

# CON<sup>servation</sup>SCIENCE

## newsletter

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### EDITORIAL

#### DoC Special Services

The Department provides a number of special services to staff, one of these is the video workshop based in Rotorua Conservancy and run by Lindsay Canham. The video workshop makes videos for staff and is constantly developing its range of high tech equipment.

Recently Lindsay made S&R Division additional copies of a demonstration aerial video monitoring tape and told me:

"Through a new computer graphics package we can grab individual video frames, transfer them to disk then get them put onto either 35 mm negative film for getting prints, slide film for presentations etc. or a laser print on paper up to A3 size. The prints are the most popular and are put in reports etc. especially from underwater video but I also see a future for them in aerial video work especially on the monitoring side of things."

I have seen the results and they are great pictures. Clear, crisp, and good colour. A real improvement over the old video pictures which were strangely coloured, and often blurred and fuzzy. So think video for that next monitoring job.

K. Green



Department of Conservation  
*Te Papa Atawhai*



## OPINION

### Malacophily in Te Paki

I listened to a really interesting seminar by Greg Sherley recently, on the conservation of snails, pupuharakeke (*Placostylus*), at Te Paki. Greg described predation by kiore, thrushes, wild pigs and the growing possum threat. He described the favoured habitat beneath hangehange, wharangi and kawakawa - all understorey plants to coastal forest and the distribution in gullies where fires have been less frequent. He talked of the importance of fencing the localised populations, the genetic distinctions among them, their former use as food by local iwi and the generally threatened population status of most of the remnants. He highlighted the cooperative nature of the work, involving the Conservancy, Universities, iwi and even the local rugby team, who were pleased to earn money as pupuharakeke fencing contractors.

Yet, despite all the good things, and the promising aftermath of rodent poisoning, these magnificent snails seem doomed to a marginal existence, propped up by the efforts of a few devotees. As Greg noted, the area is not only significant for snails, but for a number of other species, especially plants. If we had such a category, we would probably recognise Te Paki (and Manawa Tawhi offshore) as a far-northern ecological "province", so distinctive are its qualities.

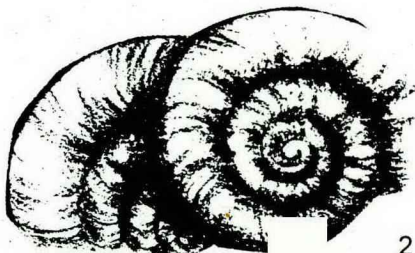
The feature that struck me from the seminar is that local community support for conservation, whether of species or places or a whole region, is absolutely essential. There is no way that a single government agency can adequately manage alone the conservation resource of Te Paki, or of

anywhere else. It needs many people on the ground and constant vigilance. It needs incentives and agreements to manage the predators, protect the gullies, restore the forest. Maori in Te Paki are not going to allow pig eradication, but they would probably help manage the gullies by planting, fencing and monitoring in return for assurances about hunting nearby, and some financial help. And where are the sponsors, the businesses that make such a fuss about their clean and green products? Together, local people can make the difference.

Isn't it about time that local communities started to take ownership of conservation resources? Isn't it about time that DoC started to trust the local community? A real partnership has to work both ways. Conservation doesn't need more knowledge, it needs "attitude" and action. DoC has the knowledge to advise, and to help wherever it can with technical matters and organisation, but without the people who actually live in an area, who actually own the broader landscape, being actively involved, the DoC estate will eventually become a scattering of museum pieces, and in Te Paki there won't be many pupuharakeke amongst them.

Through sponsorship and reward, get the people involved. Then they'll love the snails, and DoC too!

