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EDITORIAL

It has taken a long time to get CONSCIENCE into its new style and format, so this is a double issue, with colour and extra pages. I am looking forward to feedback on how you like the new look. Appearance, readability, and page size are all factors that you might like to comment upon.

Its always interesting to see ourselves as others see us, a recent example of this has been the intense American response to Kevin Jones' 1993 Churchill Report on *Archaeoligical Site Stabilisation and Reconstruction in the United States,* and K. Jones and P. Simpson's *Vegetation management on Archaeological sites*. Dr Robert Thorne from The University of Mississipi's Center for Archaeological Research recently wrote the following thoughtful comment.

> "One of the problems that we continually face in the United States is that once a site has been formally treated for conservation purposes, little is done to assess the success or failure of the conservation effort. It is clear that you [in New Zealand] are following up on your initial site loss remediation efforts and moving toward making adjustments where they are necessary. In recent months I have continually advocated the position that archaeologists must not only understand culture history, but must understand the environmental systems in which sites occur. If we do not understand those systems, how can we expect to be able to conserve the finite number of resources that remain? I have thought for a long time, but have only recently started to make the overt point, that archaeological deposits contain data that is useful to disciplines other than our own. Your work will stand as an example to our profession that we must understand the environmental system in which an archaeological site is a small part, particularly if we are to conserve that resource for the present and future generations. I am certain that our interpretive skills will improve in the future and the range of questions that we will ask of our data base will expand accordingly. Saving our resources is becoming more critical as each day passes."

Dr Thorne reminds us that in a department concerned equally with natural and historic resources, an interaction of skills and interests may produce the most effective conservation for both.

Kaye Green
Editor

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Department of Conservation
Te Papa Atawhai

REPORTING BACK

Mistletoe Workshop is a resounding success!

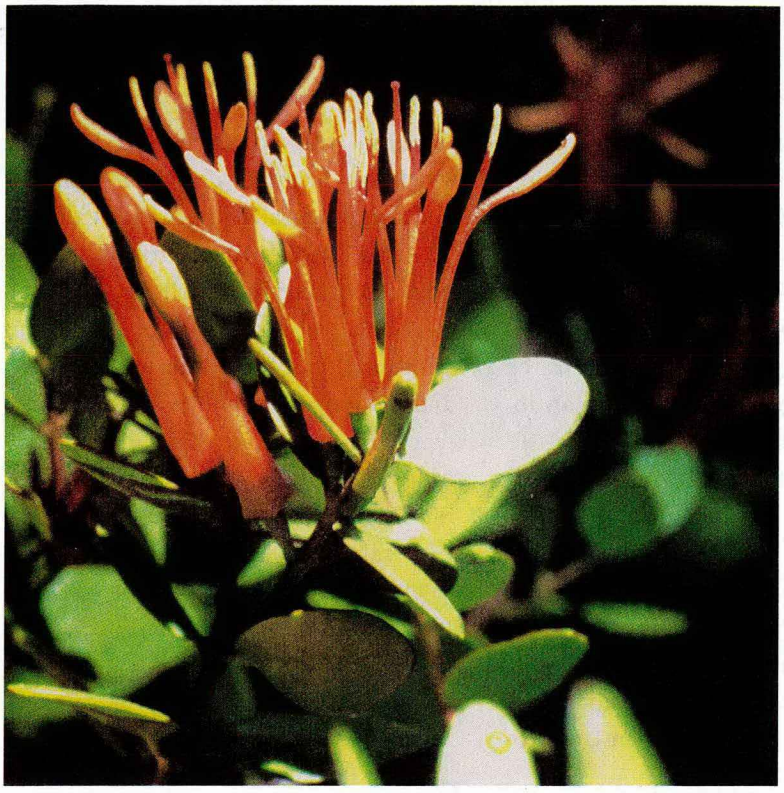
Over a four day period (17-20 July) botanical representatives from the Department's 14 conservancies and Head Office divisions, along with mistletoe experts from various universities and Landcare debated issues pertaining to leafy mistletoe conservation.

