

A SUBMISSION TO THE

MINISTERIAL TASK FORCE INVESTIGATING

FUTURE OPTIONS FOR CATTLE GRAZING

IN THE ALPINE NATIONAL PARK

**From R.W. Condon, O.A.M., F.A.I.A.S.T., B.Sc.Agr (Syd.)
Formerly Special Soil Conservationist
in charge of catchment area research
and alpine reclamation with the
SOIL CONSERVATION SERVICE OF N.S.W.**

March, 2005

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This submission deals primarily with the first of the Terms of Reference -- **the current and potential benefits and impacts of cattle grazing in the Alpine National Park**. It can be expected that members and organisations within the conservation movement will be making submissions about the adverse impacts of cattle grazing in the Alpine National Park. This part of the submission looks at some of the claims usually made by members and organisations within the conservationist movement -- as adverse impacts of cattle grazing -- and puts some alternative views based on the author's observations in respect of cattle grazing and its effects in alpine and subalpine areas -- as beneficial impacts of cattle grazing

The submission will also make some comment on one of the implications listed in the second of the Terms of Reference, viz., **implications for the cost of management services for the Alpine National Park** and also comment on the third of the Terms of Reference -- **possible options for the future of cattle grazing in the Alpine National Park**

Because of the manner in which these latter two items have been dealt with in this submission, it is more appropriate to deal with the latter item as the second section of this submission and the former as the third section.

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The author's qualifications

The author was formerly a senior officer of the Soil Conservation Service of N.S.W. In the mid- and late 1960s, his duties included oversight of the Service's alpine area investigations, including the reclamation work on the Main Range on Carruthers Peak and Mount Twynam and other severely eroded areas in the Summit Area of the NSW Snowy Mountains. He was also a member of the Kosciusko State Park Trust at the time the administration of the Park was taken over by the National Parks and Wildlife Service of NSW.; a member of the Hume-Snowy Bushfire Prevention Management Scheme; and co-chairman of the Quarterly Soil Conservation Conference whose responsibility it was to ensure that the engineering works constructed by the Snowy Mountains Hydro-Electric Authority were satisfactorily stabilised against erosion.

As well as having a close familiarity with the Main Range area, his duties took him into many remote parts of the Snowy Mountains area, including the montane forest areas -- by four-wheel-drive vehicle, on foot, on horseback and in the air. His early training as a plant ecologist and experience in soils, vegetation and erosion surveys in western New South Wales enabled him to develop a good understanding of the ecology of the alpine and sub-alpine regions in NSW.

His oversight of research and works programs was interrupted in 1968 by his transfer to the Western Lands Commission of NSW, retiring as Commissioner in 1984. He has since had reason to re-visit areas within the Kosciusko National Park and adjoining sub-alpine freehold and leasehold grazing areas, and parts of the Bogong High Plains on behalf of the Mountain Cattlemen's Association of Victoria several times in the late 1980s. This was to review the effects on the environment in the Kosciusko National Park after 30 years of freedom from grazing and to familiarise himself with the Bogong High Plains and other Victorian high country which he had visited earlier in an exchange of visits with officers of the Victorian Soil Conservation Authority.

In his work with the Western Lands Commission the author also worked in close association with the NSW National Parks and Wildlife Service in furthering the establishment of many national parks in the Western Division of NSW. He was also a member of the Kangaroo Management Review Committee for NSW advising the minister on policy issues in respect of kangaroo management

He was also closely involved with the establishment of the Willandra Lakes World Heritage Area and at the time of his retirement as Western Lands Commissioner was chairman of the Scientific Consultative Committee co-ordinating the activities of several organisations and government agencies with responsibilities and interests in the World Heritage Area. As a consequence of his training and work experience, including a period in charge of coastal dune stabilisation, he has a sound knowledge of the requirements of nature conservation in a wide range of environments.

**I. THE CURRENT AND POTENTIAL BENEFITS AND IMPACTS OF
CATTLE GRAZING IN THE ALPINE NATIONAL PARK**

Introduction

The intention in this part of this submission is to deal with the above aspects in reverse order, looking firstly at the supposed impacts of cattle grazing which the community has been led to believe by the conservation movement and the unsatisfactory research on the subject, and then looking at the current and potential benefits of cattle grazing in the Victorian Alpine National Park.

This submission is based on the writer's several years of experience as a soil conservationist in the Snowy Mountains region of New South Wales, his familiarisation with the alpine research in that area, and that in the Victorian high country, and his familiarity also with the observations of the mountain cattlemen of long experience in that area, and his own observations in the same area. This latter experience has brought home very strongly that much of the research which has driven the management of these areas (actually non-management in the case of the Kosciusko National Park) is badly out of kilter with what is actually happening in the mountains.

This policy of non-management (by lack of mild fire and lack of grazing) has led to what the writer, and the mountain cattlemen, have been predicting for years -- catastrophic destruction of the montane forest and sub-alpine environments by widespread wildfires in the summer of 2002-03

I. The impacts of cattle grazing in the Alpine National Park

To realistically consider the effects of grazing in the Alpine National Park environment, it is necessary to consider the supposedly adverse effects, and how adverse these might be, but also the beneficial effects. This submission will endeavour to deal briefly with each of these aspects

A. THE ADVERSE EFFECTS

1. Erosion

There is no doubt that cattle grazing has developed a bad name as a cause of erosion in the high country. But due weight needs to be given to the circumstances. The writer is not familiar with how serious this may have been in the Victorian high country, but knows the situation in the Kosciusko National Park very well, having spent six years in the 1960s administering the summit area reclamation program carried out by the Soil Conservation Service of N.S.W. on the main range north-easterly of Mt Kosciusko and supervising a number of surveys of erosion problems in the surrounding areas. The above reclamation works have been described by Clothier and Condon (1968a).

