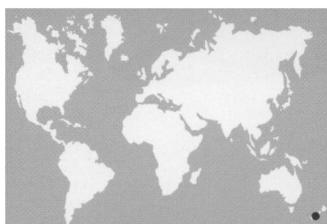


Conflicting Innovations: A Problem for Sustainable Development of New Zealand High-Country Grasslands



As elsewhere in the world, agencies of local and central government in New Zealand have renewed pressure on high-country pastoral farmers to ensure that their land use is sustainable. However, government policy innovations for conservation have often cut across the path along which farmers were innovating toward sustainable development (Figure 1). Sustained consultation in some parts of the world has revealed that highland people were not short of practical wisdom or ideals of conservation and sustain-

ability. Such deep sharing of understanding and values affected an earlier New Zealand high-country crisis over soil erosion, but it is not yet evident in a current crisis over new policy for conservation of indigenous biodiversity and recreational access. As a result, progress toward sustainable development is retarded, with polarized public debate between stereotypes of public conservation and private economic development. New Zealand needs to find new ways out of this impasse.

Historical background: unsustainability of earlier traditional pastoralism

In the mid-19th century, pastoralism for wool production was introduced to the lowlands and high country of South Island, New Zealand, to tussock grassland and scrub vegetation where the only previous grazing had been by birds and invertebrates. Both lowland and upland grasslands were reduced in density and stature by fire and grazing. Selective grazing quickly depleted them of the most favored forage components. In the lowlands, such depleted grasslands were converted to

farming and were replaced with cultivated crops and sown pastures. For a variety of reasons—climatic, topographic, politico-economic—high-country sheep runs (properties) remained as Crown leases for pastoralism. Pastoralists made use of residual and volunteer vegetation and were totally dependent for income on an erratic wool market.

Sheep numbers on high-country runs grew for the first 20 years and then became static or declined for some 80 years. The European rabbit, introduced for misguided social purposes, periodically increased in numbers toward plague

FIGURE 1 Winter scene in subhumid Naseby district, South Island, New Zealand, with sheep being fed silage on developed pastures sheltered by belts of pines planted there for this purpose. The Hawkdun Mountain slopes in the distance, used for late summer grazing to conserve herbage grown under erratic rainfall on lower ground, are now being contested for conservation objectives. (Photo by Craig Potton)



proportions despite vigorous control measures by individual runholders (pastoralists), ensuring that the grasslands never recovered for long from their earlier depletion. By 1950, high-country pastoralism was in economic and ecologic doldrums.

Consultative process of “Soil Conservation” initiates continuing innovation

Several factors interacted to promote a new climate for practical innovation. A new “Soil Conservation” arm of the government, having threatened to dispossess recalcitrant pastoralists, was quick to look for ways to help them farm their land to avert soil erosion, at the same time minimizing any appearance of threat to security of lease of land just granted under a

Recent innovations in pastoral farming in New Zealand

- Adapting grass and legume species to different climate and soil fertility regimes.
- Introducing biological control agents to counter weeds and pests such as hawkweeds and rabbits.
- Managing grazing and competitive vegetation to suppress hawkweeds.
- Monitoring of animal performance, wool quality, and wool marketing.
- Development of safe farming systems for deer and other animals.
- Monitoring of changes in soil fertility, stream water quality, vegetation conditions, and farm economics, often with quite sophisticated use of computer technology.
- Whole farm pastoral resource assessment, especially in relation to soil, topographic, and climate variations, integrated in geographic information systems.
- Fire control and grazing management to protect and enhance indigenous vegetation prized for its rarity.
- Integrating small-scale plantation and shelter forestry into pastoral enterprises.
- Creating opportunities for commercial hosting and facilitating recreation, and preserving public access to mountain recreation.

new 1948 Land Act. New community structures empowered both farmers and pastoralists to control rabbits and to take responsibility for the development and enactment of regional land use policies. From the 1960s, pasture improvement by aerial top-dressing with sulfur and phosphate fertilizer, oversowing of legumes and grasses, and fencing for grazing control became the chief practical measures for revegetating depleted and deteriorated grasslands (Figure 2). Bulldozing of hillside tracks made almost all terrains accessible to 4-wheel-drive vehicles for fire control and pastoral management.