The workshop was organised by David Norton (University of Canterbury), Peter de Lange (S&R) and Suzanne Clegg (TSU), and was held at the University of Canterbury field station at Cass. Despite some heavy snow falls and sub-zero temperatures, all participants agreed it was a resounding success.

The main objective of the workshop was to decide whether a national conservation strategy was needed for our mistletoes, and if so, how this would be structured. To achieve this, participants were asked to provide an account of the status of the loranthaceous mistletoes[1] within their conservancy area. Following this, invited "experts" reviewed our knowledge of loranthaceous distribution, autecology (especially reproductive biology, ecophysiology, host specificity) threats, IUCN Red Data Book status, survey, monitoring and management. In the evenings two excellent and provocative lectures on loranthaceous mistletoes were given. On the first evening Dr Brian Molloy covered over 20 years of his research into the taxonomy, physiological, anatomy and ecology of the New Zealand Loranthaceae. Some quite controversial conservation themes and concepts were raised by Dr Molloy, nicely setting the scene for further discussion on this subject by staff later on in the workshop. The other evening session was given by our overseas participant Dr Nick Reid (University of New England, Armadale), who discussed aspects of Australian mistletoe conservation. Dr Reid examined the relationship between animal dispersors (mistletoe birds), mistletoe and host, and of possibly greater significance to us, the effects of losing brush-tailed possums — the reverse of the New Zealand situation. In Australia the decline of these possums has resulted in a spectacular proliferation of mistletoes to the extent that they are now problematic forestry and horticultural weeds. The control of these is extremely difficult. Participants were vastly amused to see determined Australians torching mistletoes from their hosts in an altogether vain attempt to save plantation trees! The solution obviously, is the need for more possums, and New Zealand participants were

Peraxilla colensoi
'Yellow' Tuatapere S.R.
Photo: G.M. Crowcroft

[1] Excluding the dwarf mistletoes *Korthalsella*, which are now placed within the Viscaceae.



Pikirangi/red mistletoe (*Peraxilla tetrapetala*) on Mountain Beech, Craigieburn. This species is probably the most common of the three beech mistletoes.
Photo: G.M Crowcroft

quick to offer Dr Reid some of theirs! As a result of the gathering it was agreed that a national conservation strategy is needed to help co-ordinate research and management. It was accepted that mistletoes are undergoing a national decline but that the cause is complex with no single factor more significant than any other at a national level. It was felt that the national decline is rather, a symptom of the overall degredation and loss of ecosystem processes. It was agreed that mistletoes are **not** threatened within the scope of the IUCN Red Data Book categories (*c.f.* Cameron *et al.* 1995, *N.Z. Bot. Soc. Newsletter* 39: 15-28), but are better considered as "declining" species of which obvious faunal parallels include kaka, kereru and some species of albatross. Discussion on the use of the IUCN Red Data Book categories for classifying our threatened biota confirmed the view that the system in use is imperfect and another reflecting more closely the New Zealand situation might be devised. All participants expressed considerable surprise that the visual appeal of our mistletoe's, their unusual "explosive" flowers (these explode once triggered by birds such as tui or bellbird) and possible dependence on indigenous birds for fruit dispersal, has hardly been marketed by the department for conservation purposes. A pleasing focus of the workshop was the recognition that our loranthaceous mistletoes are undervalued *taonga* whose preservation is vital if we are to protect the indigenous biodiversity and ethnobotanical culture of New Zealand. This point was especially stressed by Dr Nick Reid who considered it concerning that New Zealanders were not appreciating the international importance of our mistletoes, both as primitive species providing vital clues as to the evolutionary origins of the mistletoe hemi-parasitic habit, as well as attractive flowers which help to beautify our rather sombre beech forests.

A proceedings summarising the papers presented, mistletoe distribution and relevant sections of the discussions which followed each session is being prepared. An outline of the national conservation strategy has been produced and both David Norton and Peter de Lange have been asked to write this document.

P.J. de Lange, David Norton, and Suzanne Clegg.

New in New Zealand, the Sibert Technology DDD200 Wood Decay Detecting Drill

Do you ever wonder what you would do with a lot of operating money to spare? Buy this expensive drill, maybe?

