# CONservation SCIENCE newsletter

Number 4, October 1993.
ISSN 1172-2606
Published by
Department of Conservation

*This publication supersedes SCIENCE FACTION FICTION*

## CONTENTS



*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.

## EDITORIAL

Over the years we have had problems circulating the information from Science & Research Division contracts to conservation-minded individuals and groups in the community. The problems arose from the rather cloudy nature of who owned the copyright of the report, and thus had the right to circulate (and sell) it. Further, most reports were not properly published in any sense of the word. In short: grey literature.

Beginning with our contracts in 1993, these matters have been cleared up; and in all cases we will see that provision is made for getting Conservation Research published and out to the community.

One of the most interesting new developments will be DoC and Landcare's joint publication of reports resulting from research contracts. Both bodies will have copies available. Reports will have ISSN or ISBN numbers, we will fulfil the legal deposit requirements, and when you refer to one of these reports other interested people can find a copy and check that you have been reporting accurately. . . No more grey literature!

Kaye Green
Editor

## *REPORTING BACK*

### Enter the age of surveillance technology?

The wonders of satellite telemetry were revealed to New Zealand conservationists during the *International Ornithological Congress, Christchurch, 2–9 December 1990* when French scientists showed Argos world map plots of wandering albatross feeding movements of 900 km/day. These amazing plots used a radio location doppler shift technique from the transmitter to the satellite and their accuracy varied depending on the position of the satellite, but at best were in the order of 0.5–1 km.

Now a new German SAtellite For Information Relay (SAFIR) system, is due to be launched this month and it promises much more. Not only will you be able to get location data, you will also be able to send data and messages to other similar stations via the satellite, just like Internet-Mail. These may be of interest to Conservation Officers needing remote island communications, etc.

Two access systems are available: a micro-station (80 x 40 x 15 mm, A$ 3,600) that could be used like a transmitter (and data-logger) on a large animal or equipment, etc.; and a macro-station (170 x 110 x 70 mm, A$ 6,600), which sits in a small case on the back of a lap-top. Using your lap-top you can link via the satellite to other macro-stations to send messages, and to get positions of your micro-stations.

The new system extends to having a Global Positioning System (GPS) satellite receiver built into each micro/macro-station so the position of your animal/car/stolen equipment is available anywhere in the world. Using GPS, at best an accuracy of 30 m is possible, but normally it is degraded by the US Military (Selective Availability) to c.100 m. Also you can control when the system turns on and talks to the satellite reducing typical satellite time bills to 1/10 of the Argos system.

The system is still not cheap, but some of the possible applications are remote station monitoring, large animal radio tracking, global messaging, localization of stolen automobiles, cargo tracking, mountain and boat rescue. Nick and Murray will be attending a meeting in Wellington with Australian agents for the SAFIR system during October.

**Transponder tags** The fore-mentioned satellite system uses transponder technology. These are like radio repeaters, having a miniature receiver to listen for a coded message then sending a programmed reply via a transmitter. The whole device can be very small – the ones used as implanted identification tags for cats and dogs have no battery (passive), have a unique code number and are only 10 x 1 mm. They are energised by the reading device so have a very short range of 10 cm. We are starting to use these in work where we want invisible but reliable marks for hand recovered birds and reptiles.

The satellite transponders like the "micro-station" are obviously quite powerful, but an intermediate land-based device is being developed by a Petone company. This device is being solely manufactured in New Zealand and is undergoing prototype trials, with DoC assistance, on

Mt Taranaki.

It is match-box size, can be turned on over a wide range by a coded signal sent out on paging transmissions. Once triggered, the device can then be tracked like a conventional VHF radio tag. Automatic tracking antenna arrays are intended to obtain direction bearings and enable location estimates to be sent via telephone networks to any computer.

