

# CON<sup>serva</sup>tion SCIENCE newsletter

DEPT. OF CONSERVATION

14 SEP 1995

CENTRAL LIBRARY WCO

Number 12, March 1995.

ISSN 1172-2606

Published by

Department of Conservation

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## EDITORIAL

### A Star is Born (we hope)

My apologies for the lateness of this issue, but the publications Unit has been working hard to bring out a new series of reports — entitled *Science in Conservation*.

The new series is designed to publish the reports of contract investigations commissioned by the Science Board. The series answers a need, expressed by the public, to be able to access these reports, and we hope these publications will make DoC and the contractors more publicly accountable.

The first numbers in the new series will be available from the Publications Unit in about a fortnight. There are approximately eighteen reports to be published over the next two months. There is the added attraction that this series will be our first to show off the new Departmental publications style for scientific and technical reports.

Kaye Green  
Editor



Department of Conservation  
*Te Papa Atawhai*



## OPINION

### Researcher or consultant?

I have worked within the Department of Conservation now for almost three years. It has been a frustrating time yet I have hung on because of the challenge of the situation I am confronted with — which is to work to ensure that my skills (and those of some of my colleagues) are used effectively in the name of conservation. This country and its taonga may be too precious for us to easily give up on a department that is protector of many of these treasures.

Looking back, I believe one of the main causes of my frustration has been due to the mis-match of expectations that have occurred regarding my role as "Social Scientist". I was employed as a scientist, as a researcher. This led to expectations on my part on how people would use my skills, how I would be valued and how I would be consulted. These

*A social scientist seeking to work more effectively for conservation*

expectations were not always met. I am sure that my frustration was shared by many staff outside the Science and Research Division who felt that I was unable to meet their needs. After all, what had I been employed for if it was not to meet their needs for information? It was soon very clear that my research skills had been more effectively used before I joined the department than when I became a staff member. The result was, and still is, a less than satisfactory situation where my research expertise is under-utilized, or directed to lesser priorities.

What had happened? The mis-match of expectations occurred because I believed I was a **researcher** and although not vocalised, it was clear that staff were implicitly approaching me as an **internal consultant**. So what is the difference? Research is

Research approach	Action approach
You are interested in all factors that impact the problem at hand	You are interested in factors which are under the control of the client (department/division or conservancy) and effect the problem
Being comprehensive and complete in the diagnosis of the problem is essential	Completeness and comprehensiveness is not necessary. It can be overwhelming at the point of deciding what to do
You can do research on your own. The organization doesn't have to be involved as part of the research team, i.e. networking is not important	The client's involvement in the study is important at each stage, i.e. networking with staff is a priority
You try to eliminate bias and intuition of the researcher and there is a heavy emphasis on objectivity and hard data	You are getting paid for your own bias and intuition — your judgement! You use all the feelings and perceptions you have in addition to hard data
You are essentially neutral toward whether the organization approves of the outcomes of the research	You are deeply concerned about the attitude of the client toward the outcome of the study

*Table after Block 1981, p.142*



aimed at **understanding** a problem and treats that understanding itself as enough. A consultant's role emphasizes **action** — action that will improve an organization's functioning. The purpose is not research. (See Table)

These distinctions may be overly extreme but may serve to generate debate over the more effective utilization of our skills within the department and the role modification that needs to occur within the Science and Research Division.

When the objective of work becomes action rather than understanding, the context in which the study occurs becomes vital. The people you are working with become vital. The department in which the study occurs becomes vital. Both people and department become part of the focus of a study because if action is to be taken we need to understand not only the technical conservation driven problem but also how the problem is being managed. Technical problems almost always have accompanying management problems that affect how the department has attempted to resolve the technical problem. Sometimes the management issues are even more interesting than the technical skills. There may also be parallels in the way the problem is managed, and in the way we will be managed and the way our expertise will be used.

"To not address the organizational side is to see your expert recommendations distorted and only partially implemented because of the difficulty that the organization has in communicating, trusting and managing itself."

(Block, p.149)

When the objective of work becomes action rather than understanding, timeliness also becomes one of our most important considerations.

People need action now! A department needs action now! We need to be flexible enough in our time management to address their needs in a timely way. Responsiveness needs to be part of our own specific Science and Research mission statement. To insist on staying within my research role according to a project planning system can mean not only that individual staff members outside Science and Research will remain frustrated with my inability to help them, but also that, across the board, departmental frustration with our research staff may increase to such an alarming level that the viability of the Division is continually questioned until a point is reached when it can be finally disbanded.