The drill is a unique instrument offering a totally new method of detecting and assessing decay and other defects in timber and in living trees.

Hand held and light in weight the Wood Decay Detecting Drill is very simple to use. It rapidly penetrates hard or soft woods thus giving an instantaneous read-out from which the internal density can be ascertained. The use of the small (1 mm) diameter drill/probe is virtually undetectable leaving no structural damage to timber or to living trees. And the clever bit is an additional hand held unit which emits a warning audio signal should there be any metal in the proposed path of the probe.

The DDD200 comes with a long life rechargeable battery for convenient field use. Accurate graphic traces provide permanent records for monitoring progress of decay.

The patented DDD200 is the result of research over ten years by the Plant Pathology Research Division of the Department of Agriculture in Northern Ireland and was developed in connection with research and advisory work on internal decay in conifers and fungi degradation in city trees.

The drill, in its present form, was developed jointly with Sibert Technology and represents the successful combination of field based research and development and practical manufacturing expertise. The Sibert Technology DDD200 Wood Decay Detecting Drill is imported by the sole New Zealand Agent - Baranduin Marketing Technology - and retails for $12,600 plus GST.

Applications

Arboricultural and Forestry Surveys
Timber Preservation Surveys
Architectural and Construction Surveys
Wooden Utility (Telegraph) Pole Surveys
Wooden Vessels (Surveys and Maintenance)

Please contact Ian Macfarlane
Baranduin Marketing Technology
Box 38-199 Wellington Mail Centre.
Telephone (04) 568-3056

GEOTIMES News and Trends in the Geosciences

Nina Swift has requested this publication by the American Geological Institute as a new addition to HO Library.

The August 1995 issue is now available in the Library, and features major articles on: **ECOSYSTEMS PAST AND PRESENT**, with **Plant Invasions**, an article by Robyn J. Burnham.

Clues to Global Change – Carbon Exchange Anomalies Increasing atmospheric concentrations of carbon dioxide and potential for global warming have focused attention on understanding past changes in carbon storage, and the flow of carbon between marine and terrestrial ecosystems. Reconstructing glacial and interglacial environments may help researchers predict Earth's climate.

Exploring an Active Seafloor Hydrothermal System Ocean Drilling programme, to investigate how massive sulphide deposits are formed. Material recovered from within an active seafloor massive sulphide deposit along the slow spreading Mid Atlantic Ridge is assisting understanding of the architecture of such deposits. **NEWS NOTES** and **COMMENTS**, and finally **GEOLOGIC PHENOMENA** A record of what's currently erupting, cracking or quaking around the globe. Data from Ruapehu are there too.

RESEARCH IN PROGRESS

Using Periphyton to read the enrichment status of a stream

by Barry Biggs, NIWA, PO Box 8602, Christchurch

This is the third of Barry Biggs' articles on Periphyton —Ed.

It is possible to deduce a considerable amount about the enrichment status of a stream in the field by just "eyeballing" the periphyton community. Is the community composed of tightly bound mats, loose flocculent mats, or streaming green filaments? What proportion of the bed is covered by the streaming filaments? What does the occurrence of thick grey-white growths mean?

Pick your time and place

It is important to remember that the periphyton you see in a stream is a product of gain and loss processes, reflecting both physical and nutrient conditions (see *Conservation Science Newsletter 13*). Thus, a complexity of interactions determines what grows where at any one time. However, there are ways that we can easily reduce these complexities and focus on the question of most common interest: how enriched and/or polluted are these waters?

To address this question it is important to locate the optimum habitats and times for periphyton growth in your streams: in other words, habitats and times where loss processes have been minimised. Remember that periphyton require long periods of stable flow, stable substrates and moderate to low water velocities to develop to the limit of the available nutrients. So it is important to survey your streams when there has been approximately one month of stable, low flows and to focus on areas with stable cobble sediments and moderate to low velocity waters. The most stable habitat is usually in stream riffles. However, high water velocities may restrict growth. Run habitats usually make up the largest proportion of stream surface area and have the most suitable velocities. However, runs frequently have finer gravel substrates which are less suitable than cobbles for periphyton growth. Thus, it is important to look at both riffle and run habitats.