Philip Simpson  
S & R Division, Tory Street





## NOTES AND NEWS

### Over-collecting: An often overlooked factor in the decline of plant taxa

Recently a paper by this title was published in the international botanical journal *Taxon* (see Norton *et al.*, 1994, *Taxon* 43: 181-185). As one of the junior authors of the paper I felt a summary of the recommended collection guidelines could be useful. The paper has particular relevance because all of 6 plant case studies presented are based on New Zealand examples, and demonstrate how over-collecting by professional and amateur botanists has either caused, or significantly contributed to plant extinctions. It is suggested at international level that botanists adopt the following plant collection guidelines:

1. Where possible, use photographs to record uncommon plant taxa, rather than collecting specimens, at least as a preliminary record.
2. If collecting is necessary, do not collect whole plants unless there are more than 20 plants present, or do not remove more than 5 % of any one plant.
3. Do not collect flowers or fruits, if only one or a few flowers or fruits are present.
4. Do not collect material for duplicates from uncommon taxa, unless this can be done from cultivated plants without jeopardising *in situ* preservation.
5. Use seeds or cuttings for cultivation, rather than removing whole plants.

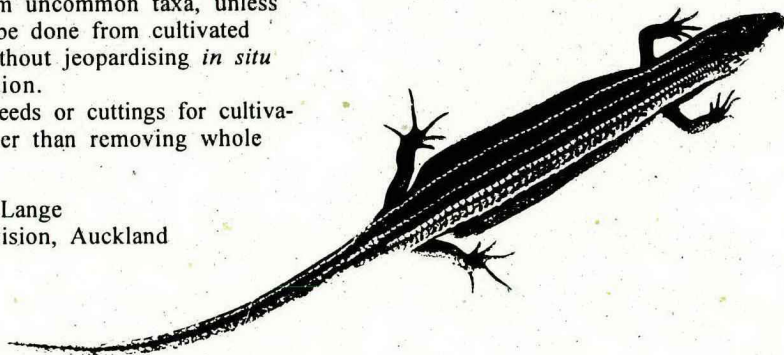
Peter de Lange  
S&R Division, Auckland

### New Species of Skink from Stewart Island

Charles Daugherty (Victoria University of Wellington) and I have recently published the formal description of a new skink from Stewart Island, *Leiolopisma stenotis* (the name refers to the small ear opening possessed by the specimens examined). This brings to a total of 20 the described species of *Leiolopisma* in New Zealand. The new species was distinguished from other members of its genus by its distinctive colour pattern, and, more importantly, by genetic differences discovered using gel electrophoresis. Gel electrophoresis is the technique that recently uncovered a new type of kiwi in Westland. It has been applied with great success to New Zealand lizards, resulting in the description of five new taxa prior to *L. stenotis*.

The recognition of *L. stenotis* as a separate species means that there are now known to be five lizard species on Stewart Island, two of which (*L. stenotis* and the Harlequin Gecko, *Hoplodactylus rakiurae*) are endemic to the island.

Geoff Patterson  
S&R Division, Tory Street



## Some notes on the vascular flora of Cuvier (Repanga) Island

During Labour Weekend of last year I accompanied the Waikato Botanical Society on a field trip to Cuvier (Repanga) Island. During our four day stay Paul Champion, Ian Atkinson, Gillian Crowcroft and I re-investigated the flora of the island, with the intention of later publishing a paper detailing the changes in the islands vascular flora since the goats were removed in 1961.

The present vascular flora of Cuvier stands at 368 taxa of which 138 are adventive and the remaining 226 indigenous. A further 4 persist as cultivation relics within the Lighthouse Settlement. None of the species recorded from the island are endemic and not surprisingly the flora has strong links with Great Barrier Island, the nearby Mercury Islands Group, and of course Coromandel. Our field work resulted in adding a further 82 additions to the most recent comprehensive published account of the island's flora (Beever *et al.* 1969: *Tane* 15: 53-68). Several of these additions were made following the redetermination of herbarium vouchers in the Auckland Institute & Museum Herbarium (AK) collected by Beever *et al.*, Ian Atkinson and Anthony Wright during their visits to the island.

During our visit we were pleased to discover a small population of the nationally "vulnerable" bindweed *Calystegia marginata*, which is not only a new record for the island but also the first record of this species from within the Department of Conservation Waikato Regional Conservancy boundary since c. 1880, when it was discovered by James Adams near Thames. Another threatened plant, Cook's scurvy grass (*Lepidium oleraceum*) was searched for with no success. This species was

collected from the island by Thomas Cheeseman in 1895 (AK!) and has not been seen since. Its current absence is peculiar, as the species survives on nearby Great Barrier Island (albeit scarce) and on the nearby Mercury Islands Group. Following the removal of the goats in the 1960's one would have expected this species to recolonise. Possibly its absence relates to the still small numbers of nesting grey-faced petrel (*Pterodroma macroptera gouldi*) residing on Cuvier. Now that kiore (*Rattus exulans*) have been eradicated numbers of nesting sea-birds should increase and possibly cooks scurvy grass will re-establish then.

