



CONSERVATION
TE PAPA ATAWHAI

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No. 79

KAWEKA MOUNTAIN BEECH - ANIMAL PEST PROBLEM

(Short Answers in Conservation Science)

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KAWEKA MOUNTAIN BEECH - ANIMAL PEST PROBLEM

**Proceedings of a Workshop held on 27 October 1993
at Conservation House, 59 Marine Parade, Napier.**

G Walls
Conservancy Advisory Scientist, Napier

THE ORIGINS AND PURPOSE OF THE WORKSHOP

Mountain beech forests are naturally collapsing in the western Kaweka Forest Park, but are not regenerating as expected. Evidence from exclosure plots and aerial and ground survey have pinpointed the problem to high levels of browsing by deer, particularly sika deer, although other mammals are also implicated.

As a result of a field inspection in late June 1993 by the Director-General of Conservation (Bill Mansfield), the Director of Estate Protection Policy Division (John Holloway) and Hawke's Bay Conservancy staff a number of suggestions were made to tackle the situation. Foremost among them was the convening of a "meeting of wise heads" at a workshop to bring conventional wisdom of the most knowledgeable scientists and observers to the problem in order to:

- substantiate the nature of the problem;
- help formulate management solutions.

ORGANISERS

Department of Conservation, Hawke's Bay Conservancy: mainly Geoff Walls (Conservancy Advisory Scientist), with help from Phil Mohi (Field Centre Manager, Puketitiri), Bill Fleury (Animal Pest Specialist based in DoC Wanganui) and John Ombler (Regional Conservator).

PARTICIPANTS

Department of Conservation, Head Office

- John Holloway, Director of Estate Protection Policy Division, the division that co-ordinates DOC policy, planning and operations for issues such as animal problems.

Department of Conservation, Hawkes Bay Conservancy (Napier)

- Terry Pellett, Protection-Use-Advocacy Manager
- Phil Mohi, Field Centre Manager, Puketitiri Field Centre (the field centre that includes Kaweka Forest Park)
- Eddie Te Kahika, Conservation Officer, Puketitiri Field Centre
- Geoff Walls, Conservancy Advisory Scientist
- Keith Briden, Conservancy specialist in animal and plant pests and recreation

- Gavin Rodley (Notetaker)
- Bill Fleury, Animal pest expert shared with Wanganui Conservancy. Long experience in Kaweka mountains, vegetation monitoring and animal control. Author of report on Te Pukeohikarua exclosure monitoring.

Department of Conservation, Tongariro/Taupo Conservancy (Turangi)

- Harry Keys, Conservancy Advisory Scientist
- Cam Speedy, Conservancy specialist in animal pest control, experienced in region.

Department of Conservation, Bay of Plenty Conservancy (Rotorua)

- Chris Jenkins, Manager Use/Advocacy, with previous (NZ Forest Service) experience of Kaweka mountain beech surveys.

Rangitikei-Hawke's Bay Conservation Board

- Robin Hilson, Chairperson

Hawke's Bay Residents

- Ashley Cunningham, Formerly NZ Forest Service. Has had a long involvement with this particular issue, including setting up Te Pukeohikarua exclosure and making a film in 1985 to alert political heads to the issue.
- Pat Grant, Formerly MOW and local Catchment Board hydrologist. Leading NZ expert on climate change and hydrology, especially in relation to vegetation processes in Hawke's Bay. Long history of Kaweka mountain land research.
- Rob Whittle, Farmer with long interest in Kaweka mountains, their vegetation and wildlife.
- Jack Nicholas, Farmer with long interest in Kaweka mountains, their vegetation and wildlife.

Hawkes Bay Regional Council (Napier)

- Robin Black, Resource scientist, very experienced in geology and erosion processes of Kaweka mountains.
- Ian Boothroyd, Environmental Monitoring Manager.

