PROCEEDINGS OF AN INTERNATIONAL YEAR OF MOUNTAINS CONFERENCE

Jindabyne - Australia
November 25-28, 2002

Coordinated by
AUSTRALIAN ALPS NATIONAL PARKS

In partnership with
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International Council on Monuments and Sites

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International Year of Mountains 2002
Acknowledgements

In addition to some presenters who were unable to supply their written paper, there were a number of Aboriginal presenters from different parts of Australia who chose not to submit a written form of their presentation as this is not a traditional method of communication.
**Welcome to Country**

My name is Rae Solomon Stewart. I was born in Orbost on the banks of the Snowy River. My family come from Dalgety and South Jindabyne areas.

I come to Jindabyne to welcome all the people that are here today to celebrate the Year of the Mountain.

**Malarkin gungge yalarguin**

In Aboriginal languages one word has more than one meaning.

We are all gathered here peacefully for the Year of the Mountain celebration and we welcome you to our country.

My grandfather, Billy Rutherford used to break in Brumby horses for the police and he used to ride over the snowy mountains and other different places around this area, rounding up the Brumby horses and sometimes searching for people who were lost.

My other grandfather, Ned Solomon used to shear sheep, build fences for the farmers and shoot the wild dogs to stop them killing sheep.

The Snowy Mountains were very important to the people who lived here because of the Bogong Moth. The caves protected the people from the snow, wind and rain in the winter months and provided shade in the summer months.

I trust that your time here in Monaro Ngarigu country will be of great benefit to you all.

Thank you for your time and patience.

*Rae Stewart*  
*Monaro Elder*
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FINAL FORUM ISSUES
Day One – Conference Plenary Session
Welcome to the Mountains and Opening of the Conference

Tony Fleming

Director, Southern, NSW National Parks and Wildlife Service

I acknowledge we are in Monaro Country and show my respect to the Indigenous Elders.

Yesterday was a wonderful opportunity to be reminded how rich and spiritually significant indigenous culture is. Thanks to everyone who made yesterday’s celebrations transpire into an event which has touched the hearts of all those who attended. I really hope that the opportunities ahead of us over the next few days will further strengthen the significance and opportunities of indigenous culture.

I would also like to acknowledge that this conference is a product of our hard working park agency staff across the ALPS working with our partners from the CRC for Sustainable Tourism and ICOMOS. Many staff and contractors have worked non-stop for many days and nights to make this event happen. The difficulties, concerns, frustration’s and logistical nightmares have all been overcome due in large part to the strength of the ALPS Program – People from the ALPS Parks together with Environment Australia working in partnership.

International Year of the Mountains is a wonderful opportunity for us to reflect on how important our mountains are:

- Our National Parks
- Our sources of water
- Our higher rainfall areas in what is the worlds driest continent
- Our sources of inspiration
- Destinations for visitors
- Opportunities for challenging ourselves
- Areas presenting enormous challenges for fire managers
- Areas where the containment and management of introduced species present huge challenges
- Areas where natural and cultural conservation merge together.
- Areas of immense social, cultural and economic significance.

We are lucky in Australia in many ways, but most notably is the fact that within our mountains we find peace. Tragically this is not the case today in many mountainous areas throughout the world. In many of the world’s mountainous zones territorial borders run along the mountain tops with resultant political tensions and war.
During the next four days I would encourage you all to take time to reflect on the world situation and to acknowledge the opportunities we have in Australia to better understand and better manage our mountains.

I would also like to acknowledge our sponsors

- CRC for sustainable tourism and Trangrid
- And the support of the Station Resort, Horizons, Perisher Blue and the bus companies
- Thankyou to AUSAID for supporting the attendance of our Nepalese and Bhutanese participants

I would also like to especially acknowledge the interstate and overseas speakers who have travelled so far to join with us and to share their experiences, love and appreciation of their mountains with us.

This conference presents us with a unique opportunity to celebrate the value of our mountains via the three conference themes:

- Mountains for the future
- Mountains for tourism
- Mountains of meaning

On this note I am proud to formally welcome you all here and to declare the conference open.
Global Priority: What Makes Mountains So Special?

Lawrence S. Hamilton

Vice-Chair (Mountains), World Commission on Protected Areas, World Conservation Union/IUCN
Islands And Highlands, Environmental Consultancy
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Free-standing or in a range, mountains, these 3-D earth features should be conspicuous enough to bring out a piqued interest, to an "Oh, wow!" reaction. Often also, added to their impressiveness in the landscape is a metaphysical "presence" that evokes deeper emotions in the inner-being of humans. Mountains are special because they take on deep cultural significance (for example Mount Fuji). To some traditional peoples mountains are held in awe or fear or are sacred sites where religious ceremonies are held. These may be the seats of the gods (Mount Olympus to ancient Greeks), the abode of the ancestors (Mountains in Yunnan to the Dai), cosmic centers (San Francisco Peaks for the Hopi). Mount Kailas, sacred to all Jains, Buddhists and Hindus situated in the high desert of Tibet, is the world’s most sacred mountain. (Bernbaum 1990). Difficult to visit, it nevertheless is the site of "the ultimate pilgrimage and circumambulation" for around a billion people. The sacred, active volcanic peak of Ngauruhoe, part of Tongariro NP was given by the Maori in trust for protection to the people of New Zealand and is now a World Heritage Site. In the United States there are many mountains of sacred significance to Native Americans. Two of these, Mount Shasta and Devil's Tower are currently the scene of much controversy over tourism development and their sacrality. Artists, poets, writers, and alpinists have also developed special metaphysical relationships with mountains. And even the most heavy-breathing hiker or jaded tourist must experience on uplifting of the spirit and a sense of wonder when confronting the majestic valleys and mounts. If the sense of sacredness or wonder does not give them enough protection, we need to give them secular status as national parks, monuments and preserves.

A second important cultural reason why mountains matter, --why they are worthy of special study and care, --is because they are home to at least one-tenth of the world's people, including the most endangered minority ethnic groups. Mountain people, hill-billies, highlanders, marginalized people, whose cultures are being eroded in heedless development by exogenous forces, are too precious a cultural heritage to lose. We are losing one language per week currently (P. Raven 1998, Personal Communication). These cultures add richness to our world fabric, and they are possessors of traditional knowledge and ways of living sustainably in these fragile environments. Most prehistoric hunters and gatherers preferred mountains because of the great plant and animal diversity within short distances, year round water, wood, shelter and conditions favorable for self defense (Rhoades 1985). Moreover, in domesticating the five of the most important food staples in the world (wheat and barley in the Zagros Mountains of the Near East; maize in highland Mexico; potato in the Andes; rice in SE Asia highlands), these early mountain dwellers set the stage for lowland civilization, --which then gradually marginalized the mountain peoples.

Mountains increasingly became areas to be exploited to benefit lowlanders: the transhumant grazier who used the high grasslands only for summer grazing, the lumberjack for wood, the miner for minerals, or the engineer who built dams and roads for the benefit of the lowlands. But through all of these changes,
mountain farmer-herders who chose to live in often remote valleys did evolve a sustainable land use and were able to maintain their cultures partly because of that isolation. We need mountain people, and the world will be culturally impoverished unless we do things differently.

Mountains are the water towers of the world, receiving the bulk of its terrestrial precipitation, largely because of the orographic effect which results in higher rainfall or snowfall than in surrounding lowlands (Linniger et al.). Large amounts of this may be stored as snow and glaciers both of which then nourish the watercourses which are lifeblood of the land. For instance, the Nile and the Indus from their sources in the mountains nourish the life and economies of Egypt and Pakistan. It has been aptly stated that without the nourishing waters from the Karakoram/Hindu Kush ranges there would be no Pakistan. Elsewhere, mossy, lichen-draped cloud forests on mountains capture horizontal or occult precipitation which otherwise does not reach the ground, and add it to the water budget (Hamilton et al. 1995). The prime raison d’être for the Forest Preserve in New York State’s Adirondack Mountains was to safeguard the water source of most of the State’s important rivers.

Much of the world’s remaining native biological diversity, especially of species and ecosystems, is in the mountains. For instance, at the Dali fair in Yunnan’s mountains, Dr. Pei Shengji found 550 species of plants and animals brought for trading by six ethnic hill tribes (Pei, 1990 Personal Communication). This species richness is due largely to the extreme heterogeneity of environments (climates and soils), because of the rapid elevational changes (altitudinal vegetation belts), variable directional orientation (aspects), and abundant microhabitats. Moreover a great share of the world’s endemic species are found in mountains (e.g. the Puerto Rican parrot or the mountain gorilla of the Virungas) due to the isolated island nature of mountain massifs. They are often the last bastions of wild nature, --“islands” in a sea of transformed or exploited lowlands.

The aforementioned four reasons why mountains are important alone argue for giving them special attention, but they also have other characteristics which dictate that mountains require a different approach in sustainable development than that which may be applicable elsewhere.

In the first place these three-dimensional structures are dynamic earth features, manifesting powerful processes of volcanism, surface erosion, uplift, earthquakes, landslides, torrents and rockfalls due to tectonic and topographic processes. These processes, and the climate which is both variable and extreme, mean disturbance, and also mean a slow recovery from disturbance to the soils, vegetation or fauna. This gives fragility to mountain ecosystems. Lowland development techniques are often totally inappropriate.

Mountains are relatively remote from centers of population, wealth and political power. This compounds their economic and political marginality. Access is poorer, law enforcement is less. These factors often mean a greater distrust of government and more evasion of laws made in distant places over independent mountain people. This often leads to mountains being a sanctuary for refugees from “the system”, or those who wish to escape from the pressures of urban environments and regulations. Poaching game or illegally harvesting plants or timber may be common, --many inhabitants feeling that laws made by a distant government are inapplicable and that livelihoods are more important.

Related somewhat to the above is the situation where the mountains are zones of tension or conflict. One thinks here in part about illegal crops, moonshiners, bandits, and guerrillas that have often characterized these wilder landscapes (e.g. rebel groups in mountains worldwide, cocaine in Colombia, Maui wowie on Haleakolo, Hawai’i). Many revolutions have been born in the mountains (e.g. Cuba), and defeated rebels take refuge there. The Afghan mountains are arenas of sanctuary for tribal rebels and have been and are still the scene of armed conflict.

Mountain ranges are also often frontiers between states or nations, and as such have been and are today often the scene of international tension (e.g. Perú/Ecuador) or even warfare (e.g. Virunga Mountains or Kashmir border). On the other hand, they offer singular opportunities for the establishment of abutting border parks, peace parks and transborder cooperation in management which has myriads of ecological, economic and social/cultural benefits (Glacier-Waterton International Peace Park between US and Canada, Alpi Marittime-Mercantour Parks between Italy and France).

As previously mentioned, the highlands are outflow areas, --where physical mountain products (soil, fuelwood, timber, minerals, agricultural products, game, and non-wood forest products, move downslope
to the lowlands. They are also outflow areas for people, wherein young people and skilled persons also move out to the lowlands where opportunities seem better. This leaves a residual population in many mountain regions of older people, and of course women, who have always done much of the land management. There is a special challenge in development scenarios addressing women's key roles.