This though is not an argument for disbanding our research role — we will continue to need expert knowledge on a whole range of conservation issues. Rather this is a plea for more internal recognition of an action oriented consultant role. Our researchers, our knowledge workers need to work hand in hand with people who understand people and organizational systems. In the jargon of the day — we need to work on the quality of our product to maintain and enhance our competitive advantage! To not address these issues means that we collude with an organizational system that keeps the department from good problem solving and the effective use of our skills.

Margaret O'Brien,  
S&R Division, Tory Street

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## REPORTING BACK

### Mapara Revisited

I am almost ashamed of it! After three years of monthly study visits, in September 1981 I walked away from the Mapara Reserve and its kokako, only to make one brief return. The walk away was literal, but certainly not in spirit, since I have had the good fortune to remain closely in touch with the species and with work at Mapara. Several factors have contrived to keep me in touch: firstly, the evolution of the Kokako Recovery Plan and its promise of growing activity and support; then the birth of the Kokako Research by Management Programme; finally, the great work of members and associates of the Recovery Programme all over the North Island.

On joining DoC in 1990, I acquired the task of supervising the research effort on Kokako at Mapara and establishing the Research by Manage-

ment Programme. The latter was not without its difficulties and it received some harsh yet valuable criticism in its early days, as we struggled to build a series of management activities into a credible scientific experiment. I am not going to report on that yet though, except to say that the outcome has been great and that Mapara has been a vital part of it. Instead, I am offering a personal view of the outcome of years of work by Waikato Conservancy and our own researchers in that one area.

A couple of weeks ago I spent a few days in the field, to give some assistance in what has been the busiest season to date, but also to make comparisons with the Mapara I knew 15 years ago.

To walk along one of the many tracks in the forest back then was to fill one's senses with the sound of birds,





particularly bellbirds, tui, and kokako; the heady smell of goats, which were everywhere; and views of a vegetation showing clearly the ravages of goats, pigs and possums. Some steep slopes were almost devoid of vegetation. Narrow spurs afforded hazardous walking because of the marbles left by the goats, and the understorey was virtually non-existent in many places. Possum-chewed leaves of five-finger and other species littered the ground and the handful of fuchsia trees were bare of leaves. There were, nevertheless, a few magnificent fully-clothed rata trees standing alongside others whose lives were already at an end.

In the three breeding seasons up to 1981, we only managed to find three kokako nests, one of which succeeded. Post-breeding surveys in two years yielded no more than the two fledglings from that nest. While the nest-finding skill of our team wasn't close to that of the people working at Mapara today, clearly the birds were not doing too well. In the 15 years since possums had arrived in the area, their effects were highly apparent (though we now realise that one of the predations noted back then was by a possum).

So what do things look like now after five years of intensive management against rats and possums? From the outside not too different at first, but inside the mind starts to boggle. Most of the same tracks exist, plus a whole lot of new ones. The smell is different — no more old billies strutting their stuff. The sounds? Well, it's hard to judge. We didn't have the forethought to undertake a population study of all bird species back then, so I can't put any figures on paper. Some species, such as bellbirds and tui, seem abundant now, just as they were then. Others, such as fantails, may have even dropped

in number. Some though, are easily much more abundant than 15 years ago. The huge reduction in predator pressure and the increased availability of fruit and other foods has produced a boom in numbers of kereru. Another bird, which I recall observing regularly in the past but which is now in mind boggling numbers, is the long-tailed cuckoo. Perhaps the reduction in predation pressure on its whitehead hosts has allowed this bird to achieve more of its potential too. My guess is that, on the whole, there has been a substantial increase in most birds.

It is in the fabric of the Mapara ecosystem, the vegetation, where the results are most visible. For once, there is great satisfaction in the difficulty of moving through the dense understorey. There is, and will be, plenty of food for insects and birds. While the few remaining large rata succumbed before rescue, the future is very bright for the rest of the forest. It is a healthy place!

And the kokako? They are going up and up and up! At last count, some 52 chicks had been banded this season. Almost all of those have fledged, and some pairs are nesting again. A couple even decided to have a nest full of nestlings and one full of eggs on the go at the same time!