These devices will be less expensive than satellite tags and have applications such as security tags, stolen vehicles, and equipment tracking, animal tracking, personal safety, remote monitoring of traps and security alarms over a limited area. Their advantage is lower cost and reduced battery consumption, because the unit is in "receive" mode most of the time. It's early days, as commercial devices are not yet on stream, so there could be some teething problems, and we don't yet know the final system costs. If you have application ideas contact Murray, at S & R, or the Stratford Field Centre staff.

Murray Douglas & Nick Gales
S & R Division, Tory Street

## Surprise tea

During winter this year, six volunteers and I joined the permanent staff of four on remote Raoul Island in the Kermadec Group for a stay of ten weeks. We arrived on board HMNZS *Monowai* with most of the stores for next year's crew. We had been informed that food supplies were basic, but wholesome, and that we should take some of our own personal delicacies with us. So I took, along with the necessary pick-me-up sweeties and essential favourite alcoholic beverages, some Twinings teas: Earl Grey, Blackcurrant, and Russian Caravan. These were communally consumed faster than you could say "Lapsang Souchong is my favourite tea of all".

After we had been on the island for a couple of weeks, we heard from Auckland Conservancy that an airforce Orion would be flying past on 23 July and would drop mail and any small, but essential items required. I promptly rang my mother and ordered (you guessed it) two packets each of Earl Grey, Blackcurrant, and Russian Caravan tea, and (you might not have guessed) two bottles of gin. The latter was requested because (a) there was an abundance of tonic water and fresh limes on the island, but we had run out of gin and (b) gin can be bought in plastic bottles which would withstand the impact of an air drop.

My mother rushed out to do this shopping to meet the flight deadline and found, to her horror, that there was not a single supermarket in South Auckland that stocked Russian Caravan tea. She had run out of time to race into the city to try the specialty tea shoppes so, in desperation, she rang the Bell Tea Co. Ltd in East Tamaki, who are the New Zealand agents for Twinings teas. The manager she spoke to said "Come on over", so she did. When she got there and explained her predicament, the manager gave her, with his compliments, four packets of Russian Caravan tea, a tea towel with Twinings first advertisement on it, and a book about their teas.

These, she duly sent to me with a request that I send a letter to the Bell Tea Co. Ltd postmarked from Raoul.

The airdrop went without a hitch, other than it was three days late because the plane broke down somewhere in the Pacific. The Orion arrived on cue and flew past low to check the conditions. After enquiring whether we minded if the packages dropped into the sea, they first landed one almost on the runway and the second on the road. As the sun set, we hauled in the parachutes and loaded the weighty parcels on board the tractor and truck and headed off to inspect our goodies. While the "situations vacant" sections of each newspaper got a thorough going over, I brewed up some Russian Caravan tea to aid the concentration of all concerned.

Before leaving Raoul, I wrote to the kind manager at the Bell Tea Co. Ltd enclosing the DoC pamphlet about the Kermadecs and the radio contact card which has a map of Raoul Island. I described the natural history of the island and explained what the responsibilities of the permanent staff are, what jobs the volunteers did and what I was doing there as well. After thanking him for his generous gifts in support of our work, I commented that the booklet on Twinings teas helped explain why I could so seldom get Lapsang Souchong tea in the supermarkets in Wellington. The letter was franked and returned with us to New Zealand aboard HMNZS *Monowai*.


On my first proper day back in the office at Tory Street, Janie Pack was beside herself with excitement, wondering what I had received in a very neatly wrapped parcel. A quick check of the franking mark revealed it had come from the Bell Tea Co. Ltd. Not fast enough for Janie, and while Rod Hay was saying "Tell her the story!", I broke into the parcel and found: one box of 100 Bell tea bags, one box of 100 Earl Grey tea bags, one packet of Earl Grey tea, one packet of Rose tea, one **tin** of Lapsang Souchong tea, the full set of 20 "Time for tea" historic New Zealand coasters, and a note "For you and your friends, we all loved your letter" with compliments from the Bell Tea Co. Ltd. Both boxes of tea bags went straight into the Tory Street tea room and have been enjoyed by many, and the other items await the return of the crew of four before being distributed.