There is extensive sheet erosion of slopes around the summits of Carruthers Peak and Mt Twynam in areas generally above 6500 ft (2,070 m). At this level, conditions in respect of frost-heave, which creates continuing erosion on bare soils when not covered by snow, and wind, are extreme. Bryant (1971) carried out a detailed survey of geology, soils, vegetation and erosion, based on aerial photos and detailed ground inspections, of the Upper Snowy Catchment above Guthega Dam. This survey recorded 59.7 % of the 8,115 ha catchment area as nil erosion, with a further 28.7 % as slight erosion, with up to 25 % of areas so affected as bare and eroding as sheet erosion. Only 3.4 % of the area was recorded as suffering from moderate sheet erosion and 0.9 % with gullying, the areas affected in these ways amounting to a total of 400 ha

By comparison, the area occupied by snow patches (in which snowdrifts persisted for most of the spring-summer-autumn) amounted to 2.85 % (265 ha), this representing more than half the area affected by severe sheet erosion and gullying. Bryant reported that gullying appeared to be confined to three situations :--

- tracks (bridle and walking),
- in and around damaged snowpatch areas,
- a former stock camping reserve,

while incipient gullying is present in severely sheet eroded areas.

Much of the more severe erosion can be attributed to the presence of a Travelling Stock and Camping Reserve near the summit of Mt. Twynam, marking the junction of two Travelling Stock Routes. It is well known that the high mountain country in both NSW and Victoria provided relief grazing for millions of sheep and cattle from the Riverina and northern Victoria in the 1888 drought, and especially the 1895-1903 drought, and several other droughts through the first half of the 20th century.

In these circumstances, it needs to be asked -- do we blame the grazing animals, or the two-legged animals responsible for permitting such heavy grazing, and for a stock route along the ridge of the main range north-easterly of Mt Kosciusko, and a camping reserve on one of the highest peaks at around 7,000 feet (2130 m) in an area subject to such climatic extremes. It must also be asked how the erosion damage described above will compare with that which will occur as a result of the baring of the soil over huge areas of montane forest and subalpine grassland and woodland by the catastrophic fires over the summer of 2002-03 -- a situation for which two-legged animals are also largely responsible.

It will be appreciated that whether cattle create an erosion problem will depend on numbers per unit area and the related grazing and trampling effects, and the severity of the erosive agents. The sub-alpine country forming the catchment of the Gungarlin River on the eastern boundary of the Kosciusko National Park, and at elevations ranging from 5,000 feet (1,520m) to 6,000 feet (1826m) had been grazed each summer for over 130 years when inspected in much detail in the 1980s. This country would also have been subjected to the drought-induced heavy grazing of earlier times. Observations in this area at that time showed plenty of evidence of past erosion in gullied streamlets, but these are now stabilised with herb, snowgrass and bog species on the sloping shoulders with the brooklets running clear. It was obvious that former severe erosion in this area has been able to stabilise itself in a regime of sensible cattle (and sometimes sheep) grazing.

The only active erosion observed over several days in three inspections of this country was that due to wombat holes on short steep convex slopes leading down to small streamlets. In these areas the wombats keep areas in excess of 1,000 square metres bare by their constant activity on the bare and eroding surfaces.

This experience has shown that cattle, in sensible numbers, can graze sub-alpine grassland and woodland without creating even minor erosion problems, and been able to stabilise the erosion from earlier, less circumspect, times. As will be shown in a later section, cattle grazing can also be used to improve conservation values by encouraging alpine flowers and discouraging shrub invasion of grassland areas.

In the Victorian high country, cattle numbers on the Bogong High Plains have been reduced over time from 18,000 in the period pre-World War II, to 10,000 in the post-war period, and from about 1977, to 4,000, the latter a voluntary reduction by the cattlemen in their concern that perhaps the researchers were right after all, and that cattle grazing was having adverse effects on conservation values. The continuing expansion of areas infested by heath, in areas from which cattle have been withdrawn and on areas now lightly used on the Bogong High Plains, suggests that present cattle numbers are too low, and need to be increased to prevent more areas of alpine grassland from being invaded by shrubs. This has happened over substantial areas of former grassland in the Kosciusko National Park, effectively destroying the amenity of such country for passive recreation.

One wonders what the situation might have been if there had been intelligent management of cattle and sheep grazing on the high peaks of the Main Range in earlier times. Towards the end of this submission is an account of how public lands under snow during the winter in the USA, have been managed by the Bureau of Land Management for summer grazing

2. Conservation Values

In the expectation that the Victorian National Parks Association will be making a submission to the Task Force, this submission takes the opportunity to put forward some contrary views. In the past, the case for the Victorian National Parks Association has been set out in a paper by Barnett (1987) on *The Effects of Alpine Grazing on Conservation Values -- the research behind the debate*, this paper being published under the auspices of the Victorian National Parks Association.

It is proposed to consider each of these items (and some others) in turn to see what traditional cattlemen's wisdom, the research to that time, and the presence and absence of grazing have shown.

(a) *Damage to sphagnum bogs*

Early researchers in the high country were quick to blame cattle as responsible for breaking up the sphagnum mossbeds so that the small streamlets, which previously went over and filtered through them, broke through, serving to drain them and lower the water table so that the sphagnum and other bog species were gradually replaced by matted snowgrass. It was also claimed that this drainage also had adverse effects on the water-holding capacity of the bogs and, hence, on catchment efficiency in respect of hydro-electric water storages.

The cattlemen were puzzled by this, having known that cattle tend to avoid bog areas (other than to drink from the edges) always picking the narrowest point to cross a stream rather than struggling through a bog area. Research by van Rees and Hutson (1983) and van Rees (1984) found that cattle spent only 5 % of their time in bog sites, these occupying 10 % of the sub-alpine landscape. This included grazing on their way through a bog area, but only a small proportion entered a moss-bed to graze rather than to drink.

