

PREFACE

This Supplement to the Society's Journal began life as a Symposium at the 1986 Annual Conference. It was prompted by the growing challenge to some long-standing scientific and management principles which held that New Zealand's flora and vegetation evolved without browsing pressure; that both were peculiarly sensitive to browsing by mammals; and that "accelerated erosion" coincided largely with the date of human colonisation and was sustained by the introduced herbivores. Elements of that challenge emerged in various publications: the origins of divarication in the flora (Greenwood and Atkinson 1977), the role of mammals in erosion (Jane and Green 1983), the impact of climate on the integrity of forest and land (Grant 1984, 1985), and the interplay of science and politics in the management of wild land and introduced mammals (Caughley 1983).

Contributors to the Symposium were asked to consider a series of hypotheses linking fundamental scientific questions to the practical business of managing natural assets:

- the New Zealand flora and vegetation evolved in the absence of herbivores
- the New Zealand flora evolved without defences against browsing
- introduced mammals entered a natural, unbrowsed vegetation
- accelerated erosion coincided with colonisation by browsing mammals
- animal control is beneficial to the stability of the vegetation and the land

The order of these questions is generally followed in this volume although, for a variety of reasons, not all of the papers which were read at the Conference appear here. On the other hand, later contributions have been included if they reflected and enriched the original purpose.

The papers will speak for themselves but, because this is a Symposium topic, some words of guidance and of summary are appropriate. Some papers are frankly speculative; they have been included so that overt speculation today can become testable hypothesis tomorrow or, at the very least, a spur to further study. In several papers the theme of co-evolution between moas and the vegetation of the ground and shrub layer emerges strongly. To emphasise this as a general principle, and extend it up into the canopy, the paper by Clout and Hay has been expressly included. It is peripheral to the equivalence of moas and large mammals, but helpful to a rounded view of the state and fate of the primeval New Zealand biota.

The paper by Mark is only one illustrating the present impact of a browsing mammal on vegetation. It neatly encapsulates the principles conveyed by many other papers, published in this Journal and elsewhere over the past 20 years, on browsing and recovery in the shrub and ground layers at different altitudes.

The influence of humans is quite clearly of crucial significance in New Zealand's natural history. Today, we can only pause in wonder at the thought of what this land must have been like before humans came with their fires and camp followers to destroy the scenario portrayed here by Holdaway. Regretting that past, and the human role in it, is really only useful as a basis for doing better in the next cycle of interference which we call 'management'.

The Symposium illustrated very clearly two of the many problems in managing the natural estate. Firstly there will always be conflict because farmers, foresters, Catchment Boards, hunters, scientists, nature lovers and politicians will all have their own predispositions and objectives for managing public lands. Somewhere in the resolution of those differences there has to be an appeal to some set of original values as a rough guide to securing, perhaps restoring, some essential 'New Zealandness'. This concept and its possibilities are beautifully developed in Molloy (1980, Chapter 4). We cannot hope to return to a state of biological grace but we may, through the practical interpretation of fundamental scientific studies, help to define some objectives for managers.

Secondly, scientific advice is not divinely inspired, infallible, or everlasting. It can only ever be as good as the information of the day, and the interpretive inspiration of both researchers and managers. The evolution of thought on wild animal management and erosion, as revealed later in these pages and elsewhere, justifies the traditional caution of the scientist, and shows the value of fundamental, seemingly irrelevant, research. For the manager, who is pressed from all sides to 'manage' now, such caution and discursive enquiry are often frustrating. Put simply, it takes time to formulate the right questions, collect the information and apply the steady, sceptical contemplation that produces the next approximation to the truth. This is amply illustrated for one person's working life in the closing essay by Grant, whose experience was echoed by several other speakers at the Symposium workshop.

Re-examining the five initial propositions in the light of the Symposium brings us a little closer to understanding New Zealand's biological and climatic

history. In relating that history to management, it is essential to separate out the geographical from the human time-scale in both the nature and the consequences of the various processes at work. We can no longer assert that the New Zealand flora evolved without browsing pressure. From ground level to canopy it had been responding over millions of years to a range of herbivores and frugivores. Adaptations in growth-form, life-cycle and physiology can be demonstrated clearly, though they did not necessarily confer any defence against browsing mammals. When the mammals did arrive the vegetation had not been browsed for several centuries but it had been modified by fire and human influence over about one quarter of the country. So on two quite different criteria, it was far from 'natural', and mammals were not ecologically equivalent to moas in their impact upon it.

Turning to the process of erosion, we cannot claim that present or recent erosion rates are new or unique. They have recurred at varying intensities during the Pleistocene and Holocene. Even so, the biota tended ultimately to return to an overall *status quo* because seed sources and community resilience were not totally disrupted. In the last 1000 years, however, new factors have entered the equation. Polynesians burnt the vegetation on an unprecedented scale and frequency; Europeans continued to do so and also added mammals and an alien flora. This new type of impact denies the biota any chance of recovering to a *status quo*.

It may well be that erosion patterns today over much of the country owe little to human influence or browsing mammals. Nevertheless, the aftermath of recent cyclonic storms shows that erosion has local and short-term components that have yet to be explored. Notwithstanding the evidence of the geological time-scale, there is still much to learn about normal, local, decade-to-decade erosion in terms of rock type, kind and quality of vegetation and presence of herbivorous mammals.

In principle, some of the objectives of wild land management can now be re-defined. Natural vegetation is not just a passive cover to shield the land surface but a dynamic *habitat*. From that point of view, better management implies more than reacting to circumstances. It requires ecologically sound

objectives based upon basic quantitative knowledge that gives the power to predict and to monitor. This is not to say that there is no such enlightened management already. There is, but the resources of people and money it commands are minute compared with those supporting the simpler philosophies of catchment control and land development. Management of natural biota and landscape can usefully pay some heed to origins and formative processes. We cannot pretend to re-create primeval New Zealand, but knowing a little more about it might help to shape our philosophy for the future.

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