I thank the Bell Tea Co. Ltd for their generosity. It's great to have a good cup of tea after a hard day in the bush, coming in scratched and bruised just on nightfall. But it's even nicer to have a special tea, and we all certainly appreciated it.

Carol West
Botanist and Tea Drinker, Terrestrial Biota Unit
S & R Division, Tory Street

P.S. I did not drink all of the gin myself. It was communally consumed, like the tea, and, in fact, there was some left when we departed. There was some Russian Caravan left too.

## NOTES AND NEWS

### "Conservation" in Florida

In fact, each day for me is a switch from the sublime to the ridiculous. We are staying with friends in a huge house on a 2.5 acre lot that is part of an estate amongst lakes and woodlands. At the moment we have a full sized rental car (Mercury Sabre) that drinks gas like there is no tomorrow. So I drive this brand new, air conditioned, quadraphonic stereo, cruise driven, digital controlled, gas-guzzling tank from an exclusive white suburb into a down-at-heel, mostly black, university where the "lab" is in a second-hand, recycled mobile post office (soon to be renovated for the last two years). My office is a desk amid a sea of U-Haul cardboard boxes. But at least it is air conditioned (the lab that is!) On the bright side, all of the drafting, reference, and microscope supplies are in easy reach and I have already made a lot of use of them.

From Dave Towns, S & R Division, in Tallahassee, Florida

### DIY weight-watching for kakapo

Murray Douglas has been completing the design for the automatic Kakapo weighing scales, which are now in operation on Little Barrier Island. This system detects the arrival of a bird at the feeding station, turns on the lap-top computer and scales, recording all the variations in weight to floppy-disk, then shuts down and waits for the next time. The software allows graphical analysis on screen, summary statistics, or output for Excel plotting. Still to be included is individual identification equipment. It all fits in a waterproof pelican case and is powered from a small solar panel.

### Forest and Rural Fire Research programme at FRI

New Zealand has been without any wildland fire research capability since the late 1970s. In recent years a number of factors have contributed to the need for rectifying this situation. As an initial step in this process, in April 1992 a Canadian fire researcher from Edmonton, Alberta, Martin E. Alexander, began a one-year secondment at the New Zealand Forest Research Institute (FRI) in Rotorua under the terms of an international assignment agreement between Canada and FRI. Mr Alexander has worked as a fire research officer with Forestry Canada since 1976. Prior to taking up his assignment at FRI he was on educational-professional development leave for 2¾ years in Canberra, Australia, where he was studying crown fire behaviour in exotic pine plantations in conjunction with the CSIRO Bushfire Research Unit for a PhD degree at the Australian National University.

As a visiting scientist in fire research at FRI, Mr Alexander will be involved in:

- technology and information transfer activities pertaining to fire danger rating and fire behaviour prediction;
- a revision of the fire danger classification criteria currently used in New Zealand;
- demonstrations of the experimental fire technique designed to furnish fire behaviour data in

selected fuel types; and

- undertake a problem analysis on fire research needs.

A position for a permanent forest and rural fire research scientist at FRI has recently been staffed. Mr H. Grant Pearce took up his appointment on 3 June. Mr Pearce, a native of Ashburton, obtained his BSc (1988) and MSc (1992) degrees in Geography from the University of Otago. Mr Alexander will serve as a "mentor" to Mr Pearce during his time in New Zealand. During his first year of employment, Mr Pearce will be contributing to the activities being undertaken by Mr Alexander and undergoing other forms of "on-the-job training".

## More definitions

It is apparent during the recent flurry of activity over planning possum and goat control that not only were people using the terms "inventory", "survey", and "monitoring" to mean different things, but there is also monitoring and monitoring. I propose a functional set of definitions to distinguish between three sorts of monitoring:

**Operational monitoring**: Monitoring what is done, where, to what, by whom, at what cost, during some management operation. In pest control this sort of monitoring measures the effort, cost, number or % of pests killed, and non-target effects of an operation. This should be done for every operation, and its aim is to improve efficiency and safety.