What to look for

Periphyton development can be measured in terms of: percentage cover of the streambed by growths with different colour, texture and thickness/length; total biomass of organic matter as 'ash-free dry mass' (AFDM); or the amount of live algae as chlorophyll a concentration. Percentage cover is the easiest to estimate and can be done quickly and reasonably accurately in the field. We simply walk a reach of stream several times, occasionally lifting stones to examine the cover (including the feel of the community), and then estimate overall cover in each of five main categories as follows:

1. Fine yellow-green or brown-green slippery films and/or hard dark crusts (these are composed mainly of diatoms and cyanobacteria/blue-green algae).
2. Brown felts up to 2 mm thick (mainly diatoms, but may include "sewage fungus").
3. Whitish-brown slimes and floc, often >5 mm thick (mainly diatoms).
4. Green, kakhi, or brown filaments often >10 mm long (mainly green algae, but some filamentous diatoms).
5. No discernible cover, stones not slippery.

If categories 1, 2 and 3 comprise a total cover of >60% it indicates a healthy stream with low concentrations of nitrogen and phosphorus and/or heavy invertebrate grazing. If category 3 comprises >60% cover then it indicates low to moderate enrichment and relatively low grazer activity. Sewage fungus, an indicator of heavy organic pollution, looks very similar to the diatoms of category 3, but has a more purply-grey colour on the exterior, is clear at the base, breaks apart easily and often has a foul odour. The degree of cover by filamentous algae in category 4 is a fundamental measure of relative enrichment. The higher the cover, the higher the enrichment. The Ministry for The Environment in their water quality guidelines for the Resource Management Act recommend that the cover of the stream bed should not exceed 40% by filamentous algae if amenity values such as contact recreation are to be protected.

No growth (category 5) during an extended period of stable flow is also a concern because it signifies particularly harsh environmental conditions. Some natural physical conditions can lead to this situation such as where streams are regularly subject to high background levels of silt and or bed sediments are very fine and unstable. However, it can also result from activities which destabilise the sediments (e.g., gravel extraction), enhanced suspended solids concentrations (e.g., mining, land and roading development) and toxic wastes (e.g., mining and industrial effluent).

Thus, carrying out a simple census of stream periphyton communities during low flows can provide much useful information about water and habitat quality.

Predicting Periphyton proliferations

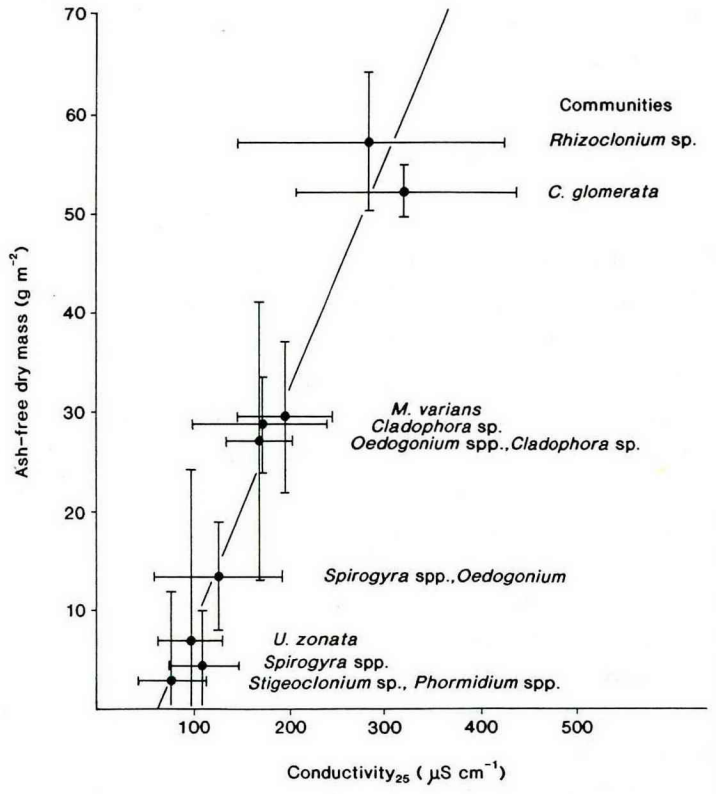
Determining the critical nutrient status of waters to predict and prevent periphyton proliferations is somewhat more difficult. It is not just a matter of taking a water sample and getting the levels of phosphorus and nitrogen analysed. This is because actively growing periphyton in shallow streams strip the nutrients from the water. The values being measured are only what is left over. However, our research has identified a simple procedure which can be used to determine approximate levels of enrichment. This is by measuring the conductivity (i.e., total ionic strength) of the water using a hand-held meter in the field. It is the most biologically useful water quality parameter to measure in streams not receiving effluent discharges. It also has the benefit that there are no delays in getting your results. You can assess immediately what you see growing at a site in the context of the water quality. The limitation of this method is that geothermal waters and salt spray are high in cations, but not necessarily nutrients, so you get much higher conductivity values for a given nutrient loading than elsewhere in New Zealand.