The impacts of long-distance transmission of air pollution are felt most in mountains. Acid rain, photochemical smog, and metal deposition from precipitation is seriously affecting fish, soil fauna, forests, and the resulting functioning of ecosystems in the industrialized countries; or downwind from major urban centers even in Third World countries. We experience this in the Northeast USA, with 40% of lovely Adirondack Mountains lakes having dead or affected aquatic life. In Canada’s Banff National Park, toxaphene levels 1000 times greater than in the lowlands has shown up in what were regarded as “pristine” mountain lakes. This is due to the phenomenon of “cold deposition” and occurs with many organochlorides. In Europe it is nowhere more severe than in the Giant Mountains of Czech Republic and Poland, where severe tree mortality and ecosystem damage has occurred. (Flousek, 1997)

Any global warming will have its most severe ecological impacts on the mountain flora and fauna of the altitudinal belts of habitat which will be shifted upwards in elevation to an increasingly smaller area. Mountain “islands” where there is not opportunity for longitudinal migration, will be most severely affected. Long mountain ranges, N-S will, however offer opportunity for species migration in response to temperature changes, and E-W ranges for precipitation change, if we can provide conservation corridors along them such as proposed in the Yellowstone to Yukon Conservation Corridor, or in the Andean Spectacled Bear Ecological Corridor in Venezuela, or the 5-nation Albertine Rift mountains in Eastern Africa.

Mountains, because their summits are the highest things around, are the target of increasingly ubiquitous communication installations. The proliferation of new radio and television stations and cellular phones is creating a skyline graffiti that urgently needs control. There are now over 75 mountain or hilltop transmitting sites in relatively unpopulous Vermont (where I live) and we are told to expect 200 new sites for cellular towers in the next decade; and nationwide there will be 118,000 cellular antenna sites (Vermont Natural Resources Council 1997). I will lift up mine eyes unto the hills, --and I will see telecommunication towers, rather than gaining inspiration. These things are coming to all countries.

Finally mountains do arouse a passion and loyalty in mountain men and women, and in local communities on or near mountains. This is true not only for the superb cloud piercers, but also for relatively low-elevation features. Those who have attempted to relegate the Scottish Highlands to something less than mountain status, or suggested that Australia really doesn't have any true mountains, have experienced some of this passion. This factor can be a real boon in marshalling local support, NGO or individual mountaineer commitment for sustainable mountain development. John Muir's passion for the Sierra Nevada was the basis of his drive to protect nature by establishing The Sierra Club, one of America's most effective conservation NGOs. In Italy, 300 members of the 900-member Parliament have designated themselves “Amici di la Montagna”.

For these and perhaps several other reasons, many mountain men and women feel mountains should achieve a focus for international political and non-governmental action, akin perhaps to tropical rainforests, coral reefs, deserts, and the like. This recognition has come finally in Agenda 21 out of the Earth Summit at Rio de Janeiro, with the global endorsement of Chapter 13. "Managing Fragile Ecosystems: Sustainable Mountain Development". A global Mountain Agenda is now gradually unfolding to implement this chapter. To be successful this process requires that there be broad public support for mountain conservation as a special area of concern. This is being fostered by the organization I represent, IUCN, the World Conservation Union. It is being fostered by a fine journal, Mountain Research and Development. It is being fostered by an electronic Network, The Mountain Forum. And now, 2002, has been declared International Year of Mountains. This has led to a host of conferences, workshops, celebrations, special climbs, and so forth. This Celebrating Mountains in the Australian Alps is another landmark, and it is a most worthy and significant event in the long march to get “Mountains” clear and compelling on the radar screen of the global political community and the laity everywhere. Congratulations!


The Natural Significance Of The Australian Alps

Professor Jamie B Kirkpatrick

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Abstract

The Australian Alps are outlier mountains in many ways. Unlike most mountains of the world, they are tectonically inactive and have been only weakly influenced by Quaternary glaciations. In consequence they sit solidly rounded, soil-mantled rather than constituted of crumbling rock and tearing ice. Their alpine areas are remote from all others in the world except for Tasmania and New Zealand, with which they share small proportions of species, and a few ecosystems. The tall alpine herbfields, heaths and short tussock grasslands characteristic of the Australian Alps have few analogues elsewhere in the world. Even the soils are unusual. Their highlight is the alpine humus soil: acid, organic rich and teeming with earth worms, formed on a mixture of weathered rock and loess. The dominance of the sparse-crowned eucalypts from the climatic treeline to coastal dunes, with their biodiverse understoreys of scleromorphic shrubs, grasses and graminoids, and their even more diverse fauna, rich in marsupials and moths, makes the Australian Alps even more globally unusual.

Introduction

The Australian Alps extend in serried blue undulations, garnished by only the occasional crag, cliff, gorge or crevice, from the Brindabella Mountains in the north to Mount Baw Baw in the south. In the east and south, they run relatively steeply into the sea only in East Gippsland, elsewhere dissipating in plateau or plain. To the west they drop into the great Australian plain, full of wheat, sheep and salt. Native ecosystems prevail throughout their length. In contrast to the western plains, the fragments are the human-modified areas, the ski villages and dams, the clearfell coupes and valley clearings.

It needs to be said at the outset that the descriptor ‘alps’ gives the wrong impression. The Australian Alps, despite a seasonal cover of snow, do not conform to the ‘alps’ image of crumbling crags and tearing ice. Their animals and plants are nonconformists as well. It is the thesis of the present paper that the significance of the Australian Alps lies in this very nonconformity, not in their relatively pathetic approximation of the ‘alp’ archetype.

The Concept Of Natural Significance

The concept of natural significance is now well-regulated, with international treaties, such as the World Heritage Convention, national legislation, such as the Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia) and State or Territory legislation, such as the National Parks and Wildlife Act 1974 (New South Wales), detailing or implying criteria for the assessment of the natural worth of areas.
The most important emphasis in these criteria is on the maintenance of particular elements of nature, whether they be biological communities, species, genotypes, land forms, soils or processes. This emphasis on maintaining natural variety arises from a well-founded fear that unregulated human activity might lead to the loss of many elements of nature. A balancing fear, that ‘the economy’ might be disrupted if all opportunities to destroy nature were regulated out of existence, has led to the development of the comprehensive, adequate and representative (CAR) approach to conserving the variety of nature. This approach, as epitomised in the Regional Forest Agreement process (RFA), seeks reservation and management regimes that ensure the future of all elements of natural variety, then leaves the rest of the landscape to the mercies of economic efficiency (Kirkpatrick 1998).

Using the CAR approach, the assessment of natural significance relates to the distance to, or beyond, adequacy. Thus, an endangered species has greater natural significance than a common species, and the remnant of a once widespread community has greater significance than an equivalent area of a widespread and still intact community. The CAR approach can be applied at a variety of scales: international, national, State, regional or local. Thus, an element of nature that is threatened in a local municipality, but common elsewhere, would have local, but not any other, significance.

The adequacy of reservation and management for the maintenance of particular elements of nature can be determined, to a reasonable degree of certainty, by scientific investigation. This is not the case for another class of natural values recognized in treaties and legislation, those related to social preference. How much wilderness is adequate? How much old growth forest is adequate? Which areas are naturally attractive? Which areas are so naturally attractive that they are worth keeping? Which areas are scientifically or culturally significant? What constitutes a superlative natural phenomenon? How much bush should we leave above the CAR minimum? Of course, the position that the variety of nature is worth keeping is a product of social preference, as much as the proportion of old growth people want to reserve at any time, but once it becomes part of social morality the minimum requirements are determinable. The targets for social preference natural values (SPNV) can only be determined through political processes.

Despite difficulties in determining thresholds, internal variation in the degree of significance of SPNV can be gauged. For example, quantitative techniques have been developed to measure wilderness values (Kirkpatrick and Haney 1980; Lesslie and Maslen 1995) and natural aesthetic values (Mendel and Kirkpatrick 1999). Old growth was considered to be more important for conservation in the RFA if it belonged to a forest community that had little surviving old growth (JANIS 1997). There is considerable scope for applying a CAR approach to SPNV. For example, it can be argued that there should be representation in world heritage areas of different types of natural landscapes that are regarded by different social and national groups as aesthetically outstanding.

A third type of natural values relate to the provision of ecosystem services for people. The production and regulation of water is the most critical of these services in an Australian context. Relative value can be measured in terms of the service provided. For example, even the most casual of computations shows that the cutting of old growth forests in catchment areas is economic lunacy.

The rest of this paper will attempt to identify those of the natural values of the Australian Alps that are significant at a global level. This account is partly based on an earlier analysis of the international significance of the Australian Alps (Kirkpatrick 1994), which, in turn, benefited from several other natural values assessments (Mosley 1988, 1992; Good 1989, 1992; Busby 1990; Boden 1991; Mosley and Costin 1992).

**A Globally Unusual Landscape**

Most mountain ranges in the world have risen where continental plates collide. The intraplate location of the Great Dividing Range of Australia (Bishop 1988), combined with an extremely narrow continental margin, makes it unique on a global scale. The Australian Alps contain most of the highest points in the Great Dividing Range.

The Australian Alps are one of a set of five temperate southern hemisphere mountain ranges that extend from sea level to at least the alpine zone. These mountains are largely highly disparate in their morphologies. Most New Zealand and Patagonian mountains are the product of plate collisions, and are almost unrelievedly precipitous, and well-carved by active glaciers. The Drakensberg of southern Africa...
is sandstone massive, famed for its cliffs and caves, and lacking spectacular glacial scenery. The Tasmanian mountains are strongly influenced in their morphologies by a massive dolerite sill, that intruded on the break up of Gondwana (Leaman 2002), and show substantial, and sometimes spectacular, evidence of Pleistocene glaciation. The Australian Alps are rounded soil mountains, having been subject to minimal glaciation and substantial Holocene donations of topsoil from the plains to the west (Johnston 2001). The closest morphological analogue to the Australian Alps in the northern hemisphere is the Appalachian Mountains. In the southern hemisphere, the Central Otago mountains are also delightfully rounded, and also have relatively deep soils.

The vegetable indumentum of the Australian Alps makes them even more distinct on a global basis. The trees that extend from sea level to the tree line are evergreen, with strangely open crowns, pastel leaves, and a remarkable ability to encourage, and benefit from, fire. They belong to the eucalypts, a diverse collection of species in a few closely-related genera, presently naturally confined to Australia and a few islands to the north (Williams and Woinarski 1997). It is only in parts of eastern Tasmania that eucalypts also run from the sea to the tree line, the Tasmanian alpine areas typically being surrounded by rainforest or sedgeland (Kirkpatrick 1997). Above the tree line, much of the vegetation is naturally dominated by large floriferous herbs or tussock grasses (McDougall 1982; Costin et al. 2000). This makes it distinct from Tasmania, where most alpine vegetation is dominated by shrubs or bolster plants (Kirkpatrick 1997). However, the subantarctic islands and New Zealand have physiognomically comparable vegetation (Wardle 1989).