Runholders’ investments in these innovations became possible from a short-lived boom in international wool prices. They were supplemented by financial grants from the government for “soil conservation.” Regional agencies set up to implement this policy provided consultative planning services, and plans frequently included provision for the development of forage resources on “safe,” productively reliable terrain, to reduce livestock use on more “vulnerable” terrain, generally at higher altitude, or even to withdraw such land from grazing.

Under the name of a “soil conservation program,” mind-sharing, practical consultation between the lowland government and high-country people flourished for more than 30 years after a slow start. The resulting “grassland development transition” from unimproved grasslands to improved pastures had dramatic effects. Livestock numbers and production rose substantially—to almost 3 million sheep in the high country—with an ever-increasing proportion of total livestock feeding coming from improved grasslands. Pastoral farming was replacing pastoralism, ahead of any law change to sanction it. Although regular central government assistance ended in 1984 and government scientific research diminished in volume, innovations continued to emerge (Box and Figure 3). Farmers have varied greatly in their speed of adopting or devising innovations. Several innovations failed, especially in drier sectors, including some attempted with government development incentives in the late 1970s and early 1980s.



FIGURE 2 Snow-tussock grassland at 1120 m that has been oversown and top-dressed as a warm-facing part of the block or tract of grazing land used for ewes and their lambs in spring and summer on Longslip Station in Ahuriri district. Annual precipitation: 800 mm. (Photo by Rod Patterson)

New policy for separation of conservation from production

At a policy level, the consultative process between farmers and government agencies culminated in a new Government High Mountains Policy in 1979, an outcome of an international workshop held in New Zealand with its proceedings published there in 1978 for what is now the World Conservation Union (IUCN), as policy goals and objectives for the high mountains of the world. As Simon Swaffield and Ken Hughey (*Mountain Research and Development* 21(4): 320–326) recently observed, this consultative approach to the integration of resource-suitable multiple uses was soon overtaken by the new government policy in the opposite direction, public administration taking the form of single-objective agencies, and privatization. For the high country, this policy has meant separating privatized land for production from public land for conservation.

For high-country pastoral farmers generally, such division appears an artifice. Clearly, some lands are not grazed but dedicated to conservation. At the other end of the spectrum are fields of alfalfa or clovers and exotic grasses used intensively as pasture or hay meadows. It is difficult, however, to recognize a sharp division between production and conservation on land under pastoral leasehold where for some 50 years continuing threads of practical innovation in productive use and conservation have been worked adaptively into an integrated landscape fabric of managed grasslands, both improved and unimproved.

Serving or subverting the purpose of the Resource Management Act?

New Zealand high-country progress toward sustainable development seemed to be promoted through the passing of the Resource Management Act (RMA) in 1991. Its single purpose was defined as promoting "sustainable management," integrating ecological, social, and economic objectives. For the first time in New Zealand, decision makers became responsible in law explicitly for "safeguarding the life-supporting capacity of air, water, soil and ecosystems" at the same time as they "enabled people and communities to pro-

FIGURE 3 A mosaic of self-selected experimental pastures at the Mt John Research Area at Tekapo in Mackenzie district. Research at this site has been important in recent years for demonstrating how different grasses and legumes in competition reveal their specific adaptations to several cultural environmental variables, moisture supply, levels of fertilizer constituents, and grazing regimes. Caucasian, white, and alsike clovers in the immediate foreground contrast with stunted fescue tussock and hawkweed in the intermediate untop-dressed strip and lush pastures dominated by lupin hybrids beyond. (Photo by David Scott)



TABLE 1 Prospective partition of land from a total of 70 runs: distinction between land to be converted to freehold and land to revert to full Crown control, principally for conservation purposes.

| | Number of runs | Mean area (ha) | Freehold | Crown control | % Freehold |
|-------------------------------------|----------------|----------------|----------|---------------|------------|
| Land Act 1948 | 38 | 5661 | 2802 | 2860 | 50 |
| Crown Pastoral Land Act 1998 | 32 | 4923 | 3257 | 1665 | 66 |

vide for their social, economic and cultural well being and for their health and safety." Furthermore, protecting outstanding natural features and landscapes from inappropriate subdivision, use, and development; protecting significant indigenous vegetation and significant habitats of indigenous fauna; and preserving the natural character of water bodies and their margins and providing public access to them were each identified as conservation matters of national importance to be provided for in achieving the purpose of the Act.