Conductivities of <10 mS/m signify unenriched waters which generally have low biomass (<10 g/m2 AFDM) dominated by diatoms and sparse clumps of filamentous taxa such as Spirogyra and Stigeoclonium (see Fig.1); whereas conductivities of >20 mS/m signify enriched waters where biomass can be >40 g/m2 (AFDM) and dominated by extensive mats of green filamentous algae such as Cladophora and Rhizoclonium (Fig. 1).

Conductivity can be used at any time of the year to classifying the enrich-

ment status of streams (except during floods) because values do not fluctuate greatly between seasons. However, it should be remembered that the periphyton growths to match the suggested level of enrichment will only be manifested during prolonged periods of stable flow and if other physical characteristics of the sites are suitable. Such classification can then greatly assist with getting a quick understanding of whether proposed changes to catchment features such as landuse or to flow regimes are likely to result in proliferations occurring or not.

Where discharges are occurring their potential effects cannot be evaluated using conductivity because nutrients are usually more concentrated in these wastes than conductivity will indicate. An alternative is to measure stream background nutrient concentrations at a time when there is little periphyton on the bed (e.g., soon after a flood). To avoid proliferations these concentrations, combined with those in the effluent, should not exceed 15 parts per million of soluble phosphorus and 150 ppm of soluble nitrogen to avoid proliferations (see the MfE Water Quality Guidelines for the Control of Undesirable Biological Growths in Water).



The error bars are 1 standard deviation. (*C. glomerata* = *Cladophora glomerata*; *M. varians* = *Melosira varians*; *U. zonata* = *Ulothrix zonata*). (Source: Biggs, B.J.F. and Price, G.M. 1987. A survey of filamentous algal proliferations in New Zealand rivers. *New Zealand Journal of Marine and Freswhater Research 21*: 175-191).

Figure 1 Relationship between mean ash-free dry mass for nine different benthic algal communities and conductivity of the water from a survey of over 400 New Zealand streams during summer low flows.

Go forth and use your Periphyton to read the health of your streams

Periphyton respond rapidly to changes in catchment and flow conditions. The resultant growth forms and biomass provide clear indications of the enrichment status of streams. Using the simple methods outlined above, and a little practice, it should be possible for Advisory Scientists and field technicians to rapidly survey streams in their regions and classify them. I am currently preparing a manual which will set out these survey approaches and a more detailed scheme for field recognition and classification of stream periphyton communities.

RESEARCH IN PROGRESS

Investigation into changes in stream morphology at two mining sites near Reefton

A 5-year study of changes to stream channels in the aftermath of mining operations has just been completed by the National Institute of Water & Atmospheric Research (NIWA).

Two streams near Reefton were monitored over the 5-year period, with photographs and cross-section surveys recording channel changes as the streams erode their banks.

The first of these streams is Giles Creek at the Dunollie coal mine, where the miner has cooperated with a range of scientific investigations into land restoration. The second site is a much smaller stream, a tributary of Slab Hut Creek which was mined for gold in the 1980s.

