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EDITORIAL

Welcome to the new Science Newsletter. I hope it contains the same qualities of news and information that have made it useful previously; and the changes better help you keep up with the science scene in DoC.

A new feature will be a more detailed look at some piece of research in progress. This issue reports on the **South Westland Cattle Exclosures.** Next issue will feature the **Women in Conservation** research undertaken by Margaret O'Brien.

If you have any ideas for the further development of the Newsletter please let me know. All ideas considered.

K. Green
Editor

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.

REPORTING BACK

Fire in the Bush

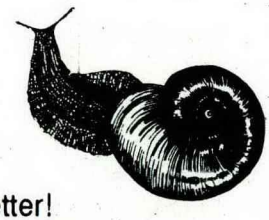
Carol West attended a Conference in Tasmania in January 1993. Prior to the Conference she made the following observations.

During my week travelling through Tasmania before the conference I made a number of observations relevant to the Department. Firstly, although most of the weedy adventives are the same as in New Zealand, e.g., *Ulex europaeus, Clematis vitalba, Salix fragilis* (crack willow), *Cirsium vulgare* (scotch thistle), and *Dactylis glomerata* (cocksfoot), there were no weeds at all in any of the native vegetation that I visited. All weeds were confined to roadsides and disused land in agricultural areas. I visited coastal heathland, rainforest dominated by *Nothofagus cunninghamii*, wet sclerophyll and dry sclerophyll forests, buttongrass moorlands, subalpine cushionfields and *Nothofagus gunnii* shrublands, and native grasslands in the midlands and highlands. In none of these vegetation associations were exotic weeds visible.

Secondly, fire is constantly used as a management tool, to reduce the fuel load of the eucalypt-dominated forests, in particular. Also fire, in combination with **no** fertiliser application, is used to maintain indigenous grassland in the midlands. Here, fire keeps out the eucalypts which would gradually increase in dominance.

Thus, it is most likely that a combination of fire and the very low natural fertility levels of most soils in Tasmania account for exotic weed species being restricted to agricultural areas.

DON'T BE SLOW . . . . .



Write up your science for the Newsletter!

Contributions are welcomed from any interested individuals. Do it now, and send to the Editor.

NOTES AND NEWS

New Zealand Threatened Plant Committee meeting

During the 11 and 12 of February the New Zealand Threatened Plant Committee met for the first time to begin what will eventually be an annual revision of the New Zealand Threatened and Local Plant Lists. The committee comprising Mr Ewen Cameron (Auckland Institute and Museum), Mr Peter de Lange (Science and Research Division, DoC), Dr David Given (David Given and Associates), Dr Peter Johnson (Landcare Research Ltd.) and Mr Colin Ogle (CAS, Wanganui Conservancy) was appointed by the New Zealand Botanical Society Committee in November 1991 and is directly funded by the Protected Species Policy Division of the Department of Conservation.

The Committee is the direct result of a major resolution made during the Threatened Plant Symposium (held at Kiwi Ranch, Kaitoke during July 1991); that control of the New Zealand Threatened and Local Plant Lists should be by a non-aligned "apolitical" body of New Zealand botanists, whose basic function was to revise the conservation status of New Zealand Threatened Plants based on public submissions and expert opinion, and publish these results annually through the New Zealand Botanical Society Newsletter.

The two-day meeting was held at Tory Street in the hastily converted "Bird Room" (the transformations including a living threatened plant display provided by the Hutt City Council and the unofficial changing of the "Bird" Room to the "Plant" Room). The Committee was welcomed by Dr Richard Sadleir, following this. Dr Peter Johnson was elected as the Chair and the Committee got down to business. The result was a major overhaul of the 1990 list compiled by David Given, which when officially published will see significant changes in the way the Department (and other interested users) will prioritise their resources into threatened plant management. These changes are summarised as follows:

The 1990 list recognised 234 threatened species using IUCN Red Data Book Threat Categories, while a further 99 species were ranked with the New Zealand classification of "Local". The 234 IUCN ranked species were distributed as follows:

7	Extinct
52	Endangered
105	Rare
35	Insufficiently Known
35	Taxonomically Indeterminate

The 1993 list has recognised 324 threatened species using IUCN Red Data Book Threat Categories, an increase of 35 taxa on the 1990 list. A further 116 species were ranked as "Local". The 324 IUCN ranked species were distributed as follows:

9	Extinct
1	Extinct in Wild
45	Endangered
59	Vulnerable
97	Rare
49	Insufficiently Known
64	Taxonomically Indeterminate

A further 20 species previously considered under some degree of threat were deleted from the **new** list as they were considered no longer threatened.