Other discoveries of regional interest include: the grass *Lachnagrostis richardii* - which is otherwise only common from Wellington south (although it occurs on the Kermadec Islands), scrobic (*Paspalum orbiculare*) - another native grass species near its southern limit, and what may be the only known island population of the adventive *Bromus* "stripy". The diversity of leaf forms exhibited by tawa (*Beilschmiedia tawa*), adds further doubt as to the validity of recognising large-leaved tawa as a distinct species *B. tawaroa*. Our field work suggests this species is merely part of the normal variation exhibited by northern offshore island populations of common mainland plants. Other examples of this phenomena can be seen in island populations of mahoe (*Melicytus ramiflorus*), pigeonwood (*Hedycarya arborea*), mangao (*Litsea calicaris*), and houhere (*Hoheria populnea*).

As well as examine the vascular flora, limited collections of mosses, liverworts, and lichens were made as requested by various specialists. Our presence a month after the removal of kiore was perhaps too early to detect any major changes in the local



fauna, but it was pleasing to see an apparent change in the behaviour of the moko skink, which was more visible during the day than it usually is on other rat infested islands. A single unbanded female stitchbird was also seen above Picnic Bay on the last full day we had on the island. This bird appears to be the only survivor of a failed transfer made in the 1980's (C.R. Veitch *pers. comm.*, 1994).

P.J. de Lange  
(on behalf of Ian Atkinson & Paul  
Champion)

### How Early is Early?

Auckland Conservancy status report for 16 June cites a date for an archaeological site in Mansion House Valley on Kawau Island of AD 1268±89. The date is one of a growing number determined by measuring the thickness of the weathered surface of obsidian.

Obsidian is volcanic glass and, as it weathers, its surface absorbs water which gradually penetrates into the obsidian. This zone of weathering, the "hydration rind", can be observed in a thin section under a microscope and its thickness measured. Every time an obsidian flake is struck from a core a fresh unweathered surface is produced. Providing the rate at which water penetrates the fresh surface is known, then the theory is that a date for when the flake was struck can be obtained by measuring the depth to which the water has penetrated.

The measurements on the Kawau Island flake were made by the Auckland University Centre for Archaeological Research. Their work, which builds on earlier research carried out in the 1960's by Professor Roger Green, shows that the important

variables which determine the hydration rate are the initial water content of the obsidian, which depends on the density of the obsidian and is easily measured, and the temperature of the flake since the time it was struck, which is not so easily measured.

The temperature used to establish the hydration rate is the average temperature of the soil in which the obsidian was found, which depends among other things on depth from the ground surface. The method assumes that the temperature of the flake has been constant since the time the flake was struck. The rate of hydration, however, increases very quickly as the hydration temperature rises and if a flake lay out on the ground surface in the hot sun for any length of time before being buried, then its hydration rind will be thicker than expected and will give an erroneous older date. This temperature error is akin to the error of "inbuilt age" in radiocarbon dating, which arises from the use of old wood in Maori fires, and like radiocarbon dates, obsidian dates under this scenario are essentially maximum ages for the archaeological event to be dated. (A different scenario can be developed to show that, under certain conditions, obsidian dates will be minimum dates).

So how is the Kawau Island date to be interpreted? First, its standard error means that the true measurement date (without regard for temperature errors) lies somewhere between AD 1090 and AD 1450 with a 1 in 20 chance of it lying outside these limits. The true "flake date", ie when the flake was struck, will be younger by an unknown amount which depends on the temperature history of the flake – how long it lay on the ground surface, and the rate at which its soil cover increased once it

was buried. If the current interpretation of the now large number of radiocarbon dates is correct, then New Zealand was first settled by Polynesians around AD 1250 to AD 1350. If the obsidian date from Kawau Island accurately reflects the age of the site where the flake was found, then it is early but fits our understanding of the chronology of New Zealand prehistory based on radiocarbon dates. Because of inherent problems of temperature control, however, the date needs to be interpreted as a maximum date with an unknown and possibly large temperature error.