Elsewhere in the world than New Zealand and Tasmania the alpine mountain vegetation is dramatically and consistently different from that of the Australian Alps. Elsewhere, where forest clothes mountain slopes, altitudinal zones are dominated by taxonomically and physiognomically different species. Elsewhere, in alpine vegetation, large herbs or tussock grasses can occur as dominants, but not both, with the typical northern hemisphere alpine vegetation types being herbaceous mats or sparse fellfield.

A Landscape Of Unusual Beauty

There is much steep country, sometimes juxtaposed to water, within the Australian Alps, but the natural aesthetic qualities that make it an exceptionally beautiful place for many people lie in the pastel pastiche of eucalypts, cypress pines, scleromorphic shrubs and tussock grasses that clothe gently undulating hills and flat-floored valleys, and the mosaic brightness of flowering daisies on the rounded slopes within the alpine plateaus; not in cliffs, lakes or torrents, which are in shorter supply and less extreme manifestation here than in most mountainous regions of the world.

Many of the invading Europeans found the typical Australian bush harsh and ugly (Taylor 1992). This is not the current perception of most inhabitants of Australia. The Heidelberg School first captured the beauty of the texture, mood and form of the dry eucalypt forest, an untidy, pastel beauty well divorced from that of the still much-admired emerald green rainforest. Rainforest is rare in the Australian Alps, which are mostly covered by the dry forest and woodland celebrated by the Heidelberg School. Variations in tree species dominance produce subtle changes in canopy colour melded into topography, while variations in the understorey substitute different sets of flowering grasses, herbs and shrubs, depending on moistness, soil type and disturbance history. In recently burned forest, delicate native orchids and lilies flower abundantly among blackened stems.

In the smaller part of the Australian Alps covered by herbfield and grassland there are outstanding wildflower displays in late spring and throughout summer (Costin et al 2000). Even before the peak of flowering there is a wondrous variation in foliage cover in the vegetation mosaics of the alpine country and limestone plains. There are even a few lower altitude valley grasslands where grey kangaroos emerge from the red heads of the dominant kangaroo grass. Such scenes were once common in much of south-eastern Australia, but are now rare (McDougall and Kirkpatrick 1994).

Kirkpatrick (1994) argued that the Australian Alps as a whole had outstanding universal significance for natural aesthetics in that they presented an ‘unique combination of gently rounded slopes, highly floriferous alpine vegetation and the pastel untidiness of the eucalypt forest’. The fact that this combination of qualities is not one that conforms with the Eurocentric romantic vision of mountains as places of steep, crumbling, icy grandeur should not detract from its international significance, given that
there is wide intercultural and intracultural variation in aesthetic perception (Dearden 1984). The presence of persistent snow is not a great selling point at the international level.

**An Important Place For The Conservation Of Biodiversity**

Australia is a megabiodiverse country, supporting, for example, almost one tenth of the vascular plant species in the world. Most species and communities that occur naturally in Australia occur nowhere else. Within Australia, the Alps represent a biotic extreme. At the species level, the Australian Alps have some minor biotic affinities with the New Zealand, and greater biotic affinities with the mountains of Tasmania. However, approximately 40% of the vascular plant taxa that occur in alpine vegetation in the Australian Alps do not occur in Tasmanian alpine vegetation (Kirkpatrick 1982), and the equivalent proportions of alpine plant communities (Kirkpatrick and Bridle 1999) and alpine invertebrates (Peter McQuillan, pers. comm.) are even higher.

The biological diversity of the Australian Alps is most outstanding at the community level. At a broad level of classification, over half of the vegetation forms and subforms of Beadle and Costin (1952) are found within their area. One hundred and seventy-seven plant communities are listed for the Australian Alps by Kirkpatrick (1994), most dominated by eucalypts. This compares favourably with the number of communities recorded in other biodiverse areas of Australia, such as western Tasmania (Kirkpatrick 1994). At the species level the Australian Alps probably have about 5% of the invertebrate and vascular plant species of Australia, being less diverse than the tropical and subtropical rainforests, and other areas of eucalypt-dominated communities, such as southwest western Australia, the Blue Mountains and southeastern Queensland. One third of the bird species of Australia occur in the region (Busby 1990).

The Main Range in Kosciuszko National Park has a high concentration of local endemic species (Good 1989; Costin et al. 2000; Kirkpatrick 2002). The Australian Alps as a whole are important for the conservation of threatened species, including two species of Burramyss, the only alpine obligate marsupial, and more than 60 vascular plant species, including the white alpine buttercup, Ranunculus anemoneus and a gentian, Gentiana bauerlenii, only known from Namadgi National Park.

**An Important Place For The Conservation Of Geodiversity**

The alpine humus soils of the high plateaus in the Australian Alps are the best manifestation of their type in the world (Costin 1989), supporting enormous earthworm populations (Costin 1989). Unlike elsewhere in the world, where they are largely restricted to carbonate rocks, alpine humus soils form on a variety of rock types in the Australian Alps, perhaps due to the influence of calcium-rich dust, constantly deposited after transportation from more arid areas to the west (Johnston 2001).

A suite of interesting fossil, and active, ‘periglacial’ landforms occur within the alpine and subalpine zones (e.g. Costin et al. 1967; Costin and Wimbush 1973). These have some international interest because they are high mountain features not related to permafrost.

The subalpine and montane limestone plains in the north of the region have some international scientific significance as a result of the work of Jennings, Spate and others (Spate and Household 1989).

**General Discussion**

Kirkpatrick (1994) scored six existing world heritage areas in Australia, and the Australian Alps, using natural criteria relevant to world heritage. The Australian Alps ranked third. If he had assessed the Australian Alps for integrity, they would have been far less successful. Ski villages, cattle grazing, dams and powerlines do not add to a case for natural international significance. Nevertheless, during the process that led to the world heritage listing of the Blue Mountains, IUCN sought a serial listing, based on the story of the eucalypts, in which the Australian Alps would have featured. Such a listing, at a national level, now seems likely under the provisions of the Environmental Protection and Biodiversity Conservation Act (1999) (Commonwealth of Australia).

Irrespective of any legal recognition of significance, the Australian Alps are very much worthy of celebration globally, and even more worth any care we can afford to take in their conservation.
management. Skiing, cattle-grazing and dam-building can take place in an enormous variety of locations on the surface of the globe, but there is only one Australian Alps.

References


Rocks are Rocks, Mountains are Mountains - 
Aboriginal Values of Mountains

Jason Ardler

Director, Cultural Heritage NSW NPWS

Introduction

I would like to acknowledge and pay my respects to the traditional owners of this land and thank the elders for inviting us into their country.

It is particularly appropriate that these celebrations are occurring in the Australian Alps. These mountains have enormous iconic significance for all Australians as the home of the man from snowy river; they have spectacular scenic values, immensely important natural values, are associated with historical events, industries and recreational pursuits and of course are of particular significance to the Aboriginal people whose ancestors shaped and have been a part of this country since time immemorial.

I am very pleased to have been invited to participate in these celebrations and talk about the Aboriginal values of mountains. It provides me with an opportunity to talk about a matter very near to my heart - the associations of Aboriginal people with country – which I would like to do in the context of current approaches to Aboriginal heritage management in NSW.

For 20 years, Aboriginal heritage management in NSW has almost completely been dominated by pre-contact archaeology, in the form of localised impact assessment studies. Apart from ignoring the non-archaeological and historical significance of Aboriginal heritage places, this approach provides few opportunities for decision making by Aboriginal people and is limited in terms of what it can tell us about Aboriginal history on a broader landscape scale.1

Recognising these concerns, much of the work now being done by the NPWS is focused on values other than archaeology. This is not to down play the contribution archaeology has made, and will continue to make, to Aboriginal heritage management, but to put more emphasis on the way Aboriginal people themselves value their heritage.

A New Approach

A new approach to Aboriginal heritage management is being developed, which respects the notion that Aboriginal knowledge and culture is both traditional and contemporary, and that the physical evidence, typically referred to as Aboriginal cultural heritage, requires the stories and traditions of people to give it context in the natural landscape.2

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1 Byrne, Brayshaw and Ireland 2001
2 Visions for the New Millenium Report 1998
It acknowledges the unbreakable ties between Aboriginal cultural heritage and nature, that Aboriginal people are the owners and interpreters of their heritage, and that this culture is inseparable from land and water.

NPWS defines cultural heritage in the following way:

*All landscapes have heritage values. Cultural heritage is the value people have given to items through their associations with those items.*

*Manifestations of cultural heritage values may be non-physical and/or physical and include, but are not limited to, cultural practices, knowledge, songs, stories, art, buildings, paths, and human remains. When natural elements of the landscape acquire meaning for a particular group, they may become cultural heritage. These may include landforms, flora, fauna and minerals.*

Consistent with this definition, the management of Aboriginal heritage both within and outside of the reserve system in NSW is guided by the following principles:

Lakescapes have been shaped by human use and associations and many people maintain their attachment to, and association with, these lands.

Lakescapes have a variety of heritage values, including natural and cultural heritage values, and these values need to be appropriately identified, assessed and managed.

Cultural heritage includes traditional, historical and contemporary associations of people with the landscape and activities related to the natural phenomena it supports as well as with particular items.

Associations or social significance of items is to be considered equally with scientific, historical and aesthetic significance in heritage assessments.

Aboriginal people have culturally specific associations with landscape. These associations may include custodial relationships with particular landscapes.

Communities are active participants in the identification, assessment, interpretation and management of their cultural heritage.

Social benefits flow to communities from participation in the management of their cultural heritage.

Information supplied by communities/individuals, regarding their cultural heritage values and associations, is owned by, and its use controlled by those communities/individuals.

Central to these principle is the notion of cultural identity and integrity.

Increasing attention is being given to the way Aboriginal people have maintained and adapted their cultural identity since European invasion. By working with Aboriginal people, we gain an understanding of the way “links with the land continue to be expressed through story, descent, occupation and use.”

Aboriginal heritage is made up of places, stories and knowledge which have as much value and relevance today as ever before. Continued use of wild resources for foods, medicines and materials, and aspirations for an active role in the management of protected areas, are testament to this.

Ian Brown from the Yarrawarra Aboriginal Corporation on the mid north coast of NSW puts it this way:

“Aboriginal people are part of the land, they don’t own land, the land actually owns them. We call the land our Mother...”

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3 NPWS Corporate Plan 2000/2003
4 NPWS Cultural Heritage Strategic Policy 2002
5 NPWS Cultural Heritage Strategic Policy 2002
6 English and Brown 2001

Celebrating Mountains – An International Year of Mountains Conference
Jindabyne, New South Wales, Australia
According to Ian, accessing traditional lands

"...is one way of getting back a bit of us, not just our heritage and culture, but we're getting back to ourselves and with our land our actual mother...our blood actually flows through the land. Every headland, every rocky outcrop, will be mystical or have a story to it." 7

This view challenges the common assumption that authentic cultural values have been lost in NSW.

**Back to the Future**

In many ways this new approach is like going back to the future.

For over a decade, from 1973, the NPWS and the Australian Institute of Aboriginal Studies undertook a sacred sites survey program in NSW. The survey team was led not by an archaeologist, but by Anthropologist Howard Creamer and Aboriginal Sites Officer, Ray Kelly, now a respected Dhungutti elder.