Most high-country farmers, often with some apprehension, had already cooperated in the preceding decade with survey parties under the Protected Natural Area Programme, identifying areas on their leases suitable for protection as significant natural areas. Having been reassured by experts that in many cases continuation of existing pastoral management would achieve the protection required, farmers were hardly prepared for the expansion proposed for such areas, often for recreational values, as conservation advocates pressed their case for "this outstanding landscape" or "that significant conservation area or habitat" before district and regional planning hearings. Such protagonists of conservation rarely acknowledged the responsibility they share under the RMA for "enabling people and communities to provide for their social, economic and cultural well being." In that respect, the cause of sustainable management may be made subservient to the pursuit of sometimes elusive conservation values. Furthermore, where land reverts to being managed under the Conservation Act, it may thereby become exempted from rules designed for the sustainable management purpose of the RMA.

Conservation advocacy and support

The creation of the Department of Conservation as a single-mission organization,

rather than as a Nature Conservancy within a Ministry for the Environment as had been originally intended in the mid-1980s, resulted from sustained pressure from nature conservation and mountain recreation lobby groups. Separate expansion of conservation land from production land or joint-purpose land has been actively supported by such groups. The conservation lobby has great influence in New Zealand primarily because of the growing popularity of conservation of the indigenous elements in flora and fauna, along with mounting enthusiasm for natural area resource-based recreation.

Protection of and assured access to familiar mountain landscapes have become key to a widely treasured living heritage. Conservation, by legal definition, now includes not only the preservation and protection of natural and historic resources but also "providing for their appreciation and recreational enjoyment by the public." This combined objective is single-mindedly championed in the mountains by the conservation lobby. From time to time conservationists challenge the sustainability of pastoral land use, especially pastoral use of unimproved grasslands.

A summary interim assessment of current tenure review

Outcomes of the policy of separation of conservation from production are demonstrated in the current progress of tenure reviews, conducted first under a process developed under the Land Act 1948 and more recently under more explicit provisions for tenure review of the Crown Pastoral Lands Act 1998 (Table 1).

These partitions, though not all finalized for the 1998 Act, have been negotiated between willing parties. The overall proportion of land to be retained in Crown control is about 43%, varying considerably between runs. In a few cases, the Crown has negotiated purchase of a property to create a conservation park. On the

"New Zealand will have real difficulty breaking out of the partitioned landscape model: production on private lands with pasture predominating, and conservation on public lands. Conservationists do not trust landowners to manage indigenous species in a sustainable fashion while landowners do not trust conservationists who try and appropriate their private property rights."
(Dr Morgan Williams, New Zealand's Parliamentary Commissioner for the Environment, addressing the 19th International Grassland Congress in Brazil on—among other things—the need for involvement of private lands in conservation of biodiversity)

FIGURE 4 Climbers' camp at Lake Thompson, on the edge of a glacial cirque at 1680 m in the headwaters of the Waiau River in the Spenser Mountains. The snow-tussock grassland is a little-grazed part of a pastoral lease on a popular traverse between Lewis Pass and St Arnaud. Will future tenure decisions prohibit seasonal pastoral use of such land in favor of conservation and recreation alone? Mt Franklin, 2340 m, in the distance, is the highest point of Nelson Lakes National Park. (Photo by Dave Chowdhury)

face of it, this appears a not unsatisfactory outcome for conservation. It would also appear that the 70 runholders completing the review to this stage are not unsatisfied. Many of them have begun new enterprises, unencumbered by limitations of the pastoral lease tenure. Perhaps of more significance for the high country is that about 80 leaseholders who have applied for tenure review are making only slow or painful progress toward negotiated agreement. Some 150 leaseholders have not yet

applied for tenure review, generally fearing that outcomes would impose intolerable burdens on future pastoral farming or emasculate their prospects for diversifying into commercial recreation or forestry.