Bruce McFadgen  
S&R Division, Tory Street

### **Funds for conservation projects**

BirdLife International and the Fauna and Flora Preservation Society, with support from British Petroleum, hold an annual competition for conservation exploration projects. Projects entering the competition are judged especially on the level of host country involvement and the global importance of the conservation issues on which the project is focused. Proposals for 1995 expeditions must be entered no later than 31 December 1994.

For further information contact:  
Michael K. Poulsen, BirdLife International, Wellbrook Court, Girton Road, Cambridge, CB3 0NA, U.K.  
Telephone (44-223) 277318; Fax (44-223) 277200.

Or Kaye Green,  
Science Publications, Tory Street

### **When was New Zealand first settled?**

In recent years archaeologists have been debating whether the old answers about when New Zealand was first settled still hold. A poll taken at the New Zealand Archaeological Association Conference in Auckland six years ago (1988) showed that there was strong support for dates in and around the 9th and 11th centuries. This was the period favoured by advocates of the so-called orthodox theory.

A new poll taken at the recent New Zealand Archaeological Association Conference at Whangarei (1994) suggests that many archaeologists have changed their minds. While there is still strong support for dates in and around the 9th and 11th Centuries, there is now also solid support for dates in the 12th Century or later.

The poll suggests advocates of a shorter prehistory are now making significant inroads into the support for the orthodox chronology. The case for a shorter prehistory has been made by a number of archaeologists, perhaps most notably by Dr Atholl Anderson in an article in *Antiquity* 65 (1991): 767-795.

A comparison of the results of the two polls will appear in *Archaeology In New Zealand* 37 (2).

Tony Walton  
S&R Division, Tory Street



## CAS Notes - The first hundred

The published series *Conservation Advisory Science Notes* has reached the milestone of its first hundred copies after two years of operation. These "short answers in conservation science" were designed as a vehicle for presenting the scientific advice purchased from outside the Department through the Un-programmed Science Advice (USA) fund serviced by S&R Division. This fund provides managers with quick access to scientific advice. *CAS Notes* are also available to publish scientific advice given by Departmental staff. Normally the advice is published soon after receipt, with a special fast-track approval and publishing system within S&R.

While some *CAS Notes* may seem to have limited application elsewhere within DoC, all managers are encouraged to look at information from other areas, to be aware of methods and techniques which could assist them. There is no restriction on who may give advice, either by person or by organisation, so the list of *CAS Notes* will increasingly become an important reference to the skills and people available to give scientific advice on conservation problems.

Throughout the Department, all staff who provide scientific advice may submit material for publication in *CAS Notes*, when the information may be beneficial throughout the Department, or when it has been originally prepared for an outside organisation. In the first instance staff should consult their CAS, or the CAS Co-ordinator in S&R for advice.

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

*CAS Notes are free to DoC staff, and may also be purchased for \$2.25 each, by persons outside the Department.*

## SECOND CONFERENCE OF THE AUSTRALIAN AND NEW ZEALAND ASSOCIATION FOR LEISURE STUDIES

Registration and  
Call for Papers

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## LEISURE Connections

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LINCOLN UNIVERSITY,  
CANTERBURY  
NEW ZEALAND

17-20 JANUARY, 1995

Hosted by:  
Department of Parks, Recreation and  
Tourism  
Lincoln University  
Canterbury, New Zealand

## RESEARCH IN PROGRESS

### Conservation of historic sites

Much heritage management consists of removing items (including buildings) from the ecological processes contributing to their deterioration. Self-evidently, we do not have that luxury with ruins and archaeological sites. They usually come to us after a long period of decay in the ecological process. Although stable in that degraded condition, there is still scope for rapid acceleration of decay or destruction of their values where unwise management occurs.

Any assessment of the conservation status of such places therefore has to take account of the ecological processes at work. These are usually plant-, but occasionally animal-dominated. Physical and soil processes are also important.