This level of use would not seem to be sufficient to break up the moss-beds. However, the greatest damage to moss-beds occurs with wildfires at times when the moss-beds are drying out because of a run of relatively dry seasons. It has been reported that moss-beds in the Kosciusko area smouldered for weeks after being set alight by the 1939 bushfires in a very hot and dry summer. Having seen bogs after the very hot March 1965 fire in the great divide area above Ravine and Lobs Hole looking like blackened rabbit warrens after obviously smouldering for several days, until the next rain in early April, it is not difficult to understand how the run-off from heavy rains after that fire could break through a weakened hillside bog structure to form a draining streamlet through the bog.

Likewise, it is not difficult to understand how a stronger streamlet could cut through the broad expanse of a valley bog after such damage following a wildfire in a dry summer. The 1939 fires would have had such an effect. The widespread fires of the 2002-03 summer would also have had a major effect on the condition of hillside and valley bogs in such a hot dry summer.

(b) *Creation of bare ground and damage to soils.*

The damage that might be caused by cattle in this respect has a somewhat hollow ring after the tens (hundreds ?) of thousands of hectares of bare ground, especially on steep and precipitous slopes in montane forest areas, created by the widespread fires of the summer of 2002-03, in both the NSW and Victorian high country. In 10-20 years time it will be interesting to see whether the erosion damage from earlier cattle and sheep grazing in the KNP amounting to perhaps 1,000 ha all told, pales into insignificance compared with that caused inevitably by the failure to use fire, in combination with grazing, as a management tool for natural areas.

It has been claimed that cattle grazing leads to bare ground. In areas where grazing pressure is high, it can be expected that there may be more space between snowgrass and other plants than in the absence of grazing. In any mountain grazing area, without the control that can be exercised by fencing in lowland pastures, grazing rates will vary from several beasts per ha in the vicinity of salt licks which are used to facilitate distribution in a grazing allotment, to one beast to several hectares in areas well removed from the current salt lick site.

If a salt lick remain at the same sites for several weeks, there will certainly be overgrazing at such sites. However, if the salt-lick sites are moved around at relatively short intervals, the short period of heavy grazing and mild trampling will normally do much good in terms of increasing penetration of rainfall moisture and re-cycling of nutrients to the area.

The need is to move the salt blocks to another site before adverse effects begin to show, preferably to an area as far as possible from the immediately previous site to ensure that the latter gets a useful rest, and having in mind that the next move should not be too close to the former site. The real need in respect of research into the effects of grazing is to undertake research into grazing management to determine approaches that will ensure maintenance and even promotion of conservation values.

(c) *Serious erosion in some areas.*

The cause of the serious erosion around the high peaks of the Kosciusko main range have been discussed previously. Within the Kosciusko National Park there are other sites where there has been serious erosion. In the vicinity of Bulls Peaks and the Brassy Mountains about 30 km further north-east along the main dividing range, these around 6,000 ft (1826 m), more in places, where strong winds falling over a steep and high scarp on the immediate east would develop very high velocities over the ridge of the great divide.

The only other area of severe erosion seen by the writer in six years or so of walking, driving, riding and flying over the Snowy Mountains region at intervals of two to four months was on the approaches to the eastern end of the Tantangara Dam wall. Here, there has apparently been a concentration of travelling stock in earlier times moving in to and out of the snow lease grazing areas. When observed in the late 1980s this was undergoing a mild recovery with snowgrass, herbs and low shrubs, establishing on the loose frost-heave soil accumulating at and working up from the bottoms of the 40-metre-long, steep slopes.

Erosion in the form of scalds to 20-30 cms depth, varying in area from 1,000 to 5,000 square metres were scattered through the sub-alpine grassland at a frequency of about one such site per 100 sq. kilometres. Again, the question arises as to the severity of such erosion, most likely created also as a consequence of the earlier extreme stocking levels in drought times, and the 1939 fires, compares with that which will have been created by the severe wildfires in the summer of 2002-03.

The writer has spent several days in various parts of the Victorian high country, including two days of detailed field inspection in the Bogong High Plains. Nowhere did he see erosion exceeding an area of 100 sq. metres. One of these sites was where a snow drift lay across an electricity authority open aqueduct, this serving to cause the water that should have flowed along the aqueduct during snowmelt and after heavy rains to be diverted over its lower bank, causing gulying over a wide but small area downslope, and risking the breaching of the bank and subsequent severe gulying. This is apparently a common occurrence.

At another site, bushwalkers approaching a nearby hut, and concentrating on only one of a pair of shallow but bare vehicle tracks, had caused a shallow rill which, in time, would become a serious gully unless steps were taken to divert the small flow back onto stable grass cover at frequent intervals.

(d) *Changes in vegetation structure.*

This refers to changes over much of the high country, in both NSW and Victoria, in which snowgrass grassland is being invaded, on a large scale, by native shrubs, forming a dense heath over increasing proportions of the grasslands. It also refers to the removal of alpine flowers which is supposed to happen under grazing.

In respect of shrub invasion, researchers and others in Victoria point to where this has happened in grazed areas. This has certainly happened on the Bogong High Plains since cattle numbers were drastically reduced in the late 1970s. Is this because of the continued grazing, or because

the numbers of cattle using the area have been drastically reduced, so that current grazing pressures are not sufficient to prevent the heath from taking over grassland.

In the Kosciusko National Park, in areas which have been free of grazing since 1958, extensive areas of grasslands in the Jagungal area and in the area generally north-easterly of Kiandra comprising what is known locally as Long Plain, are being invaded by heath, areas affected ranging from 50-60% of the total landscape in the former area and 30-40% in the latter. These estimates were made by the writer in the late 1980s. It can be expected that these proportions will have increased substantially since.