At both sites the stream channel was diverted from its original bed as part of the mining operations, and has since widened due to erosion of the loose tailings which form the banks. Recent laboratory research by NIWA indicates that the stable channel shape can be calculated if it is assumed that the banks and bed are formed of loose material. The two stream channels appear to be approaching their stable shapes, although the situation at Giles Creek is complicated by irregular deposits of erosion-resistant sandstone and coal.

The lesson to be applied to future stream diversions is that the stable channel shape can be predicted, at least approximately. Where the original channel was confined by erosion resistant banks, this stable width may be unacceptably large, and artificial bank protection such as rip-rap rock may be needed to recreate an environment similar to the original.

Major find for tuatara conservation

Scientists have discovered that soil temperature is crucial in determining the sex of tuatara.

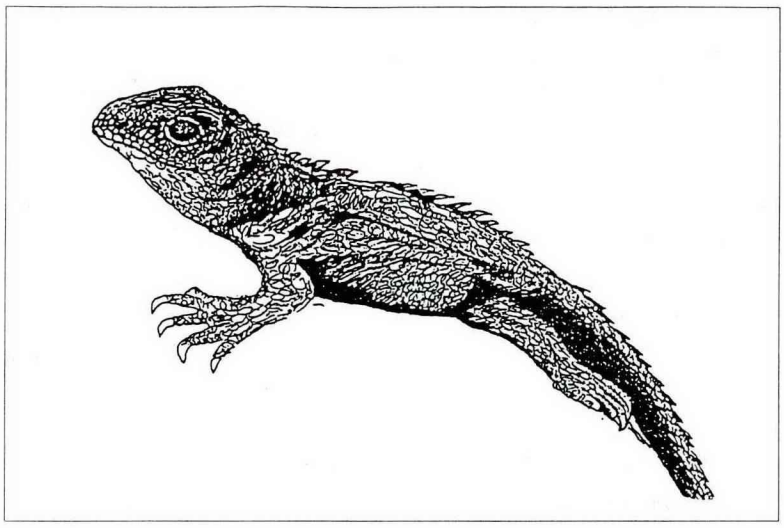
In most animals, sex is determined by the nature of the sex chromosomes obtained from the parents, but not so in the tuatara.

Dr Alison Cree, a zoologist at the University of Otago, said the discovery was made by chance. Juvenile tuatara reared in several captive-breeding institutions were being sexed for studies on nutrition. The young tuatara from one clutch of eggs were found to be all male, whereas juveniles from two other clutches were all female.

Further study with Dr Michael Thompson from the University of Sydney and Dr Charles Daugherty from Victoria University of Wellington revealed that tuatara offspring from eggs incubated at cool temperatures were always female, whereas those from eggs incubated at warm temperatures were almost always male. The phenomenon has been found in both species of tuatara. The scientists published their discovery last week in the international journal *Nature*.

Tuatara are rare reptiles found on about 30 offshore islands of New Zealand. Their ancestors, the early sphenodontids, first appeared in the fossil record about 220 million years ago. Tuatara are the last survivors of the sphenodontid lineage, which makes their conservation of great importance.

Dr Cree said that the finding is one of the most significant advances in tuatara conservation for decades. Tuatara eggs are often incubated in captivity for captive-breeding programmes, and some of the offspring will form the nucleus of new wild colonies.



"The good news is that egg incubation programmes raising tuatara for reintroduction to the wild have used a variety of incubation temperatures. Sex ratios are likely to be about 70% female, an attractive percentage for ensuring the new populations grow rapidly", she said.

Dr Cree praised the involvement of captive breeding institutions in the research.

"Tuatara take a decade or more to reach sexual maturity. If we'd waited until a significant number reached maturity to obtain these results, captive breeding programmes could have been producing offspring largely of entirely of one sex for many years."

The phenomenon, known as temperature dependent sex determination, has been reported in some other reptiles, including turtles and crocodilians, but until now was thought not to occur in tuatara. Its presence in the ancient tuatara lineage increases confidence in the suggestion that it appeared very early in the evolution of reptiles.

Liaison Services Media Release
University of Otago

Ecology of North Island exposed sandy beaches

Despite their considerable extent in some parts of the country, exposed sandy beaches have remained one of our least known ecosystems.