Manaaki Whenua-Landcare Research NZ Ltd

- Geoff Rogers (Rotorua), Research ecologist with tremendous working knowledge of Kaweka and other central North Island mountains.
- Wayne Fraser (Christchurch), Research scientist with extensive experience in wild animal management, particularly in liaison with recreational hunters.
- John Parkes (Christchurch), Research scientist, partly funded by DOC. National overview strategist for wild animal management.
- Rob Allen (Christchurch), Scientist with specialisation in mountain beech ecology.
- Graham Nugent (Christchurch), Scientist specialising in impact of feral mammals on indigenous ecosystems.

NZ Forest Research Institute, Rotorua

- Gordon Hosking, Research ecologist working on the dynamics of mountain beech forest systems in the central North Island.

NZ Deerstalkers Association - Hawke's Bay Branches

- Joe Pearson
 - Martin Brenstrum
- Both with good knowledge of the Kaweka Forest Park.

OUTCOMES OF THE WORKSHOP

1. Introduction

Terry Pellett welcomed everyone to the workshop and this was followed by introductions.

2. Setting the Scene

Bill Fleury gave a presentation based on his report titled "Te Puke O Hikarua Exclosure Plot - Monitoring the Impact of Deer on Mountain Beech Regeneration in the Kaweka Range 1981-1992". He indicated that mountain beech forests in the Kaweka Range had been undergoing a period of canopy dieback similar to that observed in other Central North Island mountains over the last 20 years. He referred to a number of reports that had been completed over the years on the subject.

Bill Fleury said concern about the canopy decline and low numbers of mountain beech seedlings particularly in the Te Pukeohikarua area had resulted in an exclosure plot being established in this area by the former NZ Forest Service in 1981. He explained the exclosure plot concept. He then outlined the results of monitoring the exclosure at Te Pukeohikarua and interpreted the graphs included in his report.

Bill Fleury with the aid of slides showed examples of the poor condition of the mountain beech forest in the upper altitude of the Kaweka Range. He said browsing of red and sika deer on seedlings and saplings of mountain beech has clearly been demonstrated as the primary cause of the lack of mountain beech regeneration.

Bill Fleury felt the relationship between deer density and the ability of the mountain beech forest to regenerate should be further investigated, and the Department's current animal management practice there should be reviewed. He considered the magnitude of the current collapse of mountain beech forest needed to be recorded as an initial step.

3. What are the natural processes, and the time frames for those, in mountain beech forests?

Rob Allen explained the dynamics of mountain beech forests. He said that the ecology of mountain beech forests is arguably the best known about after radiata pine and that mountain beech forests are the most studied of New Zealand native forests. Mountain beech trees are relatively short lived, and mountain beech forests are relatively simple in composition and dynamic. Canopy trees are usually of similar age, and on maturity once a few begin to die the rest tend to follow quite rapidly. A "bank" of seedlings and saplings of mountain beech is normally there on

the forest floor, poised to rapidly form a new canopy as the old one collapses. Rob Allen said the exclosure plot data indicated that the natural mountain beech regeneration phase in the Kaweka Forest Park is being impeded by deer browsing, so that not only is the "bank" of seedlings and saplings severely depleted but their growth is radically impaired.

Bill Fleury, in response to a question from Geoff Rogers, stated that the exclosure plot data is representative of a large area of similar extreme sites.

Rob Allen, in answer to questions from Rob Whittle and Graham Nugent, stated that beech seed can remain viable for 2 years, though beech seedlings would have difficulty establishing in areas of turf. Pat Grant said the collapse of mountain beech forest was first recorded by William Colenso in 1845, probably as a result of gales. He made the point that droughts at various intervals have affected mountain beech forests, particularly the droughts of 1982/83.

4. Is the current situation in the Kaweka Forests outside the expected parameters?

Wayne Fraser gave a presentation on results obtained from rumen samples and hunter's returns. He said there had been a dramatic change in the proportion of sika deer to red deer in Kaweka Forest Park. He stated that for the period between 1958 and 1988 the proportion of sika deer had increased from 10% to 70% of the total deer population. He said recent information from hunter diary returns indicates that this figure had now moved towards 80%. He explained that the frequency of beech material in rumen samples from sika and red deer was similar though there were significant differences in diet.