The changes to the 1990 list were: 2 gains to "Extinct", 7 species removed from "Endangered", 2 additions to "Vulnerable", 8 species dropped from "Rare", 16 gains to "Insufficiently Known" and 29 species added to "Taxonomically Indeterminate".

These changes were based on 145 written submissions, of which a surprising 113 were received from DoC employees! Submissions were considered by the Committee along with expert opinion obtained both from within the Committee and from consultation with recognised authorities within and outside New Zealand.

Many of the changes in rank are a direct result of DoC management and the Department should rightly be proud of its threatened plant achievements in the last three years. It is perhaps useful to point out that many of the additions to the list involve recently recognised taxa whose taxonomic status is uncertain. It is in the categories of "Insufficiently Known" and "Taxonomically Indeterminate" that the most changes are anticipated, and it is with these species that the Committee would make a special plea for further information from DoC staff and public alike.

It is important to stress that the 1993 list is a **working list**, i.e., one which will be regularly updated. This means the Committee will be keen to receive comment and submissions at anytime from interested parties. While an approved "simple" submission form is not yet available, an unofficial "detailed" form can be obtained from the Convenor (P. de Lange) via Science and Research Division, DoC, P.O. Box 10-420, Wellington.

The New Zealand Threatened and Local Plant List will be published as a supplement to the New Zealand Botanical Society Newsletter hopefully in the next three months. In the meantime DoC staff can obtain the revised status of threatened species on request from P. de Lange.

Peter de Lange
Convenor, New Zealand Threatened Plant Committee

Video News

The Library has just purchased some new videos for its collection:

Natural Wonders of NZ
Te Marae (NZ Historic Places Trust)
Fly fishing in New Zealand
*Norwester: wind of contrasts
*Castles of the Underworld: NZ's limestone areas
Dolphins, whales and us
*Icebird: Adelie penguins in Antarctica
Tauwhare Pa: a tradition (DoC)
Beneath the volcano: marine life of White Island (NZ Oceanographic/ DoC)
Wild Track: marine things
Fish for the future (Murray-Darling Basin Commission)

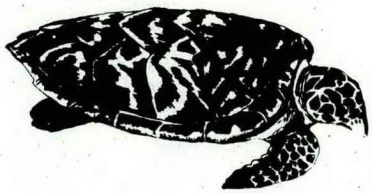
We have replaced our lost(?) copies of:

*Cold Water, Warm Blood
*Fiordland: mirror world

*** These videos are in the Wild South series.**

If you wish to borrow them for up to one month, please contact me.

Ferne McKenzie (ext. 8217)



Conservancy Archaeological Resource Statements

These statements have been identified by DoC Managers as a high priority for the time of the Human Ecology Unit.

Resource statements encompass the archaeological character, state of knowledge, and achaeological themes represented in conservancies. They provide a foundation for conservancy Historic Resources Strategies. Aidan Challis has completed one for Nelson-Marlborough, published in two parts as *Science & Research Series No.43*: "Archaeological research and management strategy: The Nelson-Marlborough region" and a paper entitled "The Nelson–Marlborough region: an archaeological synthesis", in the *Journal of NZ Archaeology*.

Aidan is at present working on an archaeological resource statement for the Canterbury Conservancy, and Kevin Jones on a statement for the East Coast.

New Society

A new society was established earlier this year which should be directly relevant to many DOC staff working in coastal areas. The *NZ Society for Coastal Sciences & Engineering* has a management committee comprising Ken Grange, John Lumsden, Andrew Lane, John Duder, Robin Falconer, and Hamish Rennie with a couple of others to be confirmed. It has regional representatives spread throughout the country, including our own Glen Lauder at Invercargill.

Membership costs $30 and a newsletter is in preparation. The group has been established to try to link a number of disparate groups and has been formed in full consultation with the marine sciences society, geography society, and ocean waves society and will not detract from those organisations. The next committee meeting will take places at the marine sciences conference in Nelson.

Further information is available from Hamish Rennie, Coastal Policy (ext 8066, Boulcott Street). The new group is serviced by the Institute of Professional Engineers, but is not under its control.

Note that corporate membership is available and is an option that conservancies may wish to consider (it enables 8 representatives at a total cost of $200, i.e., a cost saving).