While considerable work on the general ecology of exposed sandy beaches has been done overseas in the last decade or so, little research has been carried out in New Zealand. Now, however, Lower Hutt-based private research organisation Coastal Marine Ecology Consultants, with funding from the Foundation for Research, Science & Technology, is examining the relationships between intertidal animal communities and the physical environment on exposed sandy beaches in the North Island.

The study, which is being carried out jointly with a leading South African researcher on beach ecology, is aimed at improving our understanding of the biodiversity and functioning of these ecosystems in New Zealand. It is also one of a series of concurrent biological studies of sandy beaches in countries around the Southern Hemisphere which are using similar methods in order to allow direct comparisons to be made and the results from each area to be put into an international perspective.

Exposed sandy beaches can be divided into three broad types based on wave characteristics and sediment size; namely, reflective, intermediate and dissipative. The intermediate beaches can be further subdivided into four beach "states". Each type or state is characterised by a distinctive beach and surf zone morphology and combination of other physical parameters. The changes in the physical parameters that occur across this spectrum of beaches have been shown by studies in several countries

to exert a strong influence on beach inter-tidal communities, with the swash climate now thought to be the most important factor. This proposition is being tested further in the course of the present study.

Ten sites representing the various morphodynamic states of exposed sandy beaches occurring in the North Island north of latitude 40°30'S were sampled during December 1994 and January 1995. The sites studied were located on Baylys Beach, Ninety Mile Beach, Rarawa Beach, Pakiri Beach, Waihi Beach, Ohope Beach, Whirinaki Beach, Wainui Beach (Gisborne), Ocean Beach (south-east of Napier), and Himatangi Beach.

Investigation of each site consisted of a survey of the beach profile, swash measurements for a 15-minute period every two hours over a tidal cycle, breaker height and period measurements, reference collections of animals from the supralittoral and intertidal zones, replicate quantitative collections of animals at 10 "levels" on a transect across the beach within a single tidal cycle, collection of sediment samples for water content and grain size analysis at each "level", and measurement of the depth of the water table at each "level" shortly after low tide.

The reference collections have been sorted and identification of the animals is proceeding. Extensions to the known geographic range of several species have been made, and there may be one or two new species. The quantitative samples of animals have also been sorted and counted. The low tide water contents of surface sands at all sites have been determined.

Once analysis of the biological material and sediments is complete any changes in the total abundance, total biomass, species diversity and zonation of the fauna will be compared with changes in the physical parameters to test the hypothesis that the faunal community responses vary in a predictable manner across the range of morphodynamic states. Preliminary indications are that on North Island beaches total abundance and the number of species are greatest on wide, flat beaches with fine sands, and decline as beaches become steeper and sands coarser until no fauna remains in the intertidal and animals are confined to the supralittoral. If confirmed, this pattern would be consistent with that found across similar ranges of beaches in both south-central Chile and South Africa.

Sandy beaches make up only about 10% of New Zealand's coastline, and in some areas, such as the eastern Wairarapa, they are extremely localised. Sandy beaches thus are a very finite resource, have significant wilderness, recreation and fisheries values, and therefore deserve special attention in coastal inventory and management. The results of the present research will contribute to the database on these resources and assist agencies involved with coastal planning to assess conservation values, design local surveys, and regulate the use of sandy beaches more effectively.

Coastal Marine Ecology Consultants
Lower Hutt

BOOK REVIEWS

The Land and Its People circa 1840

Two maps: Infomap 346-01, *Te Ika a Maui*; and Infomap 346-02, *Te Wai Pounamu. Edition 1*, 1995. Retail price: $36 the set.

This series of two small-scale maps, covering the whole of New Zealand at 1:1,000,000, shows to good advantage recent work by the New Zealand Geographic Board on Maori place names. The names are all given correct spacing to indicate the component words and macrons (the bars above the vowels, indicating the length of the sound). Anyone choosing to use these forms should note that it will be wise to put the conventional cartographer's name in brackets after. An interesting feature is the depiction of vegetation cover in 1840, classified as 'sand or gravel', 'forest', 'alpine barrens', 'high altitude grassland and scrub', 'scrub and fernland', 'lowland tussock' and 'swamp'. This data was apparently prepared by Matt McGlone.