We are generally poor at establishing cost-effective measures of conservation status for individual sites. The most hopeful technique is to note, photograph and map erosion hot spots, at least for earthwork sites. (The question then arises, when and how to make good that damage? Or does one leave the site to achieve a gentle "angle of repose"?). But what of factors such as root penetration of subtly divided layers (often full of plant nutrients), physical pressures and grinding in soil movement, changes in soil acidity and moisture content which affect such items as iron, leather, wood, bone and shell?

In recent work with Philip Simpson, the conservation status of a number of archaeological site case studies has been reviewed. We can summarise our work in the attached diagrams which show how cost of maintenance and stabilisation of certain aspects of site condition co-vary. Although work is still proceeding, various concerns have been identified: first, grassland maintenance, whether animal stocking and

mowing are giving long-term guarantees of site preservation. If not, can we establish and maintain low-input grasslands, such as is attempted in the United States, and latterly in the United Kingdom. Second, what are the risks in reversion through rough exotic grasslands and weedlands, e.g., fire and public relations. Do we really want to leave historic places invisible in a weed- or shrubland succession? Third, in shrubland succession, when is it warranted to take steps to maintain that shrubland and prevent a forest succession, and if so how is that to be achieved?

Finally, how do we maintain the visibility of pa (fortifications) in forest cover. Many of our historic reserves have a forest cover of younger hardwood trees. This cover has some stabilisation value but it is also potentially a source of disturbance. One technique to retain the stabilising effect offered but to increase visibility is to remove intermediate and ground level shrubs, ensure satisfactory ground-level covers such as ferns or native grasses (some of which are shade-tolerant), and also allow for eventual replenishment or replacement of canopies with species such as kanuka, mangao, and rewarewa (a short list based on our experience).

Finally, historic resources are not simply physical places. Like "flagship species", they focus community fears about conservation status generally. Many of the historic places on land managed by the department are of interest to Maori. This raises fairly difficult issues of whose perspective is relevant in assessing conservation status and in deciding on when to record and why, and when and how to intervene in management. With a shared vision of why places are to be preserved physically, further information-sharing and satisfactory advocacy will follow. As professional



land conservators, we can with equanimity allow for historic places to be seen as symbols of grievance and constructive dissent.

Kevin Jones  
S&R Division, Tory Street

## Online database big hit with DoC staff

NIWA established a computer-based freshwater fish database in 1977. The database is a comprehensive collection of site-specific fish records covering the whole of New Zealand, including Chatham and Stewart Islands. Data stored include the species found and their abundance, as well as a variety of other information such as the percentage of each habitat type (pool, run, riffle, etc.), riparian vegetation, site altitude and the fishing method. See *Water & Atmosphere* 1(4): 14-15 for more details. The database has grown considerably over the past 4 years and now contains over 11,000 records.

In 1991, DoC enquired about having some fields of data from the database transferred to their computers for ease of access. Although anyone engaged in legitimate research in New Zealand may access the database through NIWA, there were often delays in getting the information into the hands of DoC staff. NIWA canvassed contributors to the database to see if there were any objections to DoC's proposal, agreed on a set of appropriate data fields, drew up a formal agreement with DoC and proceeded with the first transfer of data in July 1992. Since then, three further upgrades have occurred at six-monthly intervals.

Having the database online allows DoC to incorporate more complete and timely fisheries data into their

reports. DoC use the data, in some cases on a daily basis, to fulfil their responsibilities relating to the Resource Management Act (resource consent applications, fish pass requirements) and for their Conservation Management Strategy Plans which are essentially regionally-based, 10-year management plans. The data are also used to focus further sampling effort by identifying gaps in the national coverage or out-of-date records, particularly for species of concern to DoC (mudfish, rarer galaxiids, etc.).

The online database has received a positive and enthusiastic response from DoC who describe it as quick and reliable, with good national coverage. Support from DoC was a critical factor in the decision by the Foundation for Research, Science and Technology in 1993, to proclaim the database as nationally important. Most DoC regions are now actively assessing their freshwater fish resources and ensuring new data are both recorded and stored properly by filling in database forms and sending them to NIWA for processing. This will benefit all database users.