Wrod's Wrock Wrens

A senior manager's observation that I had been flying a desk for too long and Rod Hay's requirement for a field assistant had happily combined. Rod and I arrived at our campsite perched high above the Upper Cobb valley by 3 pm. By 6 pm we had crossed the range and seen our first rock wrens in the slabs and screes above Lake Henderson. Our objective was to observe and band as many birds as possible, recording any family groups which would show that there had been successful breeding this summer. We were to see only 14 birds in the next three days and no obvious family groups.

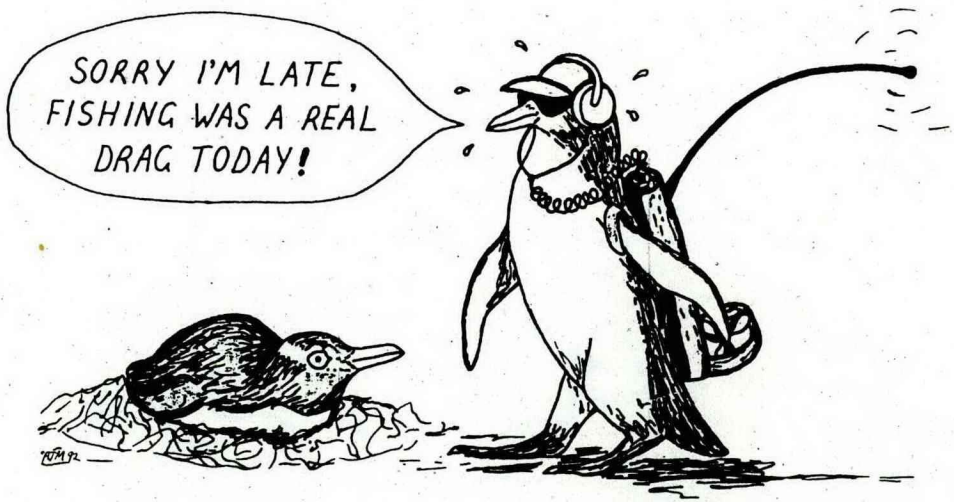
Rod's project draws information on rock wren status from the national public survey which shows that the species is widespread in alpine South Island. He focuses on this particular population in North West Nelson because, at the north end of the species' range, he considers they will act as barometer for other populations. He has been observing them at this site for several years.

Each day the birds saw me first, moving round my feet in curiosity and then carrying on feeding, almost invisible amongst the rocks and interspersed alpine scrub. A quick squeak on the Audubon bird caller would bring them back for a few moments.

How vulnerable are these birds to predators? Rod has previously trapped the area and found only very few rats and mice but Bruce Gill, the DoC ranger at Cobb Reservoir, reported to us his view that predators were increasing in the alpine and sub-alpine zones. On the inevitable day of rain and mist that we endured the birds stayed out of sight all day, supporting the view that they may well cope with winter snow cover by going underground amongst the rock slabs. In the past he has had them simply vanish from view during the days when snow covered the area, only to emerge happy and active after the thaw. Rod's other hypothesis is that they overwinter as bush wrens! (We await his paper on this with interest.)

This may have been Rod's last field trip on this project, the next stage being write-up. If this bird is in decline, and there are some warning signals from this visit, there are some strong arguments for continuing monitoring at selected sites. Rock wrens will be a very difficult species to protect given its behaviour and habitat but it is definitely one that deserves continuing attention.

Rob McColl, S&R Division



EXPLORING "TORY STREET"

The Human Ecology Unit

Aidan Challis is leader of the Human Ecology Unit. As Senior Archaeologist he is responsible for routine advice to the Historic Places Trust, particularly for the assessment of archaeological reports from conservancy staff and elsewhere on authorities and permits required under the Historic Places Act. Site inspections are occasionally required. Extensive inspections for the Trust were recently carried out with Tony Walton at Pouerua (Northland).

Tony Walton is responsible for the maintenance of archaeological databases, and with Ann Williams provides information in response to routine enquiries. Ann is writing up ethnographic studies of the Maori settlement and environment of the lower Wairau Plains (Marlborough) and studies of the use of native fish in Lake Taupo. Tony has recently finalised a major report on nineteenth century settlement patterns in the Whanganui River valley.