In these areas, and especially in the Jagungal area, the effect has been to adversely affect the amenity of the area for bushwalking and fishing, access for walking through these areas being now largely confined to the former vehicle tracks. This country had once been highly regarded for bushwalking, giving expansive views of rolling downs and rugged mountains, and providing easy access to the plentiful streams for trout-fishing. Walkers have abandoned the Jagungal area for the adjoining freehold sub-alpine summer grazing country where it is possible to find an easy place to pitch a tent beside a stream and have a safe campfire -- and enjoy alpine wildflowers in profusion (see below).

The Jagungal area was once popular for cross-country skiing, but in the heavy heath cover this becomes largely impossible. In the Victorian ski fields it has become necessary to slash the invading heath in order to provide good skiing.

For those researchers and authorities who insist that fire creates bare space which becomes occupied by shrubs, the freehold sub-alpine summer grazing country adjoining the eastern side of the Kosciusko National Park has some lessons. The occupiers here have been able to use mild fire in the late autumn to clean up the heather moving down out of the snowgum woodland on the higher knolls. The bare spaces so created are quickly reoccupied by snowgrass along with plentiful wildflowers. in the following spring. This is happening in areas being grazed by cattle every summer. The graziers keep the fire out of areas where there is an understorey of heavy shrub growth, knowing that the hot fire in such an environment will kill the mature snow gum trees and encourage a dense forest of snowgum saplings which, in turn, are easily killed by fire as fuel builds up on the floor. The dense sapling forest creates an environment unsuitable for animals other than some birds and invertebrates.

In the same area, comprising the catchment of the Gungarlin River before it joins the Snowy River above Jindabyne Dam, the summer graziers have been able to encourage wildflowers at crop density by the simple expedient of deferring their grazing to begin in January rather than November of each summer. Although a proportion of the wildflowers will be consumed, enough will be left to provide a good seeding every year, with some of the seed being passed through the animals' digestive systems, perhaps to promote germination. It is easy to encourage such an approach to grazing where there are fences to control stocking -- and easy for the holder to arrange late grazings alternately each year to keep the wildflowers coming. A little bit of serious thinking may be able to devise a similar approach for the Victoria sub-alpine grazing (and non-grazing) country to improve the floral displays.

Just how adverse (?) cattle can be in grazing out the wildflowers can be judged from the following story. In the early 1980s the KNP administration was taking action to resume some of the freehold grazing country around a paddock surrounding Davies Hut because of the wonderful display of wildflowers thereon. The holder managed to get them to agree to an exchange for a similar area of land from the Park, but adjoining his country -- which the Park was happy to agree to because of the total absence of wildflowers. Within a few years, the wildflower display in the Davies Hut paddock was weakening in the absence of the grazing cattle, while the flowers in the area taken out of the Park was then lush with wildflowers. The secret in encouraging wildflowers was in deferring grazing to January each summer. In the Davies Hut paddock, with the lack of grazing, the snowgrass was crowding the flowers out.

This brings up for consideration another change in the structure of vegetation which was happening in the KNP grasslands and in grasslands in the Victorian high country when these areas were inspected in the late 1980s, changes not as a result of grazing, but because of a lack of grazing. In the scrub-free areas in the Jagungal and Long Plain areas of the KNP, after 23 years of freedom from grazing following the March, 1965 fire across the Long Plain area, and in areas unburnt but not grazed since 1958, the snowgrass in valley bottom areas was densely packed and mostly dead and dying, so that by January of each year, green flags of snowgrass represented much less than one per cent of the plant mass. On the nearby slopes, the snowgrass was in a similar condition but not so dense, with a bit more green flag and a very sparse scattering of wildflowers.

The writer has seen the same condition on the research plots on the Nunniong Plateau in Victoria, with the vegetation in the half aquare chain (2,000 square metres) plot dominated by mostly dead snowgrass, the area outside the plot kept fresh and green, and with alpine flowers present, by cattle grazing

There are several things wrong with this scenario of supposedly near-pristine wilderness in the Kosciusko National Park :--

- (i) The dense mostly dead snowgrass provides an easy target for lightning strike ignitions -- as does the enormous build-up of fuel in forested areas as a consequence of total lack of prescribed fire (and prescribed grazing) for the last 40 years or so.
- (ii) In the absence of mild fire or grazing there is very limited recycling of nutrients.
- (iii) the dense dead snowgrass becomes an ecological desert in terms of plant life and animal life with minimum biodiversity -- except for ants. The habitat of kangaroos and wombats is confined to the limited "oases" of fertility of a hectare or so surrounding the former homesteads and stockmen's huts which the native animals are able to keep permanently green. There is nothing for them in the dense snowgrass or heath beyond these areas.
- (iv) In the areas being invaded by heath, the snowgrass and the herbaceous plants are also being pushed out by competition for moisture, light and nutrients -- again a serious loss of biodiversity in which the lesser plant species (more likely to be rare or endangered) are likely to disappear.

(e) *Loss of species and diversity*

The material in the preceding section has shown that, in sub-alpine areas adjoining the Kosciusko National Park, areas subject to continued summer grazing by cattle over the last 150 years have no problems with loss of species and diversity. There is such a problem in areas grazed by sheep, these areas being kept fresh and green through the summer, but the alpine flowers have been replaced by clover. However, in sheep grazing areas, it may also be possible to encourage alpine flowers by managed grazing. In the Davies Hut area discussed in the preceding section, the clover had gone out of the plant community when the use of superphosphate fertiliser was discontinued in the years preceding the Park takeover.

(f) *Reduction in alpine flowers*

Again, the material in section (d) above has shown that cattle grazing doesn't necessarily result in reduction of alpine flowers. It has also been shown that grazing can be managed to ensure a surfeit of alpine flowers.