According to Uncle Ray, many non-Aboriginal people at the time were of the opinion there were no Aboriginal sacred sites in NSW and that any that did exist would not be significant to the Aboriginal people of the day.

The work of the survey team proved these views wrong. Many Aboriginal people, elders particularly, were concerned about the protection of their special places and agreed to share information about these and their associated stories and ceremonies.

This has since been the experience of others, including Scott Cane who notes that many sacred sites are “locations of worship, the abode of ancestors, a place of learning, a source of identity and community coherence. They are the store house of sacred materials and are valued in mythology, territoriality (sic), identity, cultural transmission, security, economy, reciprocity, politics and education. The sites are real, relevant and reinforcing. If these places had significance in the past, their stature has grown in the present.” 8

**Mountains are Mountains**

The Survey team recorded nearly 600 sites of spiritual or ceremonial significance to Aboriginal people across NSW, including many sites associated with mountains.

The Survey team found that, not only are the coastline and plains dotted with evidence of Aboriginal occupation, but that Aboriginal people moved across the landscape and into mountain areas for ceremonial purposes and to collect wild resources.

It is generally acknowledged that the Aboriginal significance of sites and places can only be determined by Aboriginal people. These values differ from community to community and even within communities, but when it comes to the significance that Aboriginal people place on mountains, there are many commonalities.

The Aboriginal significance of mountains can generally be defined through their:

- Link with traditional stories, belief and practices
- Use in the more recent past or present
- Importance to cultural identity 9

Mountains have always been the focal point of cultural landscapes. They often dominate a landscape and have importance for more than one cultural group. As such, mountains are often places where people gathered for ceremony.

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7 English and Brown 2001: 14
8 Cane 1990:59
9 Gay 2000
All over NSW mountains contain important and often secret ceremonial sites, to which access is restricted to the uninitiated.

Many older Aboriginal people can recall being told as children about the ceremonies that took place on mountains and how it was forbidden for them to go there without the permission of Elders.

The formation of mountains is usually linked to significant dreaming stories. The Anaiwan people of the NSW Northern Tablelands tell of two brothers who were always fighting over food, women and weapons. The brothers were eventually banished to the far ends of Anaiwan country and turned into mountains. The two brothers now protect their land and people.”

Mountains are often linked by family connections – One of the best known stories is that of the Three Sisters of the Blue Mountains, turned to stone by their witchdoctor father to save them from being harmed by an angry bunyip. However, in his own efforts to escape the bunyip, the witchdoctor lost his power and his daughters now stand silently on their mountain ledge, waiting to be brought back to life.

A further example is that of the 3 Brothers on the mid north coast. This story was told by Gumbaynggir elder Henry Buchanan during the Sacred Site Surveys:

There were three brothers who had...just gone through initiation and were required to live alone for several months before they could become recognised as fully initiated men in each of their separate stages of initiation. The three brothers had been in the bush for some months when they began to worry about their mother and father. The youngest [brother] volunteered to check on his mother and father... Just when he left their camp he saw an old witch arrive but he didn’t take any notice of her and when he arrived at his mother and father’s camp, he told them that he had seen the old lady near his brother’s camp so his father said to him “you must go quickly or this old lady will kill your two brothers and she will eat them.”

Just before he had left, his father gave him a special boomerang which he had just made, saying “here, this will keep you safe.” So the young boy set off to tell his brothers about the old witch. But when he got near to where his two brothers were camped, he saw the witch had already been there before him. He asked the old woman what she had done with his two brothers and she told him that she had eaten them and then said that she was going to eat him too. Before she had the chance to get him he hit her on the head with his father’s boomerang and split her in two. He then took one half of her body and buried it in the river and the other half he threw in the sea...so that the bad spirits of [the witch] cannot return to the earth again.

After he had done this he went back to his brother’s camp and gathered their bones and took them and buried them on North and Middle Brother mountains. Then he went to the South Brother and committed suicide. Several days later the father came looking for his three sons and when he couldn’t find them he heard a voice which told him they were buried on the Mountains. So he named the mountains after each one of his sons.

Legends such as these are an important means of transmitting intergenerational wisdom. They teach important life skills and provide a tangible link between people and the places they value.

The telling of these stories is a “creative act.” Each time a story is told it may be varied depending on which lessons the teller wants to emphasise. In this way, stories remain relevant and responsive to people’s need. There at least 2 recorded variations of the Three Brothers’ story.

Many mountains are gender specific. Gulaga (or Mt Dromedary) on the far south coast of NSW is a woman’s mountain and from certain view points resembles the shape of a reclining woman. There is an expression used by Yuin people that when the old woman puts on her possum skin cloak the rain will set in. That is, when the clouds cover the top of Gulaga, the rain will set in.
However, some parts of Gulaga are also accessible to men. Often in Aboriginal cultures, the west is associated with women and the east with men. Accordingly, Gulaga is divided into east and west - men’s access is along the eastern ridge, while the western side is the women’s side.

An important aspect of Aboriginal culture is the relationship between individual sites and the landscape within which they lie. That is, it may not only be the mountain that is significant but the sites and places that can be seen from the mountain. Alternatively mountains can provide a link between significant features or places, giving them a collective as well as an individual meaning. Only with an understanding of this wider context is it possible to assess true meaning.

This is true for the Australian Alps. Kosciuszko is the most famous of the peaks in the Alps. And yet, it is only one of many peaks with significance to Aboriginal people, which together form an important complex of initiation sites, trails and sacred places which are all related.

The cultural importance of Kosciuszko is therefore embedded in a much wider range of country than the peak itself.

When it comes to the Aboriginal significance of a mountain, size definitely does not matter. Pigeon House Mountain was so named by Captain Cook because of the way he perceived its distinctive shape and the way it dominates its immediate surroundings.

However, Yuin people view Pigeon House from a different perspective. We call it Bulgaan. The mountain’s significance is associated with its resemblance to a woman’s breast, and also its proximity to a traditional trading route between the coast and tablelands.

Although only rising to a humble 720m above sea level, Bulgaan is one of the most spectacular natural landmarks in NSW and of immense significance to Yuin people.

The use and maintenance of sacred mountains has always ensured the protection and well-being of people and country. However, this has been substantially disrupted since European settlement.

Harry Creamer recorded Dick Donnelly in 1981 saying:

[Traditional knowledge] must be given to you up on a mountain, nobody got a mountain now. They said now well we can’t go anymore, we can’t go up on to that mountain now to school our young people what to do, because the white man won’t have it. That time it was a free country. Got to be a secret place, quiet place up there.

To Yuin people Mumbulla Mountain is Biamanga, a sacred place associated with the initiation of young men.

In Yuin legend, the landscape of the Dreamtime was featureless until superhuman beings formed headlands, lakes, rivers and mountains. These ancestors of current Yuin people had great power and young people had to be shown how to maintain good relations with them.

The arrival of Europeans, to whom the importance of sacred Yuin places was invisible, prevented them being visited. They took gold from Gulaga in the 1890’s and logged Biamanga. However these places continued to be respected and kept alive by the old people.

In 1978 Guboo Ted Thomas led the Wallaga Lake Aboriginal community in a campaign to stop logging on Biamanga and protect the sacred sites associated with it.

It was six months before logging was halted and the claims of the Yuin community investigated. To most people in the non-Aboriginal community there was nothing special about Mumbulla Mountain – as far as they could see “rocks are rocks, mountains are mountains.”
But, according to Guboo Ted Thomas:

“These are sacred matters which must be kept quiet....These are our laws which come to us from the mountain. We only talk about these things when we are forced to do so in order to protect our sacred places.”

Many claimed that this secret sacredness was invented and the then Minister for Conservation was reported as having said there would need to be more evidence than just someone “knocking two sticks together and chanting” to justify the claim.

But, in 1979 a report by Brian Egloff came out in support of the Yuin people’s claims. As a result, 7,508 hectares of forest around Mumbulla Mountain was declared Biamanga Aboriginal place under the National Parks and Wildlife Act 1974.13

Later, Biamanga Aboriginal Place became part of Biamanga National Park. In 1996, as part of the Eden Forest Agreement, Biamanga was listed on Schedule 14 of the National Parks and Wildlife Act. Part 4A of the Act provides for lands so listed to be vested in a Local Aboriginal Land Council on behalf of their traditional owners. These lands are then leased back to NPWS and managed by a Board of Management comprising a majority of Aboriginal owners. Unfortunately Uncle Ted is no longer here to see the end of the fight for Biamanga that he started nearly 25 years ago.

It is significant that of the seven protected areas currently listed on Schedule 14 to be returned to their Aboriginal owners, four are associated with culturally significant mountains. These are Biamanga NP, Gulaga NP, Mount Grenfell Historic Site (near Cobar) and Mount Yarrowyck NR (near Armidale).

Places may be declared Aboriginal places under s84 of the NPW Act that are or were of special significance with respect to Aboriginal culture. Aboriginal places may or may not contain physical evidence of Aboriginal occupation. What is important is that significance is determined by Aboriginal people and places that do not contain physical evidence can be afforded the protection of the NPW Act.

Over the past three years, NPWS has been revisiting the work of the Sacred Sites Survey team of the 1970’s, with a view to completing the investigation of places nominated for declaration as Aboriginal places.

Not surprisingly, many of the places nominated were mountains. Also, not surprisingly, given that NPWS now manages over 6.5% of NSW, many of the places nominated have since been incorporated into protected areas.

Despite this fact, many Aboriginal communities have determined that their original nominations should continue to be pursued. As a result Aboriginal places have recently been declared over a number of culturally significant mountains within protected areas.

In these cases, declaration of an Aboriginal place is not so much about protection, but recognition of the cultural significance of a landscape reserved primarily for its nature conservation values.

This is also a call from Aboriginal people for active participation in decision-making with respect to their special places within protected areas.

Elders are traditionally recognised in Aboriginal society as having the right to determine access to sites in their area. They also have the right to speak on and determine questions of use in relation to those sites.

The declaration of an Aboriginal place within the Gibraltar Range National Park has prompted Aboriginal Elders in the Glen Innes area to commence negotiations with the NPWS to prevent access to their sacred site. The Elders have asked that the site not be promoted to park visitors, that signs be removed and a walking track in the vicinity of the site be closed. NPWS has been challenged with finding a solution which respects the Aboriginal significance of the area, while retaining a popular park visitor experience.
Although keen to have their sacred mountains protected and recognised as Aboriginal places, many Aboriginal people do not want their location or the details of their significance generally known.

Many believe that the best protection for significant sites is to keep them secret. As we have seen in the case of Biamanga, it is often only when these sites are in immediate danger that people are prepared to talk about how significant they are.

Others would prefer to let significant sites and information about them be destroyed than compromise their obligations to protect them by giving information to people who shouldn’t have it.\(^\text{14}\)

Of course many mountains have significance beyond their Aboriginal values. Many are regional icons, most have significant natural heritage values and are associated with recreational activities ranging from bushwalking to abseiling and even snow skiing.

Unfortunately, these values sometimes compete with and are detrimental to Aboriginal values. An obvious example of this is Mt Warning, known to local Bundjalung people as Wollumbin – meaning cloud maker.