**Performance monitoring**: Monitoring the effect of some management action on the conservation values that were to be protected is different. Sometimes these values are measurable (number of kokako, regeneration of rata), but others are not (representative kauri forest). In the latter case some logical index (a bioindicator – who wants to define one of these?) must be measured, usually this would be some other conservation value. However, in a few cases the relationship between pest density or control effort and successful protection is established, and the index can be an operational measure such as kills/hunter-day. This sort of measurement is often more difficult to carry out, may require research to underpin it, and its aim is to improve protection effectiveness.

**Conservation monitoring**: Monitoring the changes in ecosystems that are occurring in the absence of any management action is a third sort of monitoring. This is the general estate condition and trend monitoring whose purpose is to justify future management action.

I do not care what we call these three sorts of monitoring (except I'll have to change a lot of text in draft if they are altered). However, it is important that everyone uses a common language because these definitions have real consequences.

John Parkes
Landcare Research, Lincoln

## Still more definitions

DEFINITION OF OFFICIAL PUBLICATIONS FOR INTERNATIONAL USE
by International Federation of Library Associations and Institutions, Official Publications Sections (Adopted August 1983)

1. An **official publication** is any item produced by reprographic or any other method, issued by an organisation that is an official

body, and available to an audience wider than that body.

2. An **official body** is:

(i) any legislature of a state, or federation of states; or of a province (state) or regional, local or other administrative subdivision;

(ii) any executive agency of the central government of such a state or federation of states or of a province (state) or regional, local or other administrative subdivision;

(iii) or any court of judicial organ;

(iv) any other organisation which was set up by an official body as in (i), (ii) and (iii) above, and maintains continuing links with that body whether through direct funding or through its reporting mechanism or its accountability;

(v) any organisation of which the members belong to any of the above 4 categories, including intergovernmental organisations.

Provided that the body is considered to be official in the country concerned.

3. An **official publication** is defined by the status of the issuing source regardless of the subject-matter, content or physical form.

## Climate change and tree research begins

New Zealand Forest Research Institute and Manaaki Whenua – Landcare Research staff will measure the effects of increased carbon dioxide concentration and raised temperature on tree growth. The project is the only one of its kind in the Southern Hemisphere and one of twenty official projects worldwide investigating the implications of climate change.

The unique research facility has 16 open-top growth chambers loaned from the United States Forest Service. A tower will separate carbon dioxide from waste biogas at the Christchurch City Council's Wastewater Treatment Plant. The carbon dioxide is piped to the nearby site and pumped into the 4.5 m high chambers to simulate the levels predicted for the middle of the next century. Carbon dioxide levels are predicted to double from 350 to 700 parts per million over the next 50 to 100 years and temperatures are expected to increase by 3° celsius.

Native and introduced trees will be grown in the open-top chambers to assess the impact on native and plantation forests. Specially cloned 18 year old mature pine (*Pinus radiata*) have been developed in association with the University of Chiba in Japan. The trees will respond as mature trees, but will be small enough to grow in the chambers. Along with the mature and juvenile pine trees, native red beech (*Nothofagus fusca*) will be grown.

The project will look at how forests will respond to a warmer planet and their role in storing carbon. A warmer climate and more carbon dioxide is likely to affect the production of plantations forests and the distribution of native trees in New Zealand. Climate change could be good news for New Zealand forestry as trees could grow faster and produce up to 30% more wood. The researchers will also look at how elevated carbon dioxide will affect tree processes and wood quality.

Science, Research and Technology Minister Simon Upton launched the Forest Ecosystems Elevated Carbon Dioxide Project on 6 October. The collaborative project cost $ 150,000

to set up and is funded by the Crown's Foundation for Research, Technology and Science. Additional support has come from a New Zealand Lottery Board Grant, ECNZ, Southpower, the Christchurch City Council and the USDA Forest Service.