If you are thinking that your organisation could also benefit from having the freshwater fish database online, please contact Jody Richardson at NIWA. You need not be part of a national network like DoC, as data can be issued on a regional basis. All you need is a computer with some database management software and a desire to use the information to protect and enhance New Zealand's freshwater fish resource.

Jody Richardson, NIWA, Hamilton  
[P O Box 11-115 Hamilton, Phone: 07 856-7026; Fax: 07 856-0151]

Reprinted from *NIWA Water and Atmosphere* 2(3) 1994

## BOOKS

### To be published

The Science and Research Division has signed a contract with Victoria University Press to publish an innovative work on the archaeology of New Zealand. Written by Kevin Jones, *Nga Tohuwhenua mai Te Rangi: A New Zealand Archaeology in Aerial Photographs*, will contain about 190 vertical and oblique aerial photographs of archaeological sites around New Zealand. The Maori part of the title translates as "Landmarks from the Sky". The photographs are sourced from the historical collections of the Department of Survey and Land Information, Lloyd Homer of the Institute of Geological and Nuclear Sciences Ltd, Waikato Museum of Art and History, oblique

photographs taken by Kevin, and a few other photographs from the collections of individuals.

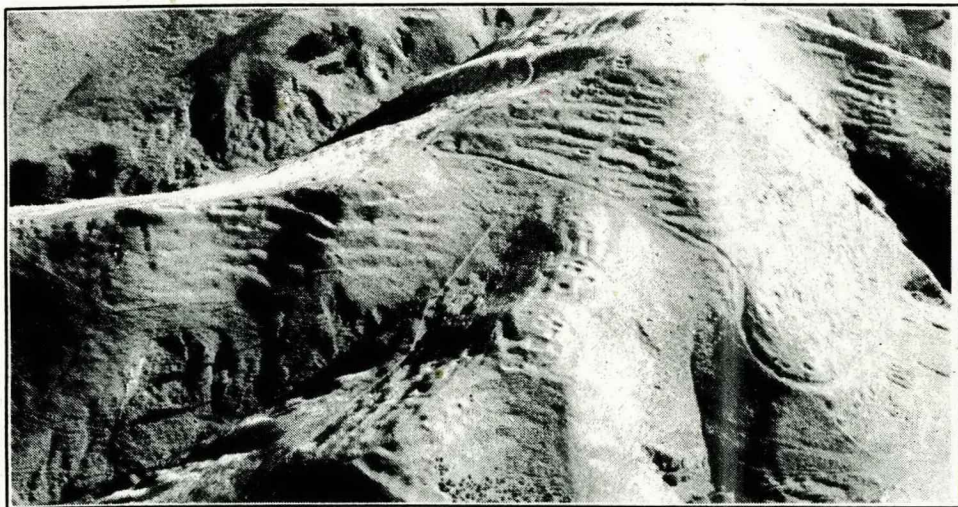
The book is in three parts. Part 1 covers thematic issues such as settlement pattern, gardening, warfare, and 19th-century fortifications. Part 2 is a regional round-up, with 9 chapters devoted to regions. Part 3 covers 19th-century themes such as mission settlements, farming, gold mining and coal mining.

Publication date: early December 1994

Retail price: \$39.95

Staff price: \$20.00

*Copies can be ordered from Science Publications, Tory Street.*



*Hikurangi, a pa in the Otarara Historic Reserve, near Napier. Prominent are many raised rim pits and the extensive terraces for which this pa is famous. It was first occupied by Awanuiarangi, later by Taraia of Ngati Kahungunu.*



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## IN CONJUNCTION WITH

## THE NEW ZEALAND LIMNOLOGICAL SOCIETY

*DoC makes available to a wider public, papers from a symposium on aquatic habitats, held during the 1993 annual conference. Copies have been sent to all CAS, to librarians and to the Head Office library.*

Collier, K.J. (Ed.) 1994. **The restoration of aquatic habitats.** Department of Conservation, Wellington. 172 p.

*Selected papers from a special symposium on the second day of the New Zealand Limnological Society 1993 Annual Conference, 10–12 May 1993, Wellington, New Zealand. Ten papers are presented in four broad groups: wetlands, lakes, streams and rivers, and social considerations.*

**Cost: \$17.00 to the public (incl. GST).**

Copies can be ordered from Science Publications, Tory Street.