Mount Warning is also associated with the European “discovery” of Australia, being named by Captain Cook as a visible landmark to warn mariners of the Point Danger reefs near the mouth of the Tweed River.

In the mid-1800’s, forestry in the region provided one of Australia’s earliest export industries and, in the 1890’s, prompted one of the earliest forest preservation campaigns and arguably the beginning of the modern conservation movement. Parts of the current Mount Warning national park were reserved for recreation and conservation purposes in 1928.\(^\text{15}\)

To the Bundjalung people, Wollumbin is a revered warrior who overlooks the entire Tweed valley. Wollumbin holds great cultural significance for all Bundjalung people from Yamba in the south to Brisbane in the North.

Mount Warning is of course, also the first place on the Australian mainland to be touched by the morning sun. Largely for this reason, its summit receives 100,000 visits a year.

NPWS previously supported visitation of Mount Warning, maintaining its walking tracks and installing a viewing platform on its summit. By the end of the last century, Mount Warning had become so popular as a destination to view the sunrise on New Year’s Day, that a ballot had to be conducted to restrict visitor numbers.

In 1999, local Bundjalung people sought an injunction to prevent year 2000 New Year celebrations taking place on Wollumbin, claiming that these activities were disrespectful of their cultural beliefs and were having an unacceptable impact on their sacred mountain.

Although their efforts were unsuccessful, a direct consequence of this action has been that the NPWS now more fully understands and recognises the significance of Wollumbin to the Bundjalung people and has committed to cooperative management of the mountain with the Aboriginal community. This has involved the establishment of an Aboriginal management committee for the area.

As I said earlier, Aboriginal heritage values are not restricted to the pre contact era. Mountains are also associated with events of great historical importance to Aboriginal people, not all of which are cause for celebration.

\(^\text{14}\) Rich 1989
\(^\text{15}\) NPWS 2002
Massacres of Aboriginal people are known to have occurred on mountains. This is because massacre sites are often associated with the camp sites at which their victims sleep or gather. Camp sites are likewise associated with ceremonial life and in the early days of invasion ceremonial gatherings left Aboriginal people particularly vulnerable to massacre.

In 1835, for instance, Aboriginal men, women and children were trapped on the edge of a large cliff in the Barrington Tops area by white settlers and either leapt to their death, or were thrown over the cliff edge, depending on which report of the incident you accept. This site is of great significance to Worimi people today and, although protected as part of Mt Mackensie Nature Reserve, is currently the subject of an Aboriginal place nomination.

In the century following invasion, mountain country was also a refuge for Aboriginal people escaping European violence. In 1842, a letter to the editor of the Sydney Morning Herald recounted the retreat of Baryugil people of the mid-Clarence area.

“Since the hostile encounters with the blacks which took place upon this river about a year ago... they have rarely shown themselves, but have kept among the mountains, and avoided all intercourse, always making off as fast as possible if accidently seen...”

More recently, at the time of the Darwin bombings, during the second world war, some Biripi people moved on to Middle Brother Mountain in fear of a Japanese invasion.

Aboriginal people’s knowledge of country and ability on horse-back were critical to the development of pastoralism in NSW. Aboriginal people were very skilful at mustering stock through mountainous terrain, often utilising traditional pathways.

For Aboriginal people today, mountains are no less significant than they were to their grand parents and great grandparents. Mountains are still important in defining connections to country and providing a community’s sense of purpose and belonging. Parrots Nest, located just south of Lismore, is one such place for Widjabal Bundjalung people. The protective qualities of the site are said to have been of great support to the Widjabal through their years of struggle against the loss of their lands, enabling them to retain their strength and sense of pride in the fight to retain independence, freedom and dignity.

Because of their prominence in the landscape, mountains are at the centre of territorial organisation and spirituality for Aboriginal people. They often form a natural border between neighbouring countries and give a distinct identity to people to whom they are important.

An Aboriginal person’s “country” is literally their place of origin, culturally and spiritually. It encompasses all the places, stories and cultural obligations with which people are associated.

Mountains are integral to country and culture. And for me, their significance is really summed up by Biripi elder Pat Preece speaking of the Three Brothers:

\textit{It brings me back to my Aboriginality. Everything my race has stood for. I stand in the shadow of them... Just to think how long they have stood there and my people lived in the shadows of those mountains. They fished, they hunted, they gathered and wherever they looked, wherever they were camping with a campfire of a night, they’d get great comfort from those places. And that’s what sticks in my memory today and its held men in good stead for many years knowing there’s something there like that.}\footnote{Gay 2000: 40}

Thank you.

\begin{footnotes}
\item[16] Riebe 2000
\item[17] Gay 2000
\item[18] Harrison (in prep)
\item[19] NPWS 2000
\item[20] Swain 1993: 2
\item[21] Gay 2000: 40
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The Cultural Significance Of Australian Alpine Areas

Jane Lennon

Australian Heritage Commissioner and Heritage Consultant

Here where red dust rose
To raddle sheep and men
And the kelpie tongued at noon,
Silence has come again.
The great-boled gumtrees bow
Beneath their load of snow.

The drover and his dray
Have gone; and on this hill
I find myself alone
And time standing still.
Printless the white road lies
Before my quiet skis.

But where my skis trace
Their transient snow furrow,
For generations both
Man and beast will follow.
Now in this winter passage
I cross the deserted stage.

These lines from David Campbell’s poem, “Winter Stock Route”, conjure up images of the falling snow blotting out the evidence of human use and activities in the high country. Is this a metaphor for how we see cultural values in the Alps—recognised, then forgotten, buried or overlain?

The cultural values of our alpine environments are a specialised type and many of these values are of national significance. These values may be seen in items/places, and physical features, but can also be associated with intangible qualities such as people's associations with or feelings for an item or in other items such as cultural practices, knowledge songs and stories.

This paper presents a summary of existing knowledge about cultural values in the Australian Alps, including Tasmania. It outlines historic themes applicable to the cultural heritage of the Alps including World Heritage themes and concludes that the cultural values of the Australian Alps are potentially of international significance by applying the concept of cultural landscapes to them. The mountains of Australia are of cultural significance.
**Existing knowledge about cultural values in the Australian Alps and Tasmania**

The databases for cultural heritage places in the alpine national parks give some indication of site types, but the collection and analysis is not comparable between agencies. Cultural values derive from types of places/items and these can be organised by themes to allow for comparison. Nevertheless, pastoral sites, mining and pathways/routes predominate. It is well known that many of these pathways were based on prehistoric routes used by Aboriginal people in their seasonal occupation of the alpine country (Grinbergs, 1993; Cubit and Russell, 1999).

Some zones of extensive historical activities, such as gold mining, have been identified. Cultural landscape zones have not been formally delineated even though management guidelines have been prepared for them and some areas are obvious, such as Currango and Kiandra in Kosciuszko National Park, Orroral Valley in Namadgi National Park, the suite of Historic Areas gazetted in Victoria and areas like Cradle valley, Macquarie Harbour and the Upper Mersey valley in Tasmania.

The lack of data about Aboriginal occupation and use of the alpine areas hinders building a picture of continuity and extent of previous use over the last 40,000 years and particularly over the last 200 years, although the 2000 study by Young and Mundy is a step toward addressing this for Kosciuszko.

The following table summarises identified cultural heritage site/place data in 1999 by each agency involved in the alpine national parks, although historical place data has not been included yet for Mt Buffalo, the newest reserve added to the MOU area.

<table>
<thead>
<tr>
<th>Agency</th>
<th>Aboriginal place</th>
<th>Historic place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victoria</td>
<td>342</td>
<td>150</td>
</tr>
<tr>
<td>NSW</td>
<td>460</td>
<td>1440</td>
</tr>
<tr>
<td>ACT</td>
<td>158</td>
<td>375</td>
</tr>
<tr>
<td>Tasmania -WHA</td>
<td>746</td>
<td>400</td>
</tr>
<tr>
<td>C’wlth –RNE*</td>
<td>12</td>
<td>109</td>
</tr>
<tr>
<td>Total</td>
<td>1718</td>
<td>2474</td>
</tr>
</tbody>
</table>

* Note – RNE places are also identified in State/Territory listings

**Historic themes and assessment of significance**

There are several schemes setting out the main historic themes for the Alps as a way of grouping places with similar cultural values. The themes used for the 1991 Jindabyne Symposium on the Cultural Heritage of the Australian Alps (Scougall 1991) were:

- Aboriginal occupation and interaction with the environment prior to European contact
- Exploration and survey
- Pastoralism
- Mining
- Logging and silviculture
- Water harvesting
- Recreation and tourism
- Communication and transport
- Conservation and park management

These have been revised in the recent review of the cultural values of Kosciuszko National Park (Sullivan and Lennon, 2002), and new data and research undertaken since 1991 has been incorporated. The 1991 themes headed Exploration and Survey, and Transport and Communication, have been subsumed into other themes such as Pastoralism, or run right through all the themes, and the Aboriginal theme has been expanded.
In addition, assessments of cultural values have moved to a wider contextual consideration, in which the overarching value of all heritage items is their value to society and other attributes such as aesthetic, scientific or historic value, are seen as subsets of this general social value (Byrne, Brayshaw and Ireland, 2001).

The significance of some items and landscapes arise out of more than one theme. One outstanding example of this relates to the group of Kosciuszko Huts built for pastoral workers use then used by miners, scientists, engineers, tourists, artists and bushwalkers, while another example is the continued association of related communities to the Park, because of their part in its history and their associated customs, knowledge and attachment to the mountains.

For the long awaited new Commonwealth heritage legislation, the Australian Heritage Commission has suggested the following thematic groups to assist in selecting places of national significance:

- An Ancient Country
- An Island of Natural Diversity
- Peopling the Land
- Understanding and Shaping the Land
- Building a Nation
- Living as Australians.

All of these themes apply to items, sites, places in the Australian Alps. The thematic frameworks also assist in allocating levels of significance to places/items.

**Cultural significance of the Australian Alps**

The Alpine region... Constitutes nearly 0.3% of the area of this time-worn continent, only one-fiftieth of whose surface rises above thousand metres. Because of this unique topographic phenomena among the continents, and because both human responses to environmental challenges and the nature of social and technological activities in mountainous terrain are distinctive, it is essential to treasure evidence relating to Australia's alpine cultural heritage. And not only for its scarcity value, or for its representativeness of unique living conditions and achievements, but even for its individuality rather than its typicality (Mulvaney, in Scougall, 1992: 9).

The natural setting and environment of Kosciuszko has influenced its cultural heritage. It has the highest altitude in Australia, a large percentage of land above the snowline, characteristic alpine vegetation and fauna, rugged terrain, bountiful natural resources, and a severe and unpredictable climate.

The climate, remoteness and difficulty of access influenced Aboriginal and European occupation. Specific building and working adaptations, and seasonal use of the high country, characterised European use of the area. Topography had a great influence on movement through the area. The natural resources-Bogong moths and uplands food resources, pasturage, gold and other minerals, timber, water, and indeed snow and scenery have created a series of waves of settlers and transient users who have combined to give the Alps in general and Kosciuszko in particular a rich heritage. These attributes of occupation also apply in part to the Tasmanian high country.