On the other hand, long-term lack of grazing has resulted in a serious lack of alpine flowers in the subalpine grassland areas of the Kosciusko National Park.

In developing this submission, the writer has had access to scores of coloured photos, and their explanatory captions, taken during the late 1980s visits to the Kosciusko National Park and adjoining freehold summer grazing areas and the Bogong High Plains in Victoria. These photographs illustrate very clearly the many points made above, and below, about what is happening in these areas.

The above review of the effects of cattle grazing in promoting conservation values suggests the need for a serious re-think on the place of cattle in the Alpine National Park. That re-think should extend to approaches to the management of cattle grazing to encourage its use as a management tool, especially in areas from which grazing has been withdrawn.-- how they can be used to promote biodiversity, how they can be used to encourage alpine flowers, how they can be used, perhaps with careful use of fire, to reclaim areas of former grassland presently being taken over by heath. The continuing spread of heath in the Bogong High Plains is indicative that the cattle numbers are too low.

The re-think would best start on areas of sub-alpine grassland and heath that may have been severely damaged in the widespread and catastrophic fires in the summer of 2002-03 and be at risk of serious erosion -- with a view to managing their recovery. This should extend to thoughts about the use of cattle in areas from which they have been excluded for many years, especially as a means of encouraging recovery of areas so severely damaged that they become an erosion risk. While there is still soil on such areas, and before they regress to an erosion pavement dominated by stones, the simplest way of regenerating plant life is to drive a herd of cattle over and through such areas when the soil is suitably wet after rain -- followed by seeding with snowgrass and other suitable native species. Clover species and superphosphate and perhaps other fertilisers can be used to build up fertility and maintain fertility at a high level

until the native species are well established. The Kosciusko experience has shown that withdrawal of fertilisers will see the introduced species disappear.

Several introduced species of grasses and clovers were used in the summit area reclamation program on the Kosciusko Main Range in the 1960s. On a visit to the works in the Mt Twynam area in the late 1980s, it was noted that natural areas under snowgrass or daisies surrounding the reclaimed areas were free of any of the species introduced in the reclamation program. In areas subject to frost-heave it would be desirable to provide a mulch. In areas where vehicle access is possible, hydro-mulching as used on the Kosciusko Road (see Clothier and Condon, 1968b). could be used. Another possibility would be the use of snowgrass turf, taken in narrow strips from well-grassed areas and laid in strips on the contour across areas needing treatment. Turf-cutting machines the size of a household lawnmower were available in the 1960s.

The other matter which needs serious consideration by national park managers is using cattle grazing as a means of improving habitat for native animals, not only in the Alpine National Park but in national parks in other environments. Svenson (1990) records the proceeds of a conference of wildlife managers, presenting papers describing their use of prescribed grazing of livestock for this purpose in a wide range of environments in North American national parks.

B. BENEFICIAL EFFECTS OF CATTLE GRAZING

Most of the beneficial effects of cattle grazing, and the reasons for them, have been discussed in the preceding section dealing with the supposedly adverse impacts. It remains to summarise those previously discussed and to discuss other beneficial effects in greater detail.

1. Improvement in habitat for native wildlife.

Cattle grazing serves to keep the snowgrass sward in a fresh and green condition throughout the summer in sub-alpine grasslands and woodlands. Ideally it also needs the use of mild fire in limited areas to prevent the snowgrass from senescing and crowding out other plants.

2. Improvement in alpine flower production.

The preceding section has shown also that although cattle preferentially graze wildflowers and other herbaceous species, grazing can be timed each year to maximise the plant (and consequently faunal) biodiversity.

3. Reclamation of eroded sites

The availability of cattle in the local environment can enable them to be used to treat eroded areas. Mention was made of the use of cattle by driving them over and through sheet eroded areas when the soil is wet following good rains -- to provide niches to hold seed (and fertiliser) and rainfall moisture in place to encourage germination and establishment, preferably using native species, but understanding that if introduced species are used, they are most unlikely to invade natural areas nearby.

In the grazed sub-alpine grasslands adjoining Kosciusko National Park the most effective coloniser is the weed species known as sheep sorrel (*Rumex acetosella*). It is an aggressive coloniser on bare and disturbed sites, largely absent from nearby natural areas and disappearing as the snowgrass and daisies become established. In the Kosciusko National Park this species was also once common on construction sites undergoing reclamation

4. *Control of shrub invasion*

Although cattle do not favour some tall heath species in their mature condition, they will use these and other shrub species in the seedling and young bush stages. The shrubs invade grassland by spreading out from established mature stands, occurring initially as scattered individuals amongst the snowgrass, such sites increasing in density and height of shrubs until they become impossible to walk through. In the process they push out the snowgrass and herb species. In this condition the shrubs leave a mulch of organic matter on the soil surface which, in the event of a hot fire, is completely consumed, leaving the mineral soil bare and unprotected and susceptible to frost-heave in the non-winter season when not covered by snow,

When young shrubs are in a scattered distribution, cattle are able to keep on top of the problem. In the freehold summer grazing country adjoining the Kosciusko National Park, graziers have been able to use mild fire in the late autumn to remove mature tall shrubs which cattle have not been able to suppress, with snowgrass and herbs returning to provide adequate cover in the spring.

There is a place for these approaches in areas in the Alpine National Park from which cattle have been withdrawn. There could also be a place for using cattle grazing and mild fire on the ski slopes where shrubs are needing to be slashed to groom the slopes for skiing.

What these approaches need is someone to think seriously about what has previously been considered unthinkable by the authorities striving to appease the minority of the community in the conservation movement

5. *Protection against wildfires at unseasonable times*

Overgrown senescent snowgrass makes for easy ignitions by lightning strikes in hot and dry summer conditions, as does heavy loads of leaf and bark litter on the forest floor. It is interesting to note that, prior to the January 2003 fires in the Canberra area, bushfire brigade personnel in the area west of the ACT had measured forest floor fuel loads ranging between 84 and 200 tonnes per ha.