Kevin Jones is undertaking a new study of the management of vegetation for the stabilisation and maintenance of archaeological sites. Case studies in a range of conservancies are being documented in collaboration with S&R botanist Philip Simpson. The award of a Churchill Fellowship will assist Kevin to travel to the US and the UK to investigate techniques in use overseas. Kevin's monograph on aerial photographs of archaeological sites is being discussed with publishers.

Bruce McFadgen is continuing long term research into radiocarbon dating with particular reference to the calibration of New Zealand dates. This work, and the compilation of a database of New Zealand radiocarbon dates, relates to the importance of these results in the assessment and interpretation of archaeological sites. Bruce is also collaborating with external research contractors in field investigations at Matakana Island (Bay of Plenty).

Sue Bulmer, based in Auckland, has recently completed a substantial archaeological review of Auckland volcanic cone pa, and an annotated bibliography of the archaeology Maori settlement in the Tamaki region. Current projects include the mapping of field evidence at Mangere Mountain assisted by a grant from the Historic Places Trust, and the completion of reports on archaeological investigations at the Wiri Oil Terminal Site. Sue is also working with Northland Conservancy staff in excavations of a pa at Butler Point, Mangonui.

Gordon Cessford has several projects on the boil at present. Along with Paul Dingwall he has recently submitted a paper for *Annals of Tourism Research* entitled "Assessing Shipborne Visitors to New Zealand's Subantarctic Islands". Data collected from subantarctic voyages during the 1992/93 summer is also coming in. The Wanganui River Recreation Study is nearing completion, as the write-up proceeds, while data collection has been completed in the project "Conservation Benefits of Visits to Special Protected Areas" (Little Barrier and Tiritiri-Matangi Islands). Interviewing is about to commence in the "Word-of-Mouth" Information project, while a mail-out sample is being prepared for the "Mountain Biking Demand study project. Looks like being another full year . . .

Margaret O'Brien's work with Women in Conservation will be the focus of our next issue. Margaret is also completing the first phase of work on community attitudes towards the management of river landscapes (riparian areas). This report will be available in draft form by mid-year.

Informal comment on South Westland cattle exclosures, February 1993

Cattle have been grazed on Crown leases in the valleys of South Westland since the late 19th century. In the later decades of the 20th century, the question has arisen as to what extent such grazing is in conflict with the predominant land use of the region, that is, conservation. Responsibility for administering the leases rests with the Department of Conservation which, back in 1987, decided that objective information on the effects of grazing on natural values was essential. Of particular concern was what was happening at the transitions from grazed grassland to forest interiors. A co-operative long-term project was therefore set up, involving West Coast Conservancy, DoC Science, and Botany Division, DSIR. The last organisation was responsible for planning the layout for plots, leading the annual field work and carrying out the analyses; its role has now been taken over by Landcare Research Ltd. The Conservancy has erected exclosure fences, and all groups have taken part in the field measurements.

The plots are based on exclosures that extend from grazed grassland into the forest, and adjacent control areas that match the exclosures as closely as possible. Each exclosure and control is covered by a set of belt transects in which successive tiers of vegetation from herbs and seedlings to trees are sampled systematically. The first plots were set up in late summer of 1989, and were added to each year up to 1992. There are now seven sets, ranging from north of Franz Josef to Jacksons Bay, and involving transitions from valley grassland to silver beech forest, kahikatea swamp forest and totara-matai stands.

During its first 2-3 years each set has been only partially remeasured, mainly to indicate when full remeasurement is warranted. The first full remeasurements were done in 1992, in totara-matai transitions, followed by remeasurement of the swamp forest transition this year.

What of the results so far? To those familiar with the often spectacular effects of enclosing patches of native forest on closely-grazed farmland, the response to our exclosures might seem surprisingly muted. However, we are dealing with stocking intensities that are uneven but comparatively low overall. In the matai-totara forest we are beginning to see an increase of palatable understorey plants, such as hen-and-chicken fern and *Coprosma rotundifolia*, but numbers and sizes of young podocarps are essentially similar inside and outside the exclosures. In adjacent grassland on river silt, common buttercup (*Ranunculus repens*) and *Lotus pedunculatus* rapidly developed a rank cover that smothered a host of small native and adventive herbs, and it is not at all clear as to what happens next.