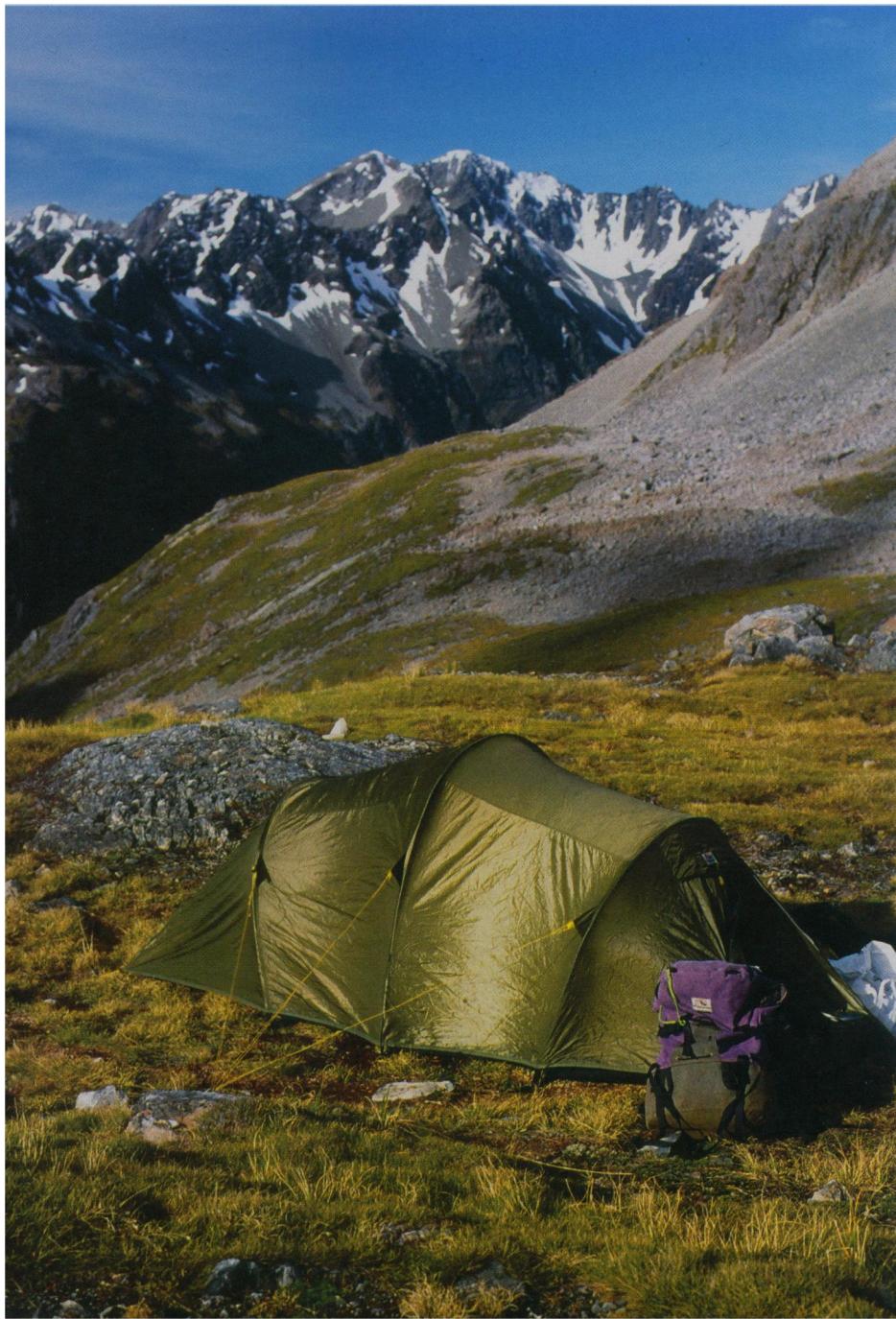
The biodiversity cause in sustainable development

Biological conservation heads the list of justifications for reverting some high-country land to full Crown control. It may be at the head of the list but not at its heart.

That place may be occupied by public recreation. Biological conservation, now widely propounded as "Biodiversity," has varied relevance to New Zealand mountains. New Zealand biological diversity has taken a hammering in the past 1000 years, and damage is not yet halted. Much loss was inevitable from the comparatively late arrival of people into isolated islands. Flora and fauna had a very high degree of endemism at the species level from long isolation from any other land mass.