The most effective way to remove overgrown senescent snowgrass is to use mild burns in patches in the late autumn, when any fire will be extinguished by the coldness and moistness of the night air and the subsequent morning frosts. This would be resuming the practices of the Aborigines when they visited the high country for feasting on the bogong moths and other local foods.

Burning the patches of senescent snowgrass in this way will result in patches of fresh green growth in the snowgrass sward in the following spring -- to attract native wildlife and to provide space for plant species other than snowgrass to become established -- thus promoting

biodiversity. Patch burning in this way is how the Aborigines managed the multitude of environments throughout Australia, and kept them productive in terms of their food supply. By this means also, they were able to minimise the areas which might be affected by the occasional catastrophic wild fires

It is also appropriate to discuss the experience of bushfire brigades in fighting the 2002-03 fires in sub-alpine grassland areas of the Kosciusko National Park. Although it is generally easier to control fires in grass country than in forested and timbered land, the task in the Long Plain area of the Park was made much easier because the fairly large brumby population in that area had been able to keep the much of the snowgrass grassland in a green condition, this serving to slow the fires down to enable fire fighters to bring them under control more easily. As a consequence some 200,000 ha of sub-alpine grassland, valley bog and woodland country was saved from those fires – but waiting for the next summertime inferno, unless the brumbies are allowed to maintain their approach to snowgrass grassland management, hopefully assisted by by the park authority using mild fire in the late autumn on the slopes adjoining the valley bogs to minimize the enormous risk to the latter from any fire.

There is also a place for cattle grazing in forest areas as a means of providing some protection from wildfires. Cattle are able to use valley areas and gentle slopes -- to keep the grasses on the forest floor invigorated, to utilise the shrubby understorey to reduce the volume of such fire hazard, and to maintain habitat for native wildlife.

6. *A reservoir of hard-won experience and wisdom.*

In their keenness to appease the conservation movement, governments throughout Australia and their agencies have chosen to neglect the pool of knowledge and experience of the high country environments. Cattlemen in the high country spend a lot of time looking at the scenery is part of their existence, taking the opportunity to observe what is happening in and to the environment, and thinking about what is happening, and how and why it is happening. They may not know the plants by their scientific names but they do know where they fit into the local environments. They have had plenty of time to observe what is happening in the long term, more so than the researcher or official whose presence is often relatively fleeting, his knowledge based largely on what he has learnt from others, this often negatively slanted.

Having spent time with cattlemen of long experience in the Victorian high country, the writer is well able to understand the frustration and exasperation when they see the results of research from which the conclusions do not match their own knowledge and decisions, and which they know will be adverse to the environment.

If the researchers had made some effort to utilise the cattlemen's knowledge in the design of their research projects and in the conclusions drawn from their research, the research findings might have been closer to the mark

This submission will be suggesting that Alpine National Park management, and other national park managements, need to be able to absorb and utilise the experience and knowledge of those who have lived and worked in close association with the environment.

This submission will also be proposing a new approach to the management of those parts of the Alpine National Park from which cattle grazing has been withdrawn, proposing the use of cattle grazing and mild fire as management tools in these areas. Park authorities will need to seek the co-operation of cattlemen in providing, and managing, cattle for management purposes. Hopefully it will lead to co-operation with members of the local community in the management of natural areas.

The nature of ecological research

The point made in the third paragraph above also begs the question as to why the research findings do not match the reality of what is happening in these environments.

Environmental research is always difficult in that, no matter how good the intentions and thorough the design and execution, it can never hope to cope with the multitude of influences that can impact on the environment. This creates problems when it comes to analysing the results -- because the researcher can only discuss the results in relation to the treatments imposed. He will have difficulty (not necessarily acknowledged) in trying to separate out the effects of those influences which he hasn't had under control, and which may not have happened during the currency of his research.

Because of cost factors, treatments have to be limited in size and time. The latter factor becomes all important in the study of the environment, particularly because climatic events, which are a major influence on what happens in and to an environment, sometimes take a long time to come around. Climatic factors probably have a greater influence than any other in sub-alpine and alpine regions but the researcher has little or no control over them and can only make educated guesses at their likely effects. He also needs to make an educated guess at the likely effect of aspects of the climate that didn't happen during the currency of his research.

It is the extremes of climate which have the major influence on the environment and which are the most responsible for the changes which are part and parcel of nature. Extreme drought, extreme winds, extreme cold and extreme heat, as in a bushfire (which is basically a climatic event) create more perturbations to the environment than cattle grazing.

The attempts of some researchers to prove the supposedly adverse effects of cattle grazing have been outstanding in the amateurish design and childish attempts to simulate the effects of cattle grazing. One piece of research (quoted by Barnett *op. cit.*) used a range of treatments on one-metre-square plots to study the effects of bare space in the snowgrass in promoting shrub establishment. In some plots, snowgrass plants were pulled out of the ground to simulate the effect of cattle grazing in creating bare space.. The effect, of course, would be to provide enough disturbance, and space, and reduced competition from the remaining snowgrass stand, to encourage the bountiful seed store in the surface few centimetres of soil to germinate -- with species suited to the timing of the following rainfall. In a heath/grassland community, it can be

expected that some of the seed store would be of heath species. If cattle grazing is having such adverse effects, it is amazing that the researchers could not find examples of such damage in grazed landscapes without having to simulate it in a stand of good snowgrass.