Staff from the Forest Research Institute and Landcare Research will monitor the project over the next three years, with data being recorded on computer every four minutes. Project Co-manager David Whitehead says the researchers hope to continue the project for 10 years, if they can obtain more funding and sponsorship. He says the project was located next to the sewage ponds because the treatment plant provided a cheap source of carbon dioxide. "This has reduced the cost and means a waste is being used to help research a future environmental problem."

Keith Lyons
Landcare Research, Lincoln

## *RESEARCH IN PROGRESS*

### Hormone levels in bird droppings to assess gonadal activity

To determine whether a bird has functioning gonads (ovary/testes) requires the taking of blood samples. Problems associated with collecting blood samples of wild birds, especially from endangered species, are trauma of repeated capture and handling, the possible influence of handling on hormone levels, and the difficulty of recapturing a particular bird. Thus, the development of a technique to determine whether a bird has active gonads or not without having to capture it is an important discovery for managers of endangered species.

John Cockrem and John Rounce, Department of Physiology & Anatomy, Massey University, have developed techniques to measure the levels of steroid hormones (oestradiol and testosterone) in droppings to determine whether birds have active gonads. If they have active gonads there is a good chance that the birds are capable of breeding in the right circumstances. In mammals, steroid hormones are excreted in urine, and the measurement of these hormones in urine is well established. However, in birds the problem is that the urine, as uric acid, is mixed with the faeces. By developing techniques to measure steroid hormones in droppings, and by collecting and analyzing blood samples and droppings from chickens, Cockrem and Rounce have shown that faecal steroid levels can be used as a measure of blood steroid levels and hence of gonadal activity in egg-laying hens and mature roosters. Of note was that a delay of up to 48 hours between defecation and the freezing of a dropping did not affect the faecal steroid levels measured.

Applying the technique to free-living kakapo on Little Barrier has provided some interesting results. Droppings were collected in 1989–90, at the start of the supplementary feeding programme. Unfortunately, each dropping could not be assigned to a specific bird (except when an individual was handled for a transmitter change) and so the sex of the producer was unknown in most cases. The majority of droppings were collected near the top of the island where males have track-and-bowl systems and so most were probably from males. The analyses showed that there was an annual cycle of testosterone levels that corresponded to the cycle of male activity at track-and-bowl systems. Thus, for males at least, there is an annual cycle of gonadal activity (growth and regression). Hopefully, collections of droppings from females will be possible in future to determine whether they too are capable of breeding annually and whether females that have fed on food supplements, but not nested or bred, are capable of breeding. It is possible that the technique will be helpful to managers of captive, and to a lesser extent wild, endangered species to determine whether a non-nesting pair or individual is capable of breeding. For those of you wanting more information about the technique, it should be available soon because papers on the chicken and kakapo results have been submitted for publication recently.

Ralph Powlesland
S&R Division, Tory Street

## Risk from Tuna Longlining

I spent 10 days on a tuna longliner (NZ registered) north-east of North Cape at the end of July, studying seabird bycatch problems. Useful data were collected from 14 sets totalling 11200 hooks set, from which 6 albatrosses were hooked: 5 Wandering Albatrosses (2 dead, 3 released alive) and 1 NZ Black-browed Mollymawk (dead). Although Cape Pigeons, and Grey-faced Petrels to a lesser extent, were the main culprits attempting to steal the baits off hooks, they did not get hooked because the hooks are too big, but they made the baited hooks available to the mollymawks and albatrosses. Nearly always it was a Wandering Albatross or a mollymawk that finished off the bait, but only 4.5% of bait thefts resulted in a hooking.

This study provided further evidence that Wandering Albatrosses are specially at risk from tuna longlining.

I was able to observe methods to reduce seabird bycatch, including the use of bird-scaring lines, with or without streamers, trailed from the stern; night setting of the longline; and the use of well-thawed bait (squid).

This was only a preliminary study of the problem, and we shall be seeking further cruises on longliners next season, in different areas and at different times.

A report from this project (now in its third edition), will be sent to the ship's owners for comment before wider circulation and eventual publication.