At this point one has to say that Mapara has been a huge success, not just for the kokako but for the community as a whole. That success is mostly the result of the inspiration and hard work of some very dedicated people. Philip Bradfield, resident ranger, is helped by Ian Flux of Science and Research, a team of Conservancy staff and volunteers, and other assistants and advisors too numerous to name, but all bitten by the Mapara bug. I salute them!

Rod Hay  
S&R Division, Tory Street

## NOTES AND NEWS

### A load of rubbish?

Current landfill space in New Zealand will only last for about 22 years if we keep up the current rate of trashing. What is more worrying, however, is the toxic effect of the heavy metals and chemicals which eventually leach out into ground water. Used oil is currently a big problem. In New Zealand we throw about 30 million litres of oil a year into our landfills and down our drains. That is as much as was spilled in the Exxon Valdez disaster!

### The taxonomy of airline advertising: Flocking good

Over the past nine months Air New Zealand has livened public perceptions of the New Zealand environment with some remarkable footage of a variety of our bird fauna. Full page advertisements in the print media and massive billboards have furthered the message through the promotion of 'koru' flocking gannets.

I did not see the initial launch on television, and was first exposed to the campaign through a full page colour advert in the Evening Post of 13 June 1994 which showed the 'koru flock'. What was immediately obvious to an ancient ganneteer was that the species in the advertisement and subsequently on billboards round the country was NOT the gannet found in New Zealand, but in fact a version (*Morus bassana*) found only in the northern hemisphere. Over many showings on television I was unable to determine whether the same species was shown in the screen version. On 1st July two visiting French ornithologists identified the gannets on a billboard in Auckland as the northern hemisphere variety, thus confirming my identification.

Discussion with the advertising agency responsible for the campaign elicited the suggestion that the firm in Dunedin who did the animation which makes the real gannets change into computer 'koru clubbing gannets' had got things wrong.

I visited the enthusiastic people at Animation Research Limited. They were able to demonstrate to me from stills of the animation shown on television that they had the birds perfectly represented as the Australasian Gannet (*Morus serrator*). They were in fact feather correct, and even more remarkable, the lower birds in the flock show the correct shadows of the birds above them in flight. Animation Research were also able to demonstrate that the billboard and newspaper advertisements were not the same, nor taken from their animation. The billboard and newspaper advertisements had in fact been done by an artist in Auckland, before the computer animation was started.

What is the clue which gave the species away? The northern hemisphere gannet has WHITE secondaries while the Australasian species has BLACK. (NOTE. The same problem occurs in the gannet represented in the painting in reception on the 6th floor of Head Office, DoC, Boulcott Street.)

New Zealanders may be the world's greatest travellers. Certainly the advertising agency for Air New Zealand has ensured, by using both a northern and southern hemisphere gannet (neither yet recorded in the other hemisphere) in their campaign, the production of an ornithological taxonomic conundrum, probably best described as a global, highly migratory, non-breeding sub-species *Morus koru flockensis*. Who says artistic licence should not be allowed!

C.J.R. Robertson  
S&R Division, Tory Street



## **RESEARCH IN PROGRESS**

### **Matakana Island geomorphology**

#### **Introduction**

Further fieldwork was carried out as part of Science and Research Division Investigations "Archaeological Conservation Assessment of Matakana Island" (Investigation 1480) and "Palaeoenvironmental Research on Matakana Island" (Investigation 1771) between 28 January and 10 February 1995. The research results given here focus on the environmental history of the Matakana Island sand barrier. The field team included Dr Bruce McFadgen (Department of Conservation, Wellington) and Dr Mike Sheppard and Mr Harley Betts (Geography Department, Massey University, Palmerston North) who are working jointly on the palaeoenvironmental research.

#### **Acknowledgements**

Dr Jeremy Gibb visited the island for a short period and provided very useful advice and discussion on various matters relating to tephra stratigraphy and to coastal processes. GeoSystems, Christchurch, kindly loaned a Geo-Surveyor GPS receiver in addition to the Pro-XL GPS which was hired from them. We gratefully acknowledge the generosity of Enoke and Adelaide Ngatai for arranging our accommodation on the island, and Mark Ngatai and Dave and Piri McCoubrie for their hospitality.