There will be few who cannot learn something from this map, and as the Maori place names collation gathers momentum under the board's direction, new more comprehensive editions will be welcome.

Kevin Jones

NEW PUBLICATIONS

New Books from Science and Research Division

Collier, K.J., A.B. Cooper, R.J. Davies-Colley, J.C. Rutherford, C.M. Smith, and Williamson, R.B. **Managing Riparian Zones: A contribution to protecting New Zealand's rivers and streams. Vol. 1: Concepts. Vol. 2: Guidelines.** Published by Department of Conservation, Wellington, 1995.

Perriman, L. and McKinlay, B. 1995. **The blue penguin (*Eudyptula minor*) at Taiaroa Head, Otago, 1992—1993.** *Science & Research Series No. 86.*

Towns, D., McFadden, I. and Thomson, P. 1995. **Offshore Islands Co-operative Conservation Project with ICI Crop Care Division: Phase three (Cuvier Island).** *S & R Internal Report No. 150.*

Thomas, M.D. 1995. **Changes in possum abundance in Waipoua Forest Sanctuary after 1080 poisoning.** *Science for Conservation: 12.*

Coleman, J. (Comp.) 1995. **Baits and baiting strategies for feral goats, pigs, and cats.** *Science for Conservation: 11.*

Rose, A.B. and Pekelharing, C.J. 1995. **The impact of controlled and uncontrolled possum populations on susceptible plant species, South Westland.** *Science for Conservation: 10.*

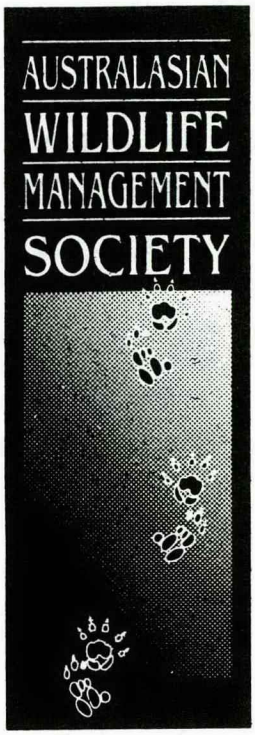
Rogers, G.M. 1995. **Control, demography, and post-control response of heather in the central North Island.** *Science for Conservation: 9.*

Stewart, G.H. 1995. **Stand development in the red/silver beech and mixed beech forests of north Westland.** *Science for Conservation: 8.*

Parkes, J.P. and Thomson, C. 1995. **Management of thar. Part 1: Thar—vegetation—harvest model development. Part 2: Diet of thar, chamois, and possums** *Science for Conservation: 7.*

Eason, C.T. and Spurr, E.B. 1995. **The toxicity and sub-lethal effects of brodifacoum in birds and bats.** *Science for Conservation: 6.*

Warburton, B. and Cullen, R. 1995. **Cost-effectiveness of different possum control methods.** *Science for Conservation: 4.*



AUSTRALASIAN WILDLIFE MANAGEMENT SOCIETY

8th ANNUAL CONFERENCE

UNIVERSITY OF CANTERBURY

CHRISTCHURCH

4 - 7 DECEMBER 1995

* **WILDLIFE MANAGEMENT FOR SPECIES DIVERSITY.**
* **INDIGENOUS PEOPLES IN WILDLIFE MANAGEMENT.**
* **BIOCONTROL AND RABBIT CALICIVIRUS DISEASE (RCD).**
* **OPEN SESSIONS.**
* **POSTER SESSION.**

Deadline for Abstracts: 14 October 1995.

Deadline for manuscripts: 20 November 1995.

Conference Co-ordinators, P.O. Box 29060, Christchurch.

Fax 03 351-9186.

Conservation Science Newsletter is issued six times per year in February, April, June, August, October, and December. Contributions should reach the Editor, Science Publications, Science and Research Division, Department of Conservation, P.O. Box 10-420, Wellington, by the 1st of the month in which they are to appear.