**Aboriginal values:**

Aboriginal occupation in the Tasmanian Wilderness dates from 36,000 years ago currently and 21,000 years in the Alps. The Kosciuszko high country was the traditional gathering place for the Bogong moth festival, one of the most important Aboriginal cultural and social events in south-eastern Australia. Because of the importance of the festival, the ethnographic evidence, the continuing Aboriginal tradition about this event, the sites, routes and physical remains of the activities associated with it are of scientific, historic and social value at a state and possibly a national level.
The new evidence for increased Aboriginal use of the alpine country, as well as being significant to Aboriginal people provides important information for all people interested in the story of human adaptation to this ancient landscape. The traditional European emphasis on scientific (archaeological) research and on the role of men in Aboriginal society has left a legacy of biased recording and analysis of Aboriginal cultural heritage which has yet to be redressed. This has led to misunderstanding and downplaying of some aspects of Aboriginal culture in the Park and an emphasis on places at the expense of landscapes. Aboriginal people and Aboriginal landscapes tend to be invisible to many Australians, and in particular contemporary Aboriginal connections in South Eastern Australia often go unrecognised or in some instances are actively denied. This situation constitutes a threat to the cultural significance of the Aboriginal heritage in alpine areas.

**Pastoral values:**

Pastoralists used prior Aboriginal land use patterns and every explorer and squatter of note in the alpine district was assisted by at least one Aboriginal guide (Lennon, 1992:145). By the early 1850s most of the Australian Alps had been nominally occupied by pastoralists though the severe winters of the high country checked permanent occupation and grazing there (Lennon, 1999: 42).

The pastoral theme, as it is expressed in the Alps represents a unique high country variation of a way of life and a period of economic and social development which is of **historic significance at a national level**. The huts, homesteads, transhumance routes and associated remains constitute physical evidence of pastoral life which is only found at these altitudes. They also represent the way of life of pastoral workers, a theme not well demonstrated elsewhere except for the Upper Mersey valley in Tasmania.

Currango is of **national historic significance** being the largest and most intact example of pastoral settlement above the snowline in Australia with 25 remaining buildings and ruins spanning 150 years of European occupancy (NSW National Parks and Wildlife Service, 1993:6).

The physical setting of the pastoral history has been used for more than a century by famous Australian artists to create works of literature and art which are nationally celebrated and which form part of the national psyche. The pastoral theme as expressed in the Alps is of **national aesthetic significance**.

The pastoral theme as expressed in Australia's highest mountains has strong **social value**, demonstrated in the very active continuation of and celebration of its traditions and the respect for its physical remains including its pastoral landscapes, wild horses, and stock routes. The Man from Snowy River is known in many households around Australia. In this sense the **social value of the theme is of national importance**.

The most celebrated wild horses in the Australian pastoral tradition are those associated with Kosciuszko, which have to some extent become a national icon, along with their riders and musterers, as demonstrated in literature, film and the Man from Snowy River sequence which opened the 2000 Olympic Games in Sydney. On the other hand the damage done, and management problems created by horses in the high country is very considerable and is considered by many people to be in direct conflict with other more significant conservation values. This is an area in which there is a clear potential for a conflict of cultural and natural values which will require careful management.

The darker side of the pastoral theme was also played out in the Alps- pastoralism contributed to the disappearance of the viable and uniquely adapted Aboriginal hunter-gatherer lifestyle in the Alps, the decline in Aboriginal population and the abandonment of many traditional places.

Much of the alpine landscape has been affected by this pastoral phase in our national development and it presents continuing evidence of this era in impressive and appealing cultural landscapes, vegetation change, a changed fire regime, the presence of wild horses and other introduced species and distinctive erosion patterns. Much of this evidence constitutes damage to the pre-European environment left by the Aborigines, but it also has significant historic and scientific value.
Mining values:
Mining rushes of the 1850s and 60's had a major impact on the Alps, not so much because of the actual area mined, but because of the intensity of the operations. Mining brought large numbers of people into the Alps at a time when they were sparsely settled or unexplored, and provided considerable impetus to regional industries and the development of fledgling towns of the region.

In particular the remains of the Kiandra gold field, being the most extensive and successful Australian gold field at this altitude demonstrate national historic significance which is most readily interpreted in the Kiandra landscape rather than at individual sites. That is, it is outstanding and unparalleled in its combination of a range of mining associated cultural features within an alpine natural environment. It also had one of the largest Chinese camps in the nineteenth century. (LRGM Services, 2002: 53).

Logging and forestry values:
Logging and timber processing is a theme of national importance in developing regional economies and the logging of alpine and mountain ash forests required understanding of the snowy climate and regeneration requirements for sustaining the industry. Timber production was of regional importance in supplying building materials for the miners at the Kiandra gold rush and then for huts and later chalet buildings in the Park.

The Alpine Creek sawmill sites are of State significance as they represent a range of techniques to process mountain ash timber from water wheel through to steam and diesel power. It has been argued that pining in Tasmania—the extraction of Huon Pine from the earliest convict occupation of the south west until the 1950s—was of national significance (Lennon, 2002).

Water harvesting:
Water harvesting is an extremely important historic theme of national historic and social significance in Kosciuszko National Park. The Snowy Mountains Scheme (1949-74), a large part of which is within Kosciuszko National Park, is the largest engineering scheme ever undertaken in Australia. It operated for a quarter of a century and directly recruited 60,000 Europeans; it has national significance as an engineering feat, as a symbol of Australian achievement, and a basis for Australia's postwar multicultural society.

The scheme had a deep and lasting impact on those who worked on it and is appropriately remembered by them and their descendants. Socially, the impact of many foreign male workers had a big effect on the life of the regional towns and their social mores.

Scientific research, conservation and park management values:
The history and achievement of Alpine science is also part of cultural heritage even though the historians of Australia have frequently neglected science in their narratives.

Before 1940, most science in the Alps was incidental, unrepeated and descriptive. It was the science of exploration conducted mostly by individuals. Since 1940, much science in the Alps has been experimental, problem-oriented and sustained over repeated visits. It has often been institutional in derivation (Griffiths and Robin, 1994). The nineteenth century botanical investigations of Von Mueller and Maiden were of international interest as were the geological studies of Edgeworth David, the anthropological work of A.W. Howitt and the meteorological studies of Clement Wragge (Lennon, 1999:54).

Vegetation analysis studies shaped the way the soil conservation agencies of Victoria and New South Wales undertook their work. Costin's work on the Snowy catchment and the Fawcett studies on the Hume and Kiewa catchments also became benchmarks of Australian alpine ecology (Griffiths and Robin, 1994:13). The first attempts at reclamation and revegetation were undertaken in 1959 in the Mt Carruthers to Mt Kosciuszko area and have proved successful. Monitoring sites to measure stone movement on Mt Twynam, karst processes at Cooleman Plain and Yarrangobilly Caves, and treeline dynamics in Thredbo Valley are also sites of outstanding cultural significance associated with scientific research (Lennon, 1999)
As the largest and probably highest profile Park in Australia at the time of its establishment, Kosciuszko has also played an important role in the evolution and development of the profession of Park manager, and of the discipline of Park management generally.

Concentration on nature conservation has had its costs. Certainly the removal of stock from the high country had been well demonstrated to be an ecological necessity, but there was initially insufficient recognition of the loss of way of life, and treasured traditions and a breaking of strong emotional ties, which resulted from the cessation of grazing in the high country (Read, 1996).

In the same way early zeal to restore a "pristine" environment initially ignored the long Aboriginal heritage of the Park, and also led to the destruction or damaging neglect of valuable historic heritage fabric, most notoriously at Kiandra. This in turn has led to protest, lobbying and research by heritage conservationists, and a gradual revision of policies and procedures to protect cultural heritage. The challenge which remains however is the integration of the management on the ground of the natural and cultural values of Kosciuszko.

Recreation values:
Kiandra, at the time of the gold rush was the birthplace of Australian skiing, first noted as a recreational pursuit in 1861, and by 1898 recreation had become an important aspect of the public value in Kosciuszko and in this year, the first complaints of damage to the high country by grazing were made by Helms who complained that it interfered with "the artist and tourist who seek the picturesque " (Gare, in Scougall, 1992: 320).

Mount Kosciuszko itself in its alpine setting as Australia's highest mountain has national significance as a symbol, a source of inspiration, and a recreational attraction for visitors.

The Kosciuszko Huts, now a major recreational asset, represent a diverse history of transient land use in the Park and are important historical markers of different, often overlapping land use but do not necessarily reflect a balance of these phases, since most extant huts date from the 1920s to the 1950s. A characteristic of the huts is their continual adaptation - from grazing, to mining, from Snowy Mountains Scheme construction to grazing, or from any of these to shelter for skiers, walkers and researchers today – and as a group the complex of huts, ruins and huts sites have national historic and social significance.

As we can see from the foregoing, it is knowledge of associations with places which has become an important attribute of cultural values. While many of these cultural values may be of national significance, very few have outstanding universal, the requirement for World Heritage listing.

World Heritage significance of the Australian Alps

In 1994 the World Heritage Committee adopted a Global Strategy which advocated thematic studies as a means of obtaining a more representative World Heritage List. They also recognised that traditional cultures with their depth, complexity and diverse relationships with their environment were hardly represented at all.

The Australian response was developing a methodology and examples of the seven themes for use in identifying “outstanding universal value” in forested areas as part of the studies concerned with Regional Forest Agreements. The following cultural themes have been used in assessments by the Australian and World Heritage division of Environment Australia subsequent to the RFA studies:

iv. Theme: Traditional human settlement and land use
   Sub-theme: Complex persistence of hunting-and-gathering society on a single continent

v. Theme: Artistic expression
   Sub-theme: Rock art

vi. Theme: Religious expression
   Sub-theme: Dreaming sites

vii. Theme: European expansion of the eighteenth and nineteenth centuries
   Sub-theme: Forced migration – a major way in which the expansion took place
   Sub-theme: Land barriers as historical themes
   Sub-theme: Integration of a continent into global economy.
In applying the Australian Thematic Methodology for World Heritage Assessment to cultural values expressed in the Australian Alps, Lennon (1999: 36-63) identified the following new sub-themes given the historical evidence in a universal context and identified places which express these values:

- New sub-theme: Continuity of a seasonal land use pattern
- New sub-theme: Transhumance
- New sub-theme: Utilizing alpine resources
- New sub-theme: Scientific research in alpine areas.

These sub-themes were accepted by the Alps Liaison Committee. They were also used in an update of cultural values in the Tasmanian Wilderness World Heritage Area (Lennon, 2002).