Wayne Fraser said sika deer tend to eat off the forest floor (e.g. seedlings, saplings and fallen leaves and stems) whereas red deer tend to eat off branches (e.g. saplings and trees) rather than the forest floor. He said the rumen samples taken from high altitude sites around the Te Pukeohikarua Exclosure Plot showed the total amount of mountain beech material consumed by sika deer (4.4% of dry weight of sample) was slightly greater than that consumed by red deer (3.8% of dry weight of sample).

Wayne Fraser indicated that the percentage of mountain beech material eaten, especially green leaves, is a very small part of a deer's diet though the difference in diet preference between red and sika deer may be critical in terms of impact on regeneration.

Gordon Hosking expressed doubts about the robustness of the data.

Rob Allen pointed out that the data collected by Chris Jenkins in 1981 would provide a good database on which to answer questions about the canopy dieback. Bill Fleury showed a video from a recent trip into the Kaweka Forest Park which focused on the canopy dieback and lack of regeneration.

Consensus

- (1) Deer are having a major impact on the structure composition and regeneration of the mountain beech forest in Kaweka Forest Park.
- (2) Sika deer are more of a problem than red deer.
- (3) It is recognised that other contributors to the impairment of regeneration include:
 - possum browsing
 - rodent browsing and seed/seedling eating
 - hare browsing
 - insect browsing
 - climatic factors (drought, frost-heave etc.)
 - microsite conditions (substrate, ground cover, shade etc.)These contributors (collectively or individually) are not the primary cause of the impairment of regeneration.
- (4) The problem is defined in terms of the nature of the regeneration response (i.e. direction, rate and composition), compared with what would be expected for a natural mountain beech forest ecosystem undergoing canopy decline.

5. What problems have we got for conservation?

The following issues were flagged by participants:

- mountain beech regeneration impairment is an extensive problem in Kaweka Forest Park which appears to be attributed to browsing deer
- loss of biodiversity (native fauna, flora and vegetation communities) through modification of forest structure and composition
- the ultimate end result if nothing is done will be loss of mountain beech forests from extreme sites, leading to replacement by shrublands, short turfs and devegetated areas
- soil and water conservation problems will follow, along with impacts on erosion processes and stream life
- we are not aware of all aspects associated with the process of canopy decline, although the basic processes are well documented
- there is a crisis approaching in red beech stands too at lower altitudes
- the highest deer numbers in the country appear to be here: figures

suggest densities of 8-12 deer per square kilometre in Kaweka Forest Park compared with 2-3 deer per square kilometre in South Island mountain beech forests

- little information available on where animal impacts are inhibiting regeneration of tree species.
- where does mountain beech forest condition decline in Kaweka Forest Park rank nationally?
- big control effort required to allow regeneration
- need to identify and protect critical sites
- canopy decline is very rapid and widespread
- recreational hunting does not appear to be able to control sika deer numbers sufficiently to allow forest recovery, even when deliberately enhanced
- assessing natural change

6. Conservation Goal

DOC has a fundamental responsibility under the Conservation Act, CMS and Kaweka Forest Park Management Plan to look after the forests of the Kaweka Range. Its prime role relating to this issue was expressed as:

- to retain the intrinsic values of the area: e.g. soil, water systems, native vegetation, native fauna and natural ecosystem processes that "belong" to the area.

It was generally accepted that where a forest belongs on an area, we have a responsibility, if possible, to at least maintain the capacity of that forest to regenerate itself.

7. Objective

To achieve the conservation goal, it was seen as necessary:

- to reduce deer numbers sufficiently to allow forest regeneration, where deer were seen as the prime impediment to regeneration.