Under pastoral impact, many plant species have changed in abundance, but there are few if any recorded extinctions. As with the rest of New Zealand, changes in mountain flora occurred with naturalization of exotics. The vascular plant flora in the mountains has grown by one third, compared with a doubling in lowland areas. Changes in the vegetation, flora, and fauna of the mountain lands have been greatest at lower altitudes and decrease with altitude. Unlike the montane and subalpine biota occupying the domains of former forest, the alpine flora and invertebrate fauna have a special significance from occupying an environment similar to that of their evolution. Their biological conservation is vital.

Apart from some skinks and geckos, most mountain organisms under threat already occur in protected areas. Surveys reveal what treasures of nature and culture we still have in the mountains, whose counterparts have been lost from the lowlands. The New Zealand Biodiversity Strategy (www.biodiversity.govt.nz) reflects the need for a wide range of measures for protection, including protection covenants on private lands. What may be questionable is whether additional protection



areas in Crown control are needed in the high country. Preservation hitherto has been achieved under existing pastoral management. Management agreements and especially covenants on freehold title might be expected to secure continuing protection.

Potentially the greatest concern with biodiversity in pursuit of sustainable development is the relationship between biodiversity and the functioning of ecosystems. It is widely believed that greater biodiversity increases the stability, resilience, and even productivity of ecosystem function. From the perspective of ecosystem function, biodiversity relates to all species, not just indigenous ones. A shrewd mix of management units from animal exclusion to regular pastoral management may secure the benefits of biodiversity to ecosystem function in mountain grasslands, especially at a landscape scale, without trying to preserve indigenous biodiversity everywhere. Understanding how ecosystems function when left to themselves may be their greatest value for sustainable development—as benchmarks for monitoring comparable processes of all other cultural ecosystems on similar terrain.

Conclusion: dispelling fears for the future

Sustainable development is present action for future options and empowerment. Like sustainable management, it is a continuing process involving continual innovation. New Zealand high-country farmers are increasingly concerned that their own, albeit belated, contributions to sustainable development are not recognized. They are troubled that land that they care for and need for their pastoral enterprise and integrity of landscape is being taken from them when biological conservation does not require it and when public use of it for recreation is seldom under threat (Figure 4). They fear for the managerial implications for land left for farming, arising from its lengthy boundaries with “conservation land,” thereby restricting use and management practice. They know the measures that they have evolved for the last 50 years have reduced risk from cli-

matic variability. They fear that restrictions on their use of undeveloped grasslands will substantially reduce the potential production of their fine wool industry and convert their enterprises on improved lands from moderate risk to high risk. They have eloquently expressed and illustrated their ideas in *Tussock Grasslands: Our Heritage*.

Conservation protagonists, especially those aiming to safeguard and enhance mountain recreational enjoyment, are fearful that the quality of their natural area experience may be reduced by any kind of further development. Although they recognize the high-country lessees’ traditional acceptance of most recreationists, they fear they may be refused access in the future under laws of trespass if the landscapes they enjoy do not revert to full Crown control. They are especially fearful that freehold land may be exploited for commercial recreation and tourism or sold to foreign owners who will use it for their exclusive purposes, while those seeking traditional recreation become excluded strangers in their own country. Some experiences of trampers and hunters with current local or foreign owners of leases have already fulfilled their worst fears.

People who love the mountains as a workplace or for peaceful recreation or to admire from near or far are increasingly concerned that New Zealand’s wild lands are already succumbing to “a space invasion” in the name of adventure tourism, challenge recreation, or even sedentary but noisy access by buses or helicopters. They note that full Crown land control apparently gives no assurance of crowd control.

All these fears are justified. They must be dispelled before the cordial ways of an earlier age can return among runholder, deerstalker, mountaineer, and “the little old lady in sandshoes who was so interested in the moths and plants.” Perhaps a fruitful way of dispelling such fears would be to set to one side the current tenure review process, and negotiate “Access Covenants” for each property under a new “High Country Recreation Access Code” to be sanctioned by a new Recreation Access Act. Do other countries have experience from which we might learn?

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