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## NEW SCIENCE & RESEARCH PUBLICATIONS

### S & R REPORTS

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

White, E.G. 1994. Ecological research and monitoring of the protected grasshopper *Brachaspis robustus* in the Mackenzie Basin. *Science & Research Series No. 77.*

Flux, Ian, Sherley, Greg, Bradfield, Philip, and Clegg, Suzanne 1994. Some preliminary results and observations on North Island kokako productivity and ecology at Mapara Wildlife Reserve, King Country, July 1991 – June 1992. *Science & Research Series No. 76.*

Sherley, Greg, Green, Chris, and Owen, Keith 1994. Distribution, conservation status and some features of the natural history of *Dorcus* stag beetles (Coleoptera: Lucanidae). *Science & Research Series No. 75.*

Simpson, P.G. 1994. The Maketu Marae totara whakaturupuranga, Kawhia. *Science & Research Series No. 74.* 16p.

Clarkson, B.R. and Stanway, E.A. 1994. Vegetation recovery following fire in the Whangamarino wetland. *Science & Research Series No. 73.* 24p.

McFadden, I. and Green, T. 1994. Using brodifacoum to eradicate kiore (*Rattus exulans*) from Burgess Island and The Knights Group of the Mokohinau Is. *Science & Research Series No. 70.* 18p.

Information Services Unit, Science and Research Division, Department of Conservation. 1994. **Data standards for the Department of Conservation.** *Department of Conservation Technical Series No. 6.* 28p.

O'Donnell, C. and Sedgely, J. 1994. An automatic monitoring system for recording bat activity. *Department of Conservation Technical Series No. 5.* 16p.

Pugsley, C. and Turnbull, J. 1994. Marine Reserves Monitoring Workshop, 24–25 February 1994. *Science & Research Internal Report No. 146.*

Adcock, Helen M. (Comp.) 1994. Conservation expertise. A directory of conservation-related research and technical skills. *Conservation Sciences Publication No. 4.* 152 p.

## CONSERVATION ADVISORY SCIENCE NOTES

Copies have been sent to all CAS, to librarians and to the Head Office library. Further copies are available from Science Publications, at \$2.25 (incl. GST) per copy.

Lloyd, B.D. 1994. Evaluating the potential hazard of aerial 1080 poison operations to Short-tailed bat populations. *Conservation Advisory Science Notes No. 108.* 12p.

Simpson, P.G. 1994. Project Crimson: an example of corporate support for conserving biodiversity. *Conservation Advisory Science Notes No. 107.* 14p.

Lloyd, B.D. 1994. A report on a brief trip to assess the status of Short-tailed bays in the Rangitaua, Ohakune area, April 1994. *Conservation Advisory Science Notes No. 106.* 11p.

Rogers, G. 1994. Kaimanawa feral horses: recent environmental impacts in their northern range. *Conservation Advisory Science Notes No. 105.* 11p.

Henderson, I.M. 1994. Population viability analysis of Blue duck (*Hymenolaimus malacorhynchos*). *Conservation Advisory Science Notes No. 104.* 39p.

Moore, P.J. 1994. What is a bad season for Yellow-eyed penguins?. *Conservation Advisory Science Notes No. 103.* 7p.

Cawthorn, M.W. 1994. Seal finger and mycobacterial infections of man from marine mammals: occurrence, infection and treatment. *Conservation Advisory Science Notes No. 102.* 15p.

Dowding, J. 1994. Evaluation of techniques for management of NZ dotterels. *Conservation Advisory Science Notes No. 101.* 24p.

Simpson, P.G. 1994. Pohutukawa and biodiversity. *Conservation Advisory Science Notes No. 100.* 12p.

Ecroyd, C.E. 1994. Regeneration of *Pittosporum turneri* communities. *Conservation Advisory Science Notes No. 99.* 34p.

Ecroyd, C.E. 1994. Location of short-tailed bats using *Dactylanthus*. *Conservation Advisory Science Notes No. 98.* 6p.

*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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PO BOX 10-420, WELLINGTON, NEW ZEALAND



Department of Conservation  
*Te Papa Atawhai*