The cultural landscape category was introduced into World Heritage nominations in 1992 as a means of integrating the natural and cultural attributes of places where there was a long history of human interaction with the landscape. Parts of the Alps can be regarded as cultural landscapes under the various categories—designed, relict, evolving and associative. The area is criss-crossed by networks of trails and tracks from various periods of use—by Aboriginal, pastoral, mining, recreation users. There are layers of physical heritage and there is the intangible heritage of stories, songs and music, poetry and art works. The patterns of human occupation, the pathways and nodes of activity and waves of settlement, have left layers of evidence in the landscape. Meanings associated with this evidence, and with the lost or destroyed evidence, is a key ingredient for interpretation in alpine landscapes. However, whether these cultural landscapes have the time depth to illustrate outstanding universal value through a hundred generation long interaction of humans with their landscape is a debatable point. For this continent only those landscapes with a long human interaction can be considered for World Heritage listing, and these will therefore be the associative cultural landscapes of a hunter-gatherer society as with the already inscribed Uluru landscape.

The cultural themes relating to the Alps can also apply in part to other mountains in Australia ranging from Uluru and Purnululu, to the Wet Tropic mountains and the Scenic Rim on the NSW-Queensland border.

At the World Heritage level, sacred mountains have been the subject of recent recognition and study. (See report of UNESCO expert meeting on Asia-Pacific Sacred Mountains, September 2001, Japan). Since the beginning of time, most of the world’s peoples have regarded mountain-tops and forests as places of mystery and spiritual elevation where gods and spirits dwell. Generally speaking, there is little or no material evidence for such places. Thus a sacred site may be purely symbolic with all kinds of remarkable natural features such as stones, cliffs, mountains, forests, waterfalls, lakes and rivers being regarded as of marked religious or spiritual significance. Such places are generally used for religious, meditative, contemplative or even commemorative purposes. Even today mountains are the object of religious and cultural pilgrimages all over the world.

Some cultural values of Australian alpine areas have international value, and in some cases, outstanding universal value as defined in the World Heritage Convention. These values have to be assessed as a regional expression of the World Heritage Committee’s global strategy and as Australia is a continent, we have a case for considering our alpine cultural values in this context. The fact that the Australian Alps are an unusual exemplar of intraplate mountain ranges has resulted in a different character—of rounded ‘soil mountains’, of extensive areas of subalpine treeless vegetation or ‘parks’ unusual on a world scale and prolific in the Australian Alps, of diverse structural types in the alpine eucalypt forests, of international superlative summer wildflower displays Kirkpatrick (1994:58-60). Kirkpatrick also considers the area to be of exceptional natural beauty and similar arguments relevant to the TWWHA were outlined in the RFA Aesthetic Values Study (Young and Lennon, 1996).

There is a case for considering nomination of the Australian alpine park reserves for World Heritage listing and for renomination of existing World Heritage properties such as Tasmanian Wilderness and the Wet Tropics to recognise their outstanding universal cultural values using the following World Heritage criteria:
**Criterion 24 (a) (v)** – be an outstanding example of a traditional human settlement or land-use which is representative of a culture (or cultures), especially when it has become vulnerable under the impact of irreversible change

The Australian Alps offer an outstanding example of traditional hunter-gatherer use which was representative of that use over 21,000 years and which has become vulnerable under the impact of irreversible change, whereby the direct descendants of these people now live in a modern rural or town society. The current archaeological record of human occupation in the Australian Alps suggests a pattern of links of hunting and gathering societies to the seasonal use of the alpine areas from 21,000 years ago in the cold climate of the Late Pleistocene through the warmer period of the mid-Holocene until the middle of the nineteenth century. The archaeological record illustrates a more intensive seasonal use of the high country from about 4,500 years ago when summer food resources like Bogong moths were available. Therefore it is suggested that in the Australian Alps, above the tree line, the continuity of human seasonal movement is possibly the longest and most ancient practised.

The TWHA also offers an outstanding example of traditional hunter-gatherer use from 36,000 years. It is most likely the oldest highland occupation of any extreme climate mountain lands in the world by any Aboriginal peoples and this would confirm its significance as having outstanding universal value as a continuous human pattern of seasonal use. The newly recorded archaeological sites of the Holocene occupation of both the southwest coast and the Central Plateau extend the already acknowledged outstanding universal value of the distribution and pattern of Aboriginal occupation in the TWHA from the Pleistocene occupation caves. And more particularly since rising sea levels separated Tasmania from the mainland about 12,000 years ago, Tasmanian Aboriginal culture has survived one of the longest known periods of geographic and cultural isolation affecting a society. Archaeological surveys since the 1982 nomination have revealed occupation sites along the coastlines, at the mouths of the retreating glaciers in the Central Highlands, along pathways linking plain and mountains.

The seasonal use of resources determining movement by people to and from coasts or high country and the use of fire are cultural practices of exceptionally long duration and from the last Ice Age. They bear witness to cultural continuity as expressed in the archaeological and habitat evidence in the evolving landscape and to the interaction of humans in maintaining the resource base in that landscape over time and through climate change with its consequent adaptations.

**Criterion 39 (ii)** - ...organically evolved landscape. This results from an initial social, economic, administrative, and/or religious imperative and has developed its present form by association with and in response to its natural environment. Such landscapes reflect that process of evolution in their form and component features. They fall into two categories:

- a relict (or fossil) landscape is one in which an evolutionary process came to an end at some time in the past, either abruptly or over a period. Its significant distinguishing features are, however, still visible in material form.
- a continuing landscape is one which retains an active social role in contemporary society closely associated with the traditional way of life, and in which the evolutionary process is still in progress. At the same time it exhibits significant material evidence of its evolution over time.

Within the TWHA there are areas that could be categorized as **relict cultural landscapes** and these relate especially to European land use practices which have now ceased. The uniquely Tasmanian interaction of humans to the natural resource resulted in these distinctive landscapes:

a. The pining landscapes of the Gordon-Macquarie Harbour –Raglan Range which illustrate the range of techniques used in this resource exploitation from the convict era of the early 1800s to the 1940s;

b. The hunting and snaring landscapes of montane grasslands on the Central Plateau, although it could be argued that they also illustrate both transference of European ecological knowledge and European adaptation to Aboriginal seasonal exploitation of native fauna through the re-introduction of traditional Aboriginal burning practices to the north western montane grasslands.

However, these landscapes probably do not have the time depth of the interaction to be considered.
Fire has been the agent maintaining a complex distribution of disclimax vegetation within the TWWHA, especially the button grass plains/sedgeland which comprise 53% of the vegetation in the TWWHA (Jackson, 1999:3). Fire not only produces a successional mosaic but causes extinction of communities and this level of displacement appears to demand a time span of human-induced fire sufficiently long enough to affect soil fertility. The palaeontological record in Tasmania shows a twofold increase in open vegetation relative to closed forest during the Last Glacial cycle. Eucalypt forest increased relative to rainforest, and charcoal increased relative to woody vegetation, and these changes occurred through a variety of climates (Jackson, 1999:1). Human use of fire was the agent. However, the role of fire in maintaining cultural landscapes, especially of the button grass plains, is currently contested.

The most recent studies indicate that the noticeable increase in fire activity about 40,000 years ago when there was no major climate change, is considered to most likely indicate Aboriginal burning. This accelerated existing trends rather than creating a wholesale landscape change but it is difficult to separate the effects of climate and human-induced burning subsequently until the European era (Kershaw et al, 2002:3).

The role of fire, albeit at different levels of intensity and distribution, in encouraging the environmental conditions for transhumance – the summer use of high country grasslands for stock grazing – has also led to a continuity of use, of the seasonal fire lighting ritual, in the same places for millennia and now continued from Aboriginal action, through European pastoralists and hunters, to public land and park managers.

As a continuing landscape, the alpine high country is subject to summer seasonal visitation by bush walkers and tourists seeking recreation and spiritual ‘food.’ There is some comparison with the seasonal movement in summer of Aborigines who visited there possibly for 21,000 years, and for at least the last 4500 years, for their Bogong moth festivals and associated rituals. This seasonal movement to the high country is a cultural continuity.

**Criterion 39 (iii)** – associative cultural landscapes. The inclusion of such landscapes on the World Heritage List is justifiable by virtue of the powerful religious, artistic or cultural associations of the natural element rather than material cultural evidence, which may be insignificant or even absent.

Even without documenting the Aboriginal spiritual associations with the alpine high country, there is still abundant evidence on which to further develop the case for associative cultural landscape listing based on the inspirational nature of Australian alpine landscapes due to their superlative natural phenomena and exceptional natural beauty both of which are realized in cultural values. There is a clear case with this criterion for reconsidering cultural values as part of the World Heritage listing.

Wilderness appreciation has now become an associative cultural value for many Australians, yet ironically it implies a disassociation of a minority from their cultural connection to an ancient land and a denial of previous uses which have also left traces of physical evidence in the wilderness. Park management objectives create a wilderness by removing previous evidence and allowing access only to certain places and along designated routes. But the visible signs are only one of the ways in which culture is written on the landscape. Many communities maintain their attachments to areas through photographs and story telling, through festivals and through visits by those who love the bush. They maintain an ‘associative cultural landscape.’

For Aborigines the whole of the land is a cultural landscape and this belief could be sustained in a case for it as an **associative cultural landscape** in accordance with World Heritage criterion 39 (iii) and cultural criterion vi. The beauty of the ‘superlative natural phenomena’ of Australian alpine areas also contributes to this categorization.

It would be interesting to see whether the World Heritage Committee would accept national attachment to the land as an associative cultural value–part of our identity as a people living on this continent down under –or whether it is only interested in relating this value to antiquity as in the 1982 acceptance of the Pleistocene occupation of the caves in SW Tasmania.

**Conclusion**
Despite the extensive identification and assessment of cultural values in Australian mountains and alpine areas and official listing of some cultural values on heritage registers, cultural heritage still has little legitimacy in heritage conservation in the mountains. It is still concerned with ‘dots on the map’ – the recording of mostly archaeological sites, or some restoration of historic fabric. It is time for managers to weave the evidence of long term historical processes into their management planning: to consider climate change, fire histories, and impacts of previous occupation. These provide baseline data from which to measure change and provide frameworks in which to deliberate on the likely impacts of current interventions proposed in the landscape.

Mountains are seen as natural areas – often great green reserves protected through legislation for all times. Yet they too are dynamic and the concept of cultural landscapes is a useful tool to apply in managing the various values, layered in these landscapes and their tangible and intangible expressions. Pathways of meaning await those willing to look at the cultural values in our mountains.

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Co-operative Management of the Australian Alps National Parks: Past, Present and Future

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The past

Human beings create all kinds of boundaries. There are the boundaries between nation states. Within nation states, boundaries exist between different levels of government or jurisdiction, especially within federal nations. Within any one jurisdiction, there are the boundaries between different agencies or areas of administration. In many respects, they are essential in terms of orderly government, but they also create problems. Such agencies usually have narrow and compartmentalised views and mandates that bring both benefits and costs. Another problem is the lack of coincidence between human and natural boundaries. Few of the former bear any relationship to natural resources and ecosystems that span boundaries both within and between jurisdictions. If the natural world is to be managed effectively, new attitudes to these boundaries are required. In the words of the Brundtland report: “The real world of interlocked economic and ecological systems will not change: the policies and institutions concerned must” (WCED 1987: 9).

