialists will discuss the features of Fiordland's wildlife, forests and fiords.

The main focus will be the fascinating but little-known 40-metre band of underwater life on the fiord walls. There will be opportunities to see bottle-nosed dolphins, blue penguins, Fiordland crested penguins, seal colonies and the rare Fiordland skink. You will also see video footage of the new marine reserve in the sound.

The trips are on 6 to 8 January and 6 to 8 February. Spaces are limited. For more information contact: "Mirror World", Summer Visitor Programme, Fiordland National Park Visitor Centre, PO Box 29, Te Anau.

Seaweek 92

THE MARINE Education Society of Australasia (MESA), a professional body of marine educators, wants to increase New Zealanders' awareness and knowledge of the marine environment. They have organised Seaweek 92, a week of activities from 16 to 22 November focussing on schools. They want people to get their toes wet and explore their local seashore. For more information contact Sally Carson, PO Box 8, Portobello, Dunedin.

More on summer camps

TE PUKE branch will be holding a camp at Tongariro National Park from 21 to 25 January. Contact Dawn Sutton, 6A Bishoprick Cres, Te Puke.

And Ann Graeme is looking for more takers for her seashore study camp at **Waihi Beach** in the Bay of Plenty from 16 to 20 January. Learn about reef life, mangroves, sea birds, sand dunes and coastal forest. Walking, swimming and snorkelling (optional). For details write to Ann Graeme, 53 Princess Rd, Tauranga.

Please include a stamped addressed envelope with all inquiries.

National kea and kaka databases

THE KEA and kaka sighting schemes have been running now for three years and consist of over 900 records. These records hold much information on bird sightings, which over many years can give some indication as to changes in populations and reveal basic behavioural information.

Should you see kaka or kea, or have old records in notebooks etc, please send them to Michael Wakelin, Science and Research Division, Department of Conservation, PO Box 10-420, Wellington. List the region, precise location, date, number of birds, time of day and map reference and altitude if possible.

70th anniversary

NEXT YEAR Forest and Bird will be celebrating its 70th birthday. We plan to run a number of special features in the journal during the year focussing on this milestone and the achievements of the society.

In preparing some of this material we would be interested to hear from any long-serving members with particular reminiscences or stories of the early years, particularly going back to the 1940s and earlier. Please write to Ian Close, PO Box 631, Wellington.

Correction

THE PHOTO of the red-crowned parakeet on the title page of our 1993 diary should have been attributed to Don Hadden.

classifieds

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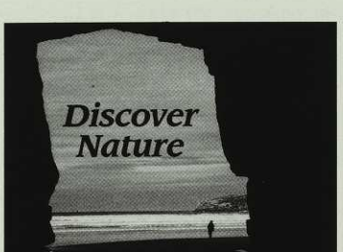

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STUDY TOURS GEOLOGY

1) "Astride Two Plates." Wellington to White Island. January 15-24th 1993.
2) "Edge of Gondwana." Northern South Island. Late March 1993.

WILDLIFE

Wildlife in the Wairarapa

a) 19-23 October 1993.
b) January 10-14th 1993.

For active amateurs contact "Study Tours" Wairarapa Community Polytechnic PO Box 698 MASTERTON (Phone (06) 377 5029).

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1992 Index

Key:
CU = Conservation update,
BO = Branching out,
WW = Worldwatch.

• Lodges and houses •

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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.

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An ideal base to explore the Far North. Near Pukenui in wetland reserve. Six bunks. Fully equipped kitchen. Separate bathroom outside. Inquiries and bookings to Howard Ockenden, Waipapa Rd, Kerikeri, (09) 407-9457 or John Dawn, Doves Bay Rd, RD 1, Kerikeri, (09) 407-8658.

William Hartree Memorial Lodge, Hawke's Bay

Situated 48 km from Napier, 8 km past Patoka on the Puketitiri Road, the lodge is set amidst the 14-ha William Hartree Memorial Scenic Reserve, and close to many varied walks in the area including the Kaweka Range, as well as hot springs and a museum. Information sheets are available.

The lodge accommodates up to 20 with 10 bunks and 10 mattresses, has fully equipped kitchen including microwave, refrigerator and stove plus hot showers and an open fireplace. Visitors supply own linen. The nearest store is a Patoka (8 km). No animals.

For rates send a stamped addressed envelope to the booking officer, Mrs Colleen Mackay, 89 Rogers 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. 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 Auckand

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. 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

The cottage at Onetangi has comfortable bunk accommodation for eight people and has a stove, refrigerator, and hot water. Adjacent to a 49-ha wildlife reserve, 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.

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; 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 building.

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

Turner Cottage, Stewart Is.

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.

New Zealand papers are leading the way, leaving competitors in their wake.

New Life Paper On A Wave

The tide has turned. Consumers are showing increasing concern for the environment - a stance reflected not only in consumers' general attitude but in their demand for, and use of, recycled product.

Paper in particular has impacted the imagination of consumers. They have caught the recycling wave and for them the only acceptable products are locally manufactured, 100% recycled brown Sandow and white Ecolade.

There is a fashion opportunity which expresses an environmental sensitivity ...boutique bags from recycled paper.

"We are experiencing very active interest in the consumer product area. There is a swing towards nostalgia. Designers and creative directors are choosing Sandow and Ecolade both of which have an environmental significance. Upmarket boutiques have recognised the fashionable market response to non plastic packaging and exclusive carry bags"- John Bradley, Managing Director, Uni Bag Limited of Wellington.

"Ecolade is an off-white paper with a rustic appeal. I would definitely use it again." - Chris Prebble, Publications Editor with the Ministry of Transport, Wellington, who used Ecolade for posters in the Ministry's drink/drive campaign.