#### **Current understanding**

Our results to date indicate that the sand barrier initially formed in at least two separate parts: a northern part; and a southern part which formed against the pre-Holocene part of Matakana Island and which was separated from the northern part by a harbour exit at the southeastern end of Blue Gum Bay. The harbour exit at Blue Gum Bay was closed about

3500 years ago as the barrier prograded seawards. Just after the Kaharoa eruption 770 years ago the southeastern end of the barrier was truncated and the barrier reduced to about 80% of its present length. Following truncation, both ends of the barrier grew rapidly, narrowing the harbour entrances at Bowentown heads and Mt Maunganui. Shells in the sands forming the two ends of the barrier, however, have given dates somewhat older than 770 years. In order to try and resolve the anomaly presented by the dates, our first research effort during this visit was directed towards a better understanding of the processes which resulted in the growth of the two ends of the barrier.

In addition to the ends of the barrier, we further investigated the origins of the parabolic dunes on the barrier. Old shorelines are marked by a series of dune ridges more or less parallel to the present shore. Across these are parabolic dunes which have formed from the blowout of the old shoreline ridges, and parabolic dunes which have formed from sand derived from the erosion of the harbour shoreline of the island and blown across the island by the prevailing southwesterly winds. Not all parabolic dunes, however, can be accounted for by these processes and some of our research effort was directed towards a better understanding of the processes by which the dunes formed.

The present sand barrier is not the first to have formed across Tauranga Harbour. The older part of Matakana Island appears to be formed of old sand ridges now buried beneath metres of volcanic ash. Ridges, very subdued, can be seen on some aerial photographs of the older parts of

Matakana Island. These ridges are parallel to the present sand barrier and originally formed more than a hundred thousand year ago. Some time was spent examining old well logs and finding the heights of old well heads to see at what depths the old sands were found. The results may help decide what role, if any, tectonic earth movement played in the formation of the present barrier.

### **Results**

*Barrier formation:* Our analysis of the sediments forming the ends of the sand barrier strongly suggest that the sands at each end of the barrier are derived from submarine ebb-tide delta deposits outside the Bowentown and Mt Maunganui harbour entrances. The deltas would have been forming for several thousands of years and would contain shells which may be up to several thousand years old. Reworking of old offshore deltas would satisfactorily explain the old shell dates from both ends of the barrier.

*Parabolic dunes:* An old parabolic dune was found which dates from before the Kaharoa eruption. The dune is too far from the harbour shoreline to have been formed by harbour shore erosion. It has blown in a northeasterly direction and is therefore not a blowout from an unstable ocean foredune ridge. No evidence for human settlement has been found older than the Kaharoa eruption, and the formation of the parabolic dune is not, therefore, a result of human activity. It indicates that parabolic dunes have formed from natural processes, possibly after vegetation damage caused by natural fires or storms.

Forest cover can limit the development of parabolic dunes, and the main influence of humans on dune formation on the sand barrier is

probably related to forest clearance. Some very large parabolic dunes formed after human settlement and while the initiation of these dunes may have been a result of natural processes, once the forest had been cleared the area of migrating dunes could expand in size and move further downwind because there were no trees to inhibit them.

The number and extent of parabolic dunes along the present coast seems to be rather greater than usual in the history of the barrier. Human influence is no doubt a factor in their formation, but because the Kaharoa shoreline is very close to the present shoreline for much of the barrier, it is necessary also to consider the effect of the Kaharoa eruption on dune formation. The ash would have been thick enough to have killed low vegetation on the dune ridges close to the shoreline and leave the sand exposed to erosion by both onshore and offshore winds. This matter is being further investigated.

### **Future work**

The results of the palaeoenvironmental work carried out on Matakana Island will be incorporated in Harley Betts MSc thesis which, it is anticipated, will be completed by the end of April. The thesis will form the basis of our project report on the research. One further field trip may be needed to fill in gaps which become apparent after the thesis has been written. It is intended to publish the work jointly as a series of scientific research papers after which a publication suitable for a more general readership is planned, possibly as part of a book on the overall Matakana project.

Bruce McFadgen  
S&R Division, Tory Street



## Summary of Talon Bait Station Results 1993/94 (Hawkes Bay)

*Did you ever wonder how much it cost to kill possums? Here is one report with some comparative data.*

### 1. Mohi Bush

50 ha – 42 bait stations – the November 1994 trap catch assessment shows a catch rate of 1.1 possums/100TN,  
= 95 % reduction of the original population.

### 2. Balls Clearing

135 ha – 51 bait stations – the November 1994 trap catch assessment shows a catch rate of 1.1 possums/100TN,  
= 95.5 % reduction of the original population.

### 3. William Hartree

14 ha – 11 bait stations – the November 1994 trap catch assessment shows a catch rate of 1.1 possums/100TN,  
= 97.4 % reduction of the original population.