In 1992 we also hoped for a complete remeasurement of grassland on stony ground, but the transects involved were destroyed during a massive flood when a river changed its course. Another exclosure, as yet only partly remeasured, shows a replacement of grassland by bracken on stony ground. We have still to analyse our data from the swamp forest transition, but despite clear signs that cattle use the control area, we anticipate that botanical differences from the

exclosure will be subtle. It is too early to pick up significant changes in our beech forest transitions, but the initial differences between our two sets of plots, which are on different leases, are certainly striking, with one showing an apparently heavily modified forest understorey, and the other being seemingly almost pristine. Obviously, it would be useful to supplement our study with information on numbers of cattle, including seasonal variations.

Our plots are expected to yield information of value to managers of the forest-grassland transitions, and this means both lessor and lessee. The most important information will lie in the quantitative data, but the visual impression conveyed by any contrasts between exclosures and their controls will also be informative.

There are also questions of a more fundamental ecological nature, for which we hope to provide some answers. For instance, how stable are forest margins against valley grassland? If there is invasion, how does it proceed and at what rate? Is regeneration of dominant forest trees aided or inhibited by dense understories?

Watch this space.

Peter Wardle and Rowan Buxton (Landcare Research Ltd) and Carol West (DoC Science & Research Division)

REVIEWS

Order for free
New Scientist Supplement
Vol. 137, No. 1860

Complexity makes life interesting and difficult. There is a lot to process now in the world, both in one's daily life, or for those who work with systems in some way. Theories are now growing up about complexity itself, made possible by the capabilities of new computers, and a great deal of research in biology, medicine and physics. Stuart Kauffman was particularly interested in order in biological systems. Results of his early computer simulation experiments led him to insights into the dynamics of complexity. Later he worked on computer models of ecosystems that interacted and evolved in parallel.

The first major element in complexity theory is that orderly patterns are observed to emerge spontaneously from complex biological systems. This notion is antithetical to Darwinian theory. Natural selection is considered to be the all powerful mechanism for the adaptation of species to their environment, and all biological forms and behaviour are believed to be its product. The second major element arises from observations of Boolean networks and cellular automata – movement of a system from, e.g., static to unstable states generates patterns of complexity and new and unpredictable orders can evolve. This dynamic or transition zone was described by Norman Packard as "the edge of chaos" and is an **emergent** property of the system. It is not predictable from conventional knowledge of the interacting components. Stuart Kauffman was energised by this notion and developed computer models of ecosystems that interacted and evolved in parallel, using species as randomly interacting and interconnected elements instead of the earlier Boolean networks or cellular automata models. A system which is tuned to the edge of chaos has the most potential for productive change,

e.g., an ecosystem achieves optimum evolution. This is a paradoxical inversion of the accepted Darwinian view of fitness . . . in Kauffman's words "collective adaptation to selfish ends produces the maximum average fitness, each species within the context of others". He has extended his interest to other complex systems, and if complexity theory is valid, it appears that it can be applied to ecosystems economics or nation states. Each interact with their worlds by a similar underlying mechanism – adaptation to the edge of chaos, where a new order emerges.

Nina Swift
S&R Division

FOR LOVE OF LICHENS

A Coastal Lichen Study at Breaksea Sound, Fiordland – P.N. Johnson, Landcare Research, Dunedin. 1992.

[A limited number of copies are available from the Science Publications Unit]

I read a considerable number of reports during the course of my duties as Director, and, like the writers, they vary considerably in interest and approach. It is rare that the conventions of scientific writing allow the enthusiasm and dedication of the writer to surface through the precise and specific prose. It was therefore a real joy to read Peter Johnson's (Landcare, Dunedin) report on "A coastal lichen study at Breaksea Sound, Fiordland" which recently crossed my desk. Clear, concise and well written, with excellent illustrations, what really impressed me about his report was his intelligent curiosity about lichens and why they happened to be found where they were at different locations on the rock face.

Peter's writing style, while perhaps not appropriate for most scientific reports, was nevertheless quite delightful.

> ". . . and the crustose lichen *Megalospora gompholoma* will cover the moss so finely that every moss leaf and stem is still visible within a ghostly coat of grey thallus"
> "at the microscopic level one becomes aware of the amount of small scale organic debris trapped amongst the fine rock crevices and amongst the lobes of foliose rock lichens. This includes bits of hair and feather, sea shell and insect, fish scales, fragments of leaf or seed. All these goodies, combined with the abundant Fiordland rainfall must keep up a frequent supply of dilute nutrients . . ."
> "Where one individual (lichen) meets another, particularly when two individuals of the same species are involved, a mutual boundary demarcation line is evident, often a narrow line that may be dark, depressed, or raised, a narrow zone of non-man's land that curves like a river. Often the overall effect is like the political map of Europe . . ."