The same researchers attempted to simulate the damage caused by the swift moth in killing snowgrass -- by clipping the snowgrass at ground level over the one-metre-square plot and holding the clipped material down with plastic mesh to prevent the wind from blowing it away. Not surprisingly there was a good response from the culms of the clipped snowgrass, sprouting through the clippings. Perhaps they didn't know that when swift moth, or case moth, kills snowgrass it kills everything, roots and all. In the absence of cattle grazing, snowgrass is able to re-colonise small areas of swift moth damage, of half a metre or so in diameter, by moving in, very slowly, by vegetative means from the edges of the surrounding snow grass. In large areas, up to 20 metres in diameter or more, re-colonisation of moth-killed areas is very slow, as in years, with very scattered herbs, and occasional shrub and an occasional snowgrass plant. The writer would expect that a bit of disturbance by cattle hooves to break up the tightly packed snowgrass hay would provide spots for seed to lodge and germinate and, in doing so, to serve a useful purpose in reclamation, even if it is by shrubs.

There is also the question of truth in research, this aspect being explored in a series of papers to the Australian and New Zealand Association for the Advancement of Science (ANZAAS) held in Townsville in August, 1987 and in following issues of the Association's journal *Search*, these providing some uncomplimentary views about scientists. Caton in the September-October 1987 issue of *Search*, amongst several less than complimentary quotations from eminent scientists, quotes astronomer Sir Federick Hoyle's statement that " Pressures are so great towards orthodoxy that it unwise for a young scientist to report an observation or an experiment should it happen to favour a declared heresy." Caton further reports that the growth of the sciences since 1945 has been accompanied by an enormous increase in the institutional power exercised. The writer is well aware of the influence of institutional power in alpine ecological research.

II. POSSIBLE OPTIONS FOR THE FUTURE OF CATTLE GRAZING IN THE ALPINE NATIONAL PARK

There are several possible options :--

- (a) To withdraw cattle completely from the Park,
- (b) To continue grazing on the present areas but increase the numbers,
- (c) To continue grazing on the present areas but increase the numbers, and to resume cattle grazing on much of the area from which cattle grazing has been withdrawn, except for those areas in excess of 6,000 feet (1,826m) and other areas which might have special reasons for non-grazing.

Each of these options is discussed further below.

A. TO WITHDRAW CATTLE GRAZING COMPLETELY FROM THE PARK.

This submission has detailed the supposedly adverse impacts of cattle grazing which appear to have been shown up by much of the ecological research, and found this to be not matched by reality. It has also detailed the beneficial impacts of cattle grazing as shown by the reality of continued alpine summer grazing for over 150 years in sub-alpine areas adjoining the Kosciusko National Park on New South Wales

The principal concern for this option is for the seriously adverse impacts which inevitably result from lack of cattle grazing in much of the Park, combined with a lack of prescribed fire. The inevitable result of this policy of non-management of the Park and adjacent montane forest has been the catastrophic fires through the high country in Victoria and New South Wales in the summer of 2002-03. It would be a safe bet that erosion and ecological damage caused by cattle grazing would pale into insignificance compared with the erosion and ecological dislocation caused by those fires.

In the Kosciusko National Park 3.1 million ha have been burnt with huge areas of mountain ash (highly susceptible to hot fires) killed outright. There will be no recovery of these by epicormic branching as occurs with most eucalypt species damaged by fire. It is presumed that this has happened in the Victorian high country also. The grey patina from the dense stands of dead trees will serve as a reminder of those fires for the next fifty years until the next inevitable catastrophic fire occurs on a similar scale -- unless the current approach to the management of natural areas is changed.

The need is for positive management to avoid a repeat in the future -- by intelligent use of prescribed grazing and prescribed fire. The 2002-03 fires are a monument to mis-management.

**B. TO CONTINUE CATTLE GRAZING IN THE PRESENTLY GRAZED AREAS,
BUT TO INCREASE THE NUMBERS OF CATTLE.**

As in A above, this runs the same risk of major ecological disaster on the areas kept free of prescribed grazing and the use of prescribed fire. The reason for increased numbers of cattle on the areas presently grazed is based on the need to hold back the invasion of grassland areas by heath, and hopefully reversing that process.

This would need close co-operation between the Park authorities and the allotment holders, with monitoring of the results. The procedure would be similar to that proposed for Option C.

**C. TO CONTINUE GRAZING ON AREAS PRESENTLY SO USED, BUT TO INCREASE NUMBERS ON
AREAS BEING OVERTAKEN BY HEATH, INCLUDING THE USE OF PRESCRIBED FIRE AND
-- TO RESTORE CATTLE GRAZING AND THE USE OF PRESCRIBED FIRE TO MUCH OF THE
COUNTRY FROM WHICH CATTLE GRAZING HAS BEEN WITHDRAWN.**

The objective in this option is to undertake positive management of the Alpine National Park -- by the use of prescribed grazing and prescribed fire, as necessary to maintain ecological values.

This would require a management committee answerable to the Director of the Park, comprised of two officers from the Alpine National Park and two experienced graziers nominated by the Mountain Cattlemens Association, Victoria. There would need to be rangeland scientists answerable to the management committee and charged with the responsibility of working with allotment holders in planning their grazing operations. Each grazing allotment would have a management plan prepared by a rangeland scientist in co-operation with the allotment holder.

The management plan would be based on an aerial photograph of the allotment with vegetation types mapped as an overlay or superimposed on a copy of the airphoto with a separate overlay showing slope and aspect categories as well as basic geology and soils information. The management plan would provide a management prescription for each land unit identified from the plan. The management prescription would cover such matters as grazing strategies (including non-grazing if appropriate), needs in respect of prescribed fire and other things that will become obvious to the rangeland scientist and allotment holder working together in the field, exchanging ideas based on their respective knowledge banks, and aiming for particular outcomes for each land unit and for the allotment as a whole.

Management plans of this nature are becoming part of the scene in farming and grazing areas in New South Wales in situations where landholders are seeking permission to clear vegetation, or offering, to the National Park authorities, a conservation area aimed at conserving a particular landscape.