### 4. Hutchinson

45 ha – 26 bait stations – the November 1994 trap catch  
= 95.3 % reduction in the original population.

Annual maintenance is carried out using the following general criteria:

- 1 bait station to approximately 2 ha (more stations in small areas)
- bait stations are refilled every 8 weeks (6.5 times a year)
- 300 g bait per station each fill
- bait stations cost \$10 each and last 5 years
- 1 kg bait costs \$3.80

Cost per hectare per year:

**poison** – 300 g x 6.5 visits/year =

1.95 kg/station x \$3.80/kg =

\$7.40/station, over 2 ha = **\$3.70/ha**

**labour** – assume a cost of \$100/day.

50 bait stations or 100 ha can be treated/day = \$1.00/ha

x 6.5 visits = **\$6.50/ha**

**bait station** – depreciation = \$2.00/yr

= **\$1.00/ha**

**Total = \$11.20/ha/yr**

Additional costs not included above include; transport, monitoring and overheads. Records are kept on the amount of bait taken, and eventually "bait take" could replace trap/catch as the operational monitoring method. This would result in further savings.

The reserves being controlled by bait stations would normally require an annual trapping (if this alternative method was being used) due to high re-infestation rates. Recent information on contract prices obtained from other conservancies indicate the following costs:

Trapped to a level of 10 possums/100TN = \$20/ha

Trapped to a level of 5 possums/100TN = \$40–\$60/ha

Trapped to a level of 2 possums/100TN = \$60–\$80/ha

Additional costs are monitoring and overheads associated with running the contract.

The Talon/bait station method is proving to be more cost-effective compared to the alternative method of annual trapping. The control level achieved is an even 95%-97% throughout the year. In addition to possum control some level of rat control is also achieved (more data is required to quantify levels).

There is also potential to reduce costs further. New poisons will soon be available. It may also be possible to reduce the number of bait stations/ha, reduce the amount of talon placed in each station, and increase the time interval between bait station servicing.

K.W. Briden

Hawkes Bay Conservancy

## NEW SERIES

### PROPOSED REPORTS IN THE SCIENCE FOR CONSERVATION SERIES

1. Atkinson, I.A.E., Campbell, D.J., Fitzgerald, B.M., Flux, J.E.C. and Meads, M.J. Possums and Possum control; effects on lowland forest ecosystems: A literature review with specific reference to the use of 1080. (*Science for Conservation*: 1).
2. Cowan, Phil and Pugsley, Chris. Monitoring the cost-effectiveness of aerial 1080 and ground control for possum hunting. (*Science for Conservation*: 2).
3. Partridge, T.R. Interaction between pingao and marram on sand dunes: Completion of permanent plot studies. (*Science for Conservation*: 3).
4. Warburton, B. and Cullen, R. Cost-effectiveness of different possum control methods. (*Science for Conservation*: 4).
5. Thomas, M.D. and Fitzgerald, H. Bait Station spacing for possum control in forest. (*Science for Conservation*: 5).
6. Eason, C.T. and Spurr, E.B. The toxicity and sub-lethal effects of Brodifacoum on birds and bats: A literature review. (*Science for Conservation*: 6).
7. Parkes, J.P. and Thomson, C. Management of Thar: Part 1 - Thar-vegetation-harvest model development; Part 2 - Diet of Thar, Chamois and Possums. (*Science for Conservation*: 7).
8. Stewart, Glenn H. Stand development in the red/silver beech and mixed beech forests of North Westland. (*Science for Conservation*: 8).
9. Rogers, G. Control, demography and post-control response of heather in the central North Island. (*Science for Conservation*: 9).
10. Rose, A.B. and Pekelharing, C.J. The impacts of controlled and uncontrolled possum populations on susceptible plant species, South Westland. (*Science for Conservation*: 10).
11. Compiled by Jim Coleman. Baits and Baiting strategies for feral goats, pigs and cats. (*Science for Conservation*: 11).
12. Thomas, M.D. Changes in possum abundance in Waipoua Forest Sanctuary after 1080 poisoning. (*Science for Conservation*: 12).
13. Smale, M.C., Rose, A.B., Frampton, C.M. and Owen, H.J. The efficacy of possum control in reducing forest dieback in the Otira and Deception catchments. (*Science for Conservation*: 13).
14. Harris, R., McDonald, R. and Calvert, P. A sound-based system for locating wasp nests. (*Science for Conservation*: 14).
15. Johnson, P.N. The rare grass *Simplicia laxae*: Field status, ecology and conservation. (*Science for Conservation*: 15).
16. Meads, M. and Notman, P. Surveys of Giant Weta: Little Barrier Island, Pig Island (Foveaux Strait), and Mt Faraday and Price's Basin (Southern Alps). (*Science for Conservation*: 16).
17. Land Rehabilitation to Indigenous Forest Species. G.W. Ross, G. Mew, J.J. Payne and R.J. Jackson. (*Science for Conservation*: 17).
18. Burns, B. and Leathwich, J. Geothermal Vegetation Dynamics. (*Science for Conservation*: 18).