Mike Imber
S&R Division, Tory Street

# NEW SCIENCE & RESEARCH PUBLICATIONS

## REPORTS

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

Montgomery, R.L. and Keys, J.R. 1993. **Volcanic hazard management in Tongariro National Park.** *Science & Research Series No. 61.* 11p.

Outlines the hazards to human activity on Mt Ruapehu, and the combination of warning systems developed to counter the dangers. Includes recommendations for the future development of warning systems and research.

## CONSERVATION ADVISORY SCIENCE NOTES

Copies have been sent to all CAS, librarians, and to the Head Office library. Further copies are available from Science Publications, at $1.50 per copy + GST and postage.

Thompson, K. and Champion, P. 1993. **Esplanade reserve recommendations for Lakes Serpentine, Mangahia, Rotomanuka, Ruatuna and Cameron (Waipa District).** *Conservation Advisory Science Notes No. 47,* Dept. of Conservation, Wellington. 18p.

Keesing, V.F. 1993. **Nitrogen content of soils, *Calluna vulgaris*, and some native plants in Tongariro National Park, (1992–1993).** *Conservation Advisory Science Notes No. 46,* Dept. of Conservation, Wellington. 18p.

Mark, A.F. 1993. **Assessment of recommended areas for protection from Morven Hills pastoral lease, Lindis ecological district.** *Conservation Advisory Science Notes No. 45,* Dept. of Conservation,Wellington. 4p.

Babcock, R.C. and Cole, R.G. 1993. **The extent of die-back of the kelp *Ecklonia radiata* in the Cape Rodney to Okakari Point Marine Reserve.** *Conservation Advisory Science Notes No. 44,* Dept. of Conservation, Wellington. 27p.

## 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 if you want to see these reports, you are encouraged to go to your conservancy librarian or CAS.)

McLennan, J.A. and McCann, A.J. 1991. **Ecology of great spotted kiwi, *Apteryx haastii.*** *DSIR Land Resources Contract Report No.91/48.*

Blaschke, P.M. 1992. **Measuring the impact of goats and possums on vegetation composition, growth, and regeneration, from exclosure plot data, Matemateanga ecological district.** *DSIR Land Resources Contract Report No. 92/53.* 45p.

McLennan, J.A. 1992. **Nationwide monitoring of kiwi populations.** *DSIR Land Resources Contract Report No.92/21.* 16p.

## SCIENTIFIC PAPERS

(With the permission of the copyright holders.) LIMITED DISTRIBUTION to DoC libraries ONLY!

Biggs, B.J.F. and Gerbeaux, P. 1993. **Periphyton development in relation to macro-scale (geology) and micro-scale (velocity) limiters in two gravel-bed rivers, New Zealand.** *New Zealand Journal of Marine and Freshwater Research 27:* 39–53. [Offprint]

Freshwater Fisheries Centre Annual Report January 1991–June 1992. 1993. MAF Fisheries, Wellington. 35p.

*Water & Atmosphere Vol.1 No.3.* 1993. Published by NIWA Freshwater, Christchurch.

# 1993 SEMINAR SERIES

## Department of Conservation
## Science Research Division

All seminars will be held in the 1st Floor Seminar Room, Conservation Sciences Centre, 58 Tory Street, Wellington, at 10.30 am unless indicated.

| Day & date | Speaker | Topic |
|---|---|---|
| Tues 2 November | Hugh Robertson S&R DoC | "What's the story kakerori" Management of an endangered Cook Islands bird. |
| Tues 16 November | Philip Simpson S&R DoC | Sudden decline in cabbage trees and its conservation implications. |
| Tues 30 November | Don Newman S&R DoC | Recovery of McGregor's skink on Mana Is.following mouse eradication. |
| Tues 7 December | Aidan Challis S&R DoC | Waitangi Treaty House: Issues in the conservation of historic resources. |

For further information on this seminar series please contact Euan Nicol or Carol West, Science and Research Division, Department of Conservation, P.O. Box 10-420, Wellington. Phone 04 471-0726 Fax 04 471-3279

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