It is envisaged that the adoption of this approach would be a gradual process, with appropriately qualified rangeland scientists being appointed, their selection undertaken by the management committee. For example, if two such officers are appointed initially, each might work with three or four grazing allotments in the first season, selected over the winter period or earlier by the management committee and tenders called for allotment holders. This process

would need to allow time for the selected allotment holders to spend time in the field with a rangeland scientist to work up the management plans and have them approved by the management committee before the grazing season commences.

In subsequent seasons the rangeland scientists would work plans in a similar way for another three or four allotments, but also keeping in contact with those already established.

It is presumed that the standard post and wire fencing would not be permitted in subalpine grazing lands which might be used by cross-country skiers and passive recreationists. However, consideration could be given to electric fencing powered by batteries and/or solar power, with replacement batteries brought up each week or so by the allotment holder. Such fences would not be used to place a fence around the boundaries of an allotment, but used to confine cattle to certain areas or to keep them away from certain areas at certain times etc. At the end of the grazing season the, normally, single-wire fences can be rolled up and stored for the winter.

It will be appreciated that the above proposal is merely a sketchy outline of how positive management might be introduced into the mountain grazing lands. But it provides a basis for someone to start thinking about positive management and its long-term benefits to the high country environment. Land management in this situation, where the State has control of the land, needs to be a co-operative effort between the administration and the land users.

It is appropriate, in this context, to make mention of the approaches adopted by the Bureau of Land Management in the USA in the management of public grazing lands in desert areas covered by snow during the winter. Before each grazing season commences, the BLM rangeland scientists are out in the field surveying the current scene and setting out the numbers of stock which may be permitted on each grazing range, having in mind the basic carrying capacity of the vegetation resource, the amount of precipitation received over the winter months and early spring, and other factors.

The animal numbers may also be time limited in terms of total annual grazing days of feed available without over-using the resource. Basic carrying capacity in terms of stock numbers per ha for a certain time can be converted to animal grazing days for particular periods and varied in accordance with the current seasonal conditions, and numbers and grazing time varied to meet particular needs. The BLM officers also carry out inspections during the grazing season to ensure that the resource is not being over-used, the officers also having the power to order a reduction in numbers or grazing time

III. THE IMPLICATIONS FOR THE COST OF MANAGEMENT SERVICES FOR THE ALPINE NATIONAL PARK

The proposal put forward in the preceding section II B will have some additional costs which may be summarised as follows :--

- (i) The salaries and travelling expenses of two or more rangeland scientists to work with the allotment holders, plus associated office expenses.
- (ii) Travelling expenses and appropriate payments to the two grazier members of the management committee,
- (ii) The costs of time and travel expenses for the two members of the management committee from the Park authority.

Against these must be considered the benefits flowing from the introduction of a positive management regime.

Putting cattlemen and their cattle and horses back into areas from which they have been withdrawn will place a resource of people with land-based knowledge and management expertise, these working in co-operation with the Park authority rather than against them with some degree of frustration. These people will also provide a knowledgeable resource for fire fighting (hopefully not necessary), for search and rescue, for reporting on conditions and developments, on weed problems, and on what is happening with wildlife and feral animals. It would be reasonable to have the allotment holders report on a monthly basis while they are using their allotments, this through their co-operating rangeland scientist. These services would be free of cost to the Park management.

The most important benefit from the co-operation between the rangeland scientist and the allotment holders would be an explosion in the knowledge available on the ecology of the region, and the application of that knowledge to the management of the area towards maximising conservation values. This newfound knowledge would supersede the research-based knowledge which, as has been shown, is obviously not always a reliable basis on which to make management decisions.

An important objective of the positive approach to Park management would be to work towards improving the biodiversity of the plant communities, upon which the faunal communities depend for their biodiversity. Most important in this respect would be the occasional use of mild fire to discourage senescence in both grasslands and heathlands. The use of mild fire as a management tool also develops a pool of knowledge about fire behaviour in various situations and its effects on various plant communities.

The availability of such knowledge would hopefully lead to broader plans for the use of prescribed fire as a management tool. The transfer of so much fuel from the forest floors in the high country into the atmosphere and local streams by the 2002-03 fires has provided the opportunity for positive management of fuel loads for the future. The nature of fire behaviour in

forest areas is well known. As fuel loads build up in future years, this knowledge needs to be put into practice to prevent a recurrence of the 1939 and 2002-03 conflagrations.

In selecting areas for grazing allotments, there will be an opportunity to keep certain areas under a regime free of grazing and/or prescribed fire so that what happens in such situations can be observed and recorded and added to the knowledge base. There will also be opportunities for using prescribed fire in such areas for developing habitat for wildlife, particularly four-legged creatures which tend to find their habitats increasingly restricted in grassland, heath, woodland and forest areas under a non-management regime.

These types of benefits, of course, cannot be expressed in fiscal terms.

The principal objective in introducing prescribed fire and prescribed grazing into the sub-alpine grasslands and woodlands and montane forest is to prevent a recurrence of the fires of 2002-03, and their costs in fire-fighting which would run into millions of dollars on each occasion that a major effort is needed. It appears that this cost was to a large extent avoided in the 2002-03 fires on the NSW side of the border by allowing the fires to burn with minimal attempt at control, but at enormous cost to the environment and to the 1,000 or so citizens in Canberra who had their homes destroyed.

Consider also the cost of greenhouse gases transferred to the atmosphere at a time when the nation is striving to reduce such emissions from industrial, commercial and residential sources. Consider also the cost of ash and sediment load transferred to streams and storages. Against these horrific but largely unmeasurable costs as a direct result of non-management of the environment, the costs of introducing positive management into natural areas would be miniscule.

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