8. Options for Addressing Problems

The following are brief precis statements of options raised and discussed:

- approach based on whole catchments (3000-4000 hectares), control for 10 years
- repeat Chris Jenkins' survey to identify how extensive the problem is and where the critical sites are
- increasing recreational hunting effort (cheap, need to set hunters goals and educate them)
- complete research required to find out what levels of deer need to be achieved to obtain a regeneration response
- need to knock base population of deer
- need to institute a research by management programme where two decent areas (4000-5000 hectares each) are set aside and other control techniques are tried. 80% of Kaweka Forest Park would still be available for recreational hunters with efforts being made to intensify their effort. In the two catchments try helicopter harvest, aerial search-and-destroy and/or ground baiting - establish a baseline for control in five years time which we haven't got now. Meanwhile do whatever associated research is required, then assess and redirect the management regime accordingly.
- the argument was put forward that the whole job should be done now, because of the urgency, the need to protect indigenous species and sufficient was already known to proceed.
- because the mountain beech forests are part of a larger ecosystem, to ensure reliability of information any experiment needs to be fairly sophisticated, with sound experimental design in terms of monitoring vegetation built in.
- area comparisons under different treatments need to be undertaken very carefully. Need to fully focus on mountain beech primarily.
- critical sites approach rather than blanket type approach. Suggest sub-sampling at critical sites within larger areas.
- protection of critical sites by felling trees around them to prevent access by deer was suggested as a possible management tool
- need to include full range of control options and test them
- fencing out of certain areas a possibility

- finance a trial 20 hours of aerial search-and-destroy operations through an open forest area spread over a year, say 2 hours per month. Limited areas - would be effective.
- recreational hunting/aerial recovery combination. (possibly uneconomic for commercial operators with sika deer).
- big issue: which areas, how best to divide up and get best information.
- need to set up good monitoring system as part of management programme
- need to look at what animal densities will give acceptable recovery repeating Chris Jenkins' survey will help do that. Following this some control trials should be undertaken using the best option(s) known to be effective and affordable.

Consensus

Despite many participants wanting to hit the issue at the core instantly, it was recognised as being necessary to gather more comprehensive information and to look at a research-by-management programme first. It was felt that Kaweka Forest Park should be divided up into catchments, and the following different treatments investigated:

- recreational hunting
- aerial hunting
- aerial search-and-destroy
- poisoning

It was recognised that Chris Jenkins' survey should be repeated as soon as possible to better identify the nature of the problem.

9. What are our knowledge shortfalls?

- extent of problem
- long-term consequences of forest loss (soils, water, stream fauna, vegetation, terrestrial biota)
- other components of the mountain beech ecosystems and how they inter-relate (soils, water, birds, invertebrates, leaf litter, etc.)
- seed source presence, and its viability

- what determines new recruitment of seedlings
- reduction of deer numbers necessary to get recovery
- regeneration potential on various sites such as screes, turfs and shrublands.
- lack of vegetation monitoring
- impact of sika deer versus red deer
- impacts of possums, hares and rodents on mountain beech forest structure, composition and regeneration.

10. Where to from here? Ideas and options

- Targeted recreational hunting effort in various areas : DOC-assisted.
- DOC Hawke's Bay prepare an "adaptive action management plan" prior to next business round - on a consultative basis with Landcare Research, H/O, deerstalkers and other interest groups.
- Repeat Chris Jenkins' surveys if resources available, otherwise programme to do so.
- Bid for lumpy funding for Landcare Research's input into monitoring design.
- Institute and monitor the effectiveness of three treatments now, that cost DOC virtually nothing:
 - do nothing
 - commercial hunting (enhanced and encouraged)
 - recreational hunting (enhanced)
 - recreational hunting (normal)
- Discuss wider issues with adjoining landowners and other interested groups such as Forest and Bird, Maruia Society, NZDA, tramping clubs, FMC, etc.
- Compile workshop proceedings (and circulate).

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Geoff Walls thanked participants for their contributions during the workshop.