I do not know whether there is any recognised convention for the common names of lichens or whether those used in the report result from the vivid imagination of Peter and other lichenologists, but the names fascinated me: Grey Daze, Black Eyes, Scribbles, Copper Domes, Sublime, Army Paint, Band Aids and Snowpake, to mention but a few are wonderfully illustrative and suggestive names. The next time I am scrambling down a coastal rock face I shall certainly look out for them.

The real value of this report to me is that it was so well-produced and written that I shall definitely remember it. I learned from it much about these little understood or appreciated organisms. I recommend it to you.

Richard Sadleir
S&R Division

NEW SCIENCE & RESEARCH PUBLICATIONS

REPORTS

LIMITED DISTRIBUTION! Copies to DoC libraries only.

Site records compiled during the development of the Coastal Sensitivity Index. February 1993. Jeremy Gibb, Angela Sheffield, and Gregory Foster. *Science & Research Series No.56.*

Completed site record forms for 113 sites, most with coloured photographs of the site. This volume contains the data on which *S & R Series No.55* was based. Of very specialised interest to those using the CSI method for assessing coastal hazard. Available for sale, but requires expensive colour photocopying.

Copies of the following have been sent to all CAS, to librarians and to the Head Office library:

The effects of colour-banding on Chatham Island oystercatchers and shore plover. January 1993. Peter Dilks and Colin O'Donnell. *S & R Internal Report No.137.*

THIS IS A RE-ISSUE OF THE SAME BOOK DISTRIBUTED WITH MEMO 56. We regret that the page numbers were omitted from the earlier distribution.

Offshore islands co-operative conservation project with ICI Crop Care Division: Phase one (Stanley Island). February 1993. David Towns, Ian McFadden, and Tim Lovegrove. *S & R Internal Report No.138.*

Eradication campaign against rabbits and Pacific rats on Stanley Island (Mercury Group). Contains details of the trial methods, results of the drop on target and non-target species, a discussion of the effectiveness, and recommendations. Appendix 1: Effects on the N.I. saddleback population, Appendix 2: Brochure for the project.

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.)

Effects of sheep grazing in a high-rainfall alpine tall-tussock grassland, Hopkins Valley, South Canterbury. June 1992. G.G. Hunter and L.R. Basher. *DSIR Land Resources Contract Report No. 92/40.* 22p.

Southland riparian study: Final report. August 1992. R. Bruce Williamson, John M. Quinn, R. Keith Smith, and Maggie L. Vickers. *Water Quality Centre, NIWAR, Consultancy Report No. 6022.* 12p. (+ 2 reprints from *N.Z.J.M.F.R.*)

Perceived riverine problems in New Zealand, impediments to environmentally sound riparian zone management, and the information needs of managers. January 1993. C. M. Smith. *Water Quality Centre Publication 24.* Water Quality Centre, Ecosystems, NIWAR, Hamilton. 61p.

SCIENTIFIC PAPERS

LIMITED DISTRIBUTION to DoC libraries and CAS ONLY! (With the permission of the Copyright Holder.) Others please consult your library.

Sustaining genetic integrity through restoration using local plant provenances. 1992. P. Simpson. Pp. 336-342 reprinted from *Proceedings. International Conference on Sustainable Land Management, Napier, New Zealand, 18-22 November, 1991.*

1993 SEMINAR SERIES

Science & Research Division,Department of Conservation

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

Day & date	Speaker	Topic
Tues 4 May	Chris Robertson Science & Research DOC	Courting in public view – some effects of tourism on nesting seabirds
Wed 12 May	Paul Champion MAF Ruakura	*Hydatella inconspicua* – investigations into the ecology and management of a threatened aquatic plant species
Tues 18 May	Greg Sherley Science & Research DOC	Translocation of invertebrates and other organisms – problems and pitfalls
Tues 1 June	Peter Johnson Landcare Research Dunedin	Possible use of fire as a management tool on the conservation estate
Tues 15 June	Jane Sheldon International DOC	Biological diversity - the global agenda (a report back from the secretariat first follow-up meeting to the Convention on Biological Diversity)

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.

CONSERVATION
TE PAPA ATAWHAI

PO BOX 10-420, WELLINGTON, NEW ZEALAND