"The characteristics of recycled paper are well suited to the manufacture of computer line flow." - Scot McArthur, Operations Manager at International Business Forms.

"Brown recycled paper Sandow has been available in envelope form for some time. Now we are converting right through the range to Ecolade" - Barry Cairns, General Manager of Domino Marketing, Auckland.

McDonald's Family Restaurants switched to recycled Sandow and Ecolade for placemats and takeaway bags.

"The recycled paper products reflect McDonald's pro-active environmental initiatives in relationship to our product packaging. Corporate awareness of environmental issues is an area of very real significance to us all." - Mark Jenkins, Director of Purchasing/Vice-President, McDonald's System of New Zealand.

Graphic designers and printers are showing a keen interest in Mataura Mill's Ecolade and Sandow.

If you want urgent information, use the Mataura Mill Hot Line 0-25-975 169

MATAURA MILL HOT LINE

YOU KNOW IT'S TIME FOR CHANGE, FOR A BETTER WAY. TIME TO PRESERVE THE BEST OF OUR WORLD - CHERISHED VALUES, DWINDLING RESOURCES. AND TIME TO STRIKE OUT FOR NEW GROWTH, NEW HOPE.

CATCH THE WAVE WITH RECYCLED PAPERS. ASK FOR ECOLADE AND SANDOW...

100% RECYCLED IN NEW ZEALAND - NATURALLY

SANDOW 100% RECYCLED PAPER

ECOLADE 100% RECYCLED PAPER

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PO BOX 9

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- ☐ PLEASE SEND ME MORE INFORMATION ON SANDOW AND ECOLADE
- ☐ PLEASE SEND ME MORE INFORMATION ABOUT OTHER NEW ZEALAND-MADE PAPERS
- ☐ PLEASE SEND ME MORE INFORMATION ABOUT PAPER RECYCLING
- ☐ PLEASE PUT ME ON THE MAILING LIST FOR YOUR MAGAZINE SHEETWISE

NAME MR/MRS/MISS/MS _____

TITLE _____

COMPANY _____

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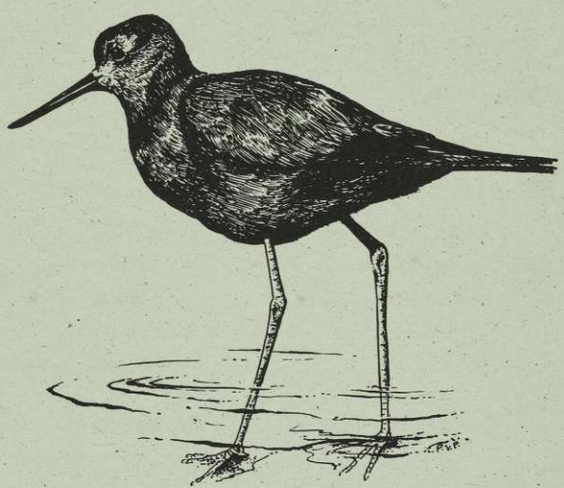
JOIN FOREST & BIRD
and
JOIN A FRIEND

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

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

And of course you receive 4 copies a years of *Forest & Bird*, the society's superb magazine.



Our key campaigns for the future are:

- marine reserves
- high country tussocklands • fisheries
- native forest protection • pollution • threatened species
- Antarctica • energy conservation • waste reduction

ROYAL FOREST AND BIRD PROTECTION SOCIETY

MEMBERSHIP FORM

Yes, I want to join. Please enter a membership in the category ticked below.

Name _____

Address _____

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Gift Membership If you are giving this membership as a gift, please enter your name and address below. 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.

Donor name _____

Address _____

_____ Telephone _____

☐ Family ☐ Single ☐ Group	$40.00	☐ Corporate	$275.00
☐ Senior (single) ☐ Senior (family)	$30.00	Kiwi Conservation Club (*separate newsletter):*	
☐ Student (with ID proof)	$25.00	☐ Single	$10.00
☐ Schools and libraries	$25.00	☐ Family, Schools and Groups	$20.00
☐ Overseas	$60.00		
☐ Life	$475.00	Donation	$_____

☐ Enclosed cheque to Forest & Bird. Charge to my ☐ Visa ☐ Bankcard ☐ Mastercard.

Card No. | | | | | | | | | | | | | | | | |

Cardholder's signature _____ Expiry date _____

Send to: FREEPOST No. 669, Membership Secretary,
Royal Forest and Bird Protection Society, PO Box 631, Wellington

92/93

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Card No. | | | | | | | | | | | | | | | |

Cardholder's signature _____ Expiry date _____

Send to: FREEPOST No. 669, Membership Secretary,
Royal Forest and Bird Protection Society, PO Box 631, Wellington

92/93

Every year the average Kiwi family disposes of one ton of household rubbish.

As the demand for more landfills increases, more of the countryside is dug up and disfigured in the name of waste.

We must reduce the amount of rubbish we throw away.

This is the only way to save the land from destruction by space-hungry landfills.

Down To Earth are fighting the waste battle with the Eco-pak. A refill pouch designed with 70% less packaging than a standard plastic bottle.

An empty Eco-pak flattens out to take up an incredible 95% less space than its equivalent plastic bottle.

And because the Eco-pak is a refill, the thousands of plastic bottles that in the past have been bound for landfills can now be reused again and again.

Less packaging also means less cost.

Not only will you be saving the New Zealand countryside by using Eco-paks, you'll be saving money too.

For the sake of the environment we must act quickly and do something about the packaging problem.

Do it now, with the Eco-pak.

DOWN TO EARTH

FOR A CLEANER WORLD.

Chiat/Day/Mojo R&C817