## NEW SCIENCE & RESEARCH PUBLICATIONS

### REPORTS

Copies have been sent to all Directors, CAS, librarians, and to the Head Office library.

#### **Wild willows in New Zealand.**

Compiled by Carol J. West 1994. *Proceedings of a Willow Control Workshop hosted by Waikato Conservancy, Hamilton, 24-26 November 1993.* An Introduction and 12 papers on the history, ecology, value, threats, and control of willow species in New Zealand.

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Moore, P.J., Wakelin, M., Douglas, M.E., McKinlay, B., Nelson, D., Murphy, B. 1994. **Yellow-eyed penguin foraging study, south-eastern New Zealand, 1991-1993.** *Science & Research Series No. 83.* Using radio telemetry, dive depth recorders, and radio tags showed the penguins dived to the sea floor up to 66 m deep off the Otago Peninsular, and 128 m off the Catlins. 37 types of prey made up the diet.

O'Brien, M., Jowett, L., Duncan, P. 1995. **Women's involvement in conservation II: A report on a conference to involve women in the wider community in conservation.** *Science & Research Series No. 81.* A conference held in Hamilton in November 1993 involved over 100 women from DoC and the wider Waikato community in establishing a network to involve them in conservation. The need for follow-up and further development in other parts of the department is discussed.

O'Brien, M. 1995. **Women's involvement in conservation I: A focus on Department of Conservation staff.** *Science & Research Series No. 80.*

Perspectives of women staff within DoC indicate they wanted the department to place greater focus on: involving and educating the public; facilitating DoC women's involvement with the public; and facilitating involvement with the department.

O'Brien, M. 1995. **Community perspectives of riparian management: A case study in Marlborough.** *Science & Research Series No. 79.*

Discussions in the community show an unexpected breadth of awareness of "river landscapes", however, there is conflict between the "authorities" and the community which impedes community change.

Walker, K., Elliot, G., Davis, A., McClelland, P. 1994. **Wandering albatross on Adams Island: census, nesting data, and body measurements, February 1993.** *Science & Research Series No. 78.*

Part of a 5-year investigation into adult mortality rates.

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Atkinson, I.A.E. 1994. **Guidelines to the development and monitoring of ecological restoration programmes.** *Department of Conservation Technical Series No. 7.* An assessment of DoC's current restoration programmes considers their extent, goals, objectives, methods, problems, and successes.

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Green, K. (comp.) 1995. **DoC science project summaries - 1993/1994. Vol.2 Output classes 5.0-9.3.** *S & R Internal Report No. 148.*

Green, K. (comp.) 1995. **DoC science project summaries - 1993/1994. Vol.1 Output classes 2.0-4.6.** *S & R Internal Report No. 147.*

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### NEW CONTRACT REPORTS

Copies have been sent to all CAS, to librarians and to the Head Office library. (Limited further copies available from this office, but you are encouraged to go to your conservancy librarian or CAS.)

Ward, J.C., Hedley, S.J. 1994. **Monitoring the New Zealand Coastal Policy Statement: A preliminary statement.** *Centre for Resource Management, Lincoln Environmental, Information Paper No. 51.* 19 p.

# LINCOLN

## UNIVERSITY

*Te Whare Wānaka O Aoraki*



### **NEW PUBLICATION**

*"Australian and New Zealand Association for Leisure  
Studies, Leisure Connexions Conference Proceedings"  
January, 1995*

*Over 200 pages with 63 papers representing leisure research  
and thinking in Australia and New Zealand.  
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*Conservation Science Newsletter is  
issued six times per year in Feb., Apr.,  
Jun., Aug., Oct., and Dec. Contributions  
should reach the Editor by the 1st of the  
month in which they are to appear.*

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