Parts of the Australian Alps are located in the Australian Capital Territory (ACT), New South Wales (NSW), and Victoria. Within each jurisdiction, there are the boundaries between different areas of government administration; in New South Wales and Victoria, there are local governments. None of these human imposed boundaries coincide with the natural boundaries in the Australian Alps, least of all what demarcates the Alps. The Australian Alps provide a classic illustration of the need to overcome boundaries in the interests of the natural environment (Crabb 2003).

Concern for the natural environment was central to early proposals for reserves in the Alps, some of which were for trans-border parks. In 1938, Myles Dunphy and the NSW National Parks and Primitive Areas Council proposed the Snowy-Indi Primitive Area, covering some 4,000 km² in NSW and Victoria, revising the proposal in 1943. In 1969, the Australian Conservation Foundation (ACF) raised “the desirability of creating a national park in the fullest sense of the word incorporating areas in the Australian Capital Territory, New South Wales and Victoria. This would have the advantage of providing a uniform management policy, and control, and a joint program for matters which affect areas in both States such as the creation of a long distance walking trail, proposed years ago” (ACF 1969, 10). Some years later, in 1973, Gough Whitlam, in his ALP policy speech, stated that a Labor Government would “work in co-operation with the New South Wales and Victoria Governments for a national park in the Australian Alps” (quoted in Mosley 1992).

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1 This paper is a summary of part of a larger analytical history of the co-operative management of the Australian Alps national parks currently being undertaken. The study is supported by the Australian Alps Liaison Committee and the Centre for Resource and Environmental Studies, Australian National University.
By the 1940s, a number of small reserves had been established in the Victorian and NSW High Country as well as the large Kosciusko State Park. Kosciusko was the most significant development in many ways, only some of which can be touched on here. It was along its border with Victoria and in adjacent areas that the early trans-boundary co-operative measures took place. They were small-scale, informal, and ‘on-the-ground’ in every respect. Bushfire prevention management was of a more formal nature, through the Hume-Snowy Bushfire Prevention Scheme established in 1950 and the Border Fire Liaison Committee.

But by the 1970s, far-sighted individuals were looking beyond their immediate concerns and the confines of their agencies. They wanted ‘to do things better’, and knew that they could. Membership of the informal ‘Kosciusko group’ included Alec Costin, Neville Gare, Roger Good and Bruce Leaver. These people, from NSWNPWS, CSIRO and the recently established Australian National Parks and Wildlife Service (ANPWS), were initially concerned with Kosciuszko, but they were united in their concern for the High Country as a whole. South of the border, Ian Weir of the Victorian Parks Service was receptive to their views. There was support beyond government bureaucracies, not least from the ACF. Support was found at the political level, such as from Terry Sheahan and Bob Carr in NSW and Rod Mackenzie and Joan Kirner in Victoria. It was one of those occasions when the right people came together at the right time, with a concern about the one place, the Australian Alps.

The work of these and other people led to the first formal gathering of Australian Alps parks’ staff at Howmans Gap, near Falls Creek, in October, 1985. Funded by the ANPWS (which was trying to find an accepted place for itself in Australian protected area management) and hosted by Victoria (desperately seeking to establish an Alpine National Park), the meeting brought together policy-makers, planners and managers from the four parks services “to discuss strategies and priorities for co-operative planning and management for national parks and other protected areas in the Australian Alps” (Davies 1986, 1). Large numbers of issues were identified in which the parks agencies could co-operate in the management of the Alps. The discussions produced ‘A Framework for Co-operation’ that gained senior bureaucratic and political support. A start had been made.

The present

Out of the ‘Framework’ came the ‘Memorandum of Understanding in Relation to the Co-operative Management of the Australian Alps National Parks’ (MOU), signed by the governments of Victoria, New South Wales, and the Commonwealth (on its own behalf and that of the ACT). Its purpose was ‘To pursue the growth and enhancement of inter-governmental co-operative management to protect the nationally important values of the Australian Alps national parks’. The MOU did not alter any existing management responsibilities, but was essentially a mechanism for the agencies to continue doing what they were doing, but doing them better and in a coordinated way. It set out the objectives and the working arrangements to achieve them.

The MOU is an evolving document and has been revised on three occasions, with a further revision in preparation. The 1989 revision was essentially to accommodate the granting of self-government in the ACT, making the Territory a signatory in its own right, and the creation of Victoria’s Alpine National Park. The document was signed during a Great Alpine Trek from Canberra to Licola, where the Victorian signing coincided with the proclamation of the Alpine National Park. The 1996 revision made a number of administrative changes, strengthened the nature of the requirements for cooperative management and working arrangements, and added the new NSW Brindabella National Park, extending the protected areas covered by the agreement to the northern limits of the Alps. The 1996 revision also dropped the requirement for a more formal legal agreement to replace the MOU, which up until 1992 had been seen as a temporary measure. The 1998 revision, signed at the centenary celebrations of the Australian Alps first park, Mt Buffalo National Park, contained some important changes. There was a new vision statement, Clause 2.5:

“The vision of the Australian Alps co-operative program is of participating Agencies working in partnership to achieve excellence in conservation management and sustainable use through an active program of cross border co-operation”.

The full story is much more detailed and only fragments can be mentioned here. Also, research has yet to unearth everything and all of those who were involved.

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The concept of ‘alpine’ was extended to include the sub-alpine environments. Perhaps of most importance, the requirement for parks and reserves covered by the agreement to be contiguous was removed and replaced by one of inclusion on a biogeographical basis. This moved the concern of the program from a number of discrete units to the entire Australian Alps. A further revision is in progress. It has been agreed that the ACT’s Tidbinbilla Nature Reserve will be added to the program and there has been discussion about including Victoria’s Baw Baw National Park. The latter would take in the most southerly parts of the Alps, but some areas of significance outside existing protected areas are still not included.

The administrative structure of the Alps program is a simple one (Figure 1). The Ministers meet occasionally and the Heads of Agencies usually once a year. The Australian Alps Liaison Committee (AALC) is the one forum set out in the MOU. Its task is ‘to co-ordinate the development and implementation of co-operative work programs and other arrangements under [the] Memorandum of Understanding’, in essence the cooperative management of the Alps national parks. The Committee, comprising a senior officer from each agency, has responsibility for implementing the projects and outcomes of the cooperative management program within the Australian Alps national parks and for the involvement of staff in the program. Being senior officers, they can make decisions on behalf of their agencies, which is essential for the operation of the Committee and the program. The Committee met for the first time on September 11, 1986, in Wodonga, the members being Neville Gare, Roger Good, Ian Weir and Andy Turner.

![Diagram of Australian Alps Cooperative Management Structure](image-url)
Meeting about four times a year, membership has changed significantly over those years, yet in spite of the changes and the “often different perspectives on park management priorities, there [has been] a strong degree of agreement and consistency in the decision-making of the AALC” (Byrne 1996).

The early 1990s saw important developments for the operation of the program. Of critical importance was the creation of the position of Program Coordinator, the only person employed by the program on a full-time basis. It is unlikely that the program could function without this position, which is filled by secondment from one of the agencies, generally on a rotational basis. Among the person’s responsibilities are managing the program and budget; advising the AALC and agency staff on the program; drafting policies and procedures; and maximizing communication about the program. There is also a part-time Community Projects Officer who is responsible for media releases, managing the Australian Alps web site, and maintaining the profile of the program in the wider community. The implementation of the program is largely undertaking by the working groups, the number and subject areas having varied over the years. At the present time there are four, concerned with Natural Heritage (NHWG), Cultural Heritage (CHWG), Recreation and Tourism (RTWG), and Community Relations (CRWG).

Their work is undertaken in accord with a three-year Strategic Plan, the first of which was introduced in the early 1990s. The purpose of the Plans is to guide the future work of the program and address the major issues in co-operative management of the Alps national parks. The Plan identifies the main areas of work in terms of Key Result Areas (KRA), together with the outcomes, strategic actions and performance measures for each KRA. Four of the KRAs accord with the working groups, Natural Heritage Conservation, Cultural Heritage Conservation, Recreation and Tourism Management, and Community Awareness. The other two are the Australian Alps Development Program and Management Expertise. For each year, there is an annual works program, with the projects designed to meet the objectives of the Strategic Plan.

The works programs and activities of the AALC, including the Program Coordinator and Community Projects Officer, are paid for from a central fund contributed to by the parties to the agreement. Until the end of the 2000-01 financial year, the contributions were $120,000 each from the Commonwealth, New South Wales and Victoria, and $40,000 from the ACT, making a total of $400,000, a budget described as “extremely modest” by an independent review of the program in 1997 (AACM 1997, 31). In spite of the fact that the budget is so small and yet so critical to the integrity of the program, the Commonwealth announced in 2000 that it would end its financial contribution. It was a poor decision for which no clear reason has been given.

As will be indicated, the program is not without its weaknesses, some significant, but it has produced major positive results, for the national parks and other protected areas and those involved in their management. As an external review concluded, the management of the Australian Alps national parks is better with the program than without it (AACM 1997, iv; see also Mackay 1996). So, what can be said to justify such a conclusion?

Many of the papers in these proceedings are concerned with the activities and achievements of the Alps program in the areas of Natural and Cultural Heritage Conservation, Recreation and Tourism Management, and Community Awareness. There is no need to detail them here. But these areas cover only four of the Strategic Plan’s six KRAs. For the fifth KRA, constantly developing the effectiveness and operations of the program is an on-going activity. The program has done much to raise the level of Management Expertise, the sixth KRA, through such activities as the annual field workshops and specialist courses. One of the most interesting aspects of cooperative management has been the facilitation of cross-border law enforcement. In spite of such very tangible achievements, perhaps of most value have been the intangibles, the day-to-day activities and on-ground work, networking, learning from others, peer support, things that are so hard to value in dollar terms but which are so valuable.

What are some of the weaknesses? The regular comments from interviews with people involved with the Alps program have been the lack of time and resources, the inevitable conflict with the agencies’ tasks, and the lack of commitment to the program and recognition of the work undertaken by the agencies. In many respects, the program operates like a voluntary organization, with all the associated pluses and

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3 Further details can be found in the Annual Reports of the AALC and the newsletter, News from the Alps, which is published three times a year.
minuses. There has been a lack of implementation by the parks of work undertaken, both in terms of research outcomes and strategies that have been developed. In part at least, this is often due to a lack of clear connection between projects undertaken and park management requirements. This raises the question, among others, as to what contribution the program has been able to make to the park management reviews currently in progress. From the outset, sound research was seen as the essential basis of the program, but there is clearly a conflict between ‘pure’ research and research that is of value to on-the-ground park management. There are continuing issues in particular parks, such as livestock grazing in Victoria, which have implications for the Alps as a whole. Some major cross-border issues have still to be really tackled, such as wild horses and dogs. Given the significance of such issues, the program should be able to take them beyond the level of individual parks to the national level, where they are perhaps more appropriately addressed. There is a continuing lack of involvement in the program by groups outside the park agencies, such as the Victorian Alpine Resorts Coordinating Council and managers of lands adjacent to the parks. There is continuing lack of community involvement, in spite of the requirements of the MOU. Having made these points, it has to be acknowledged that there are problems of widening involvement and/or membership given the statutory responsibilities of the parks agencies.

The future

The achievements of the MOU are considerable, bringing national and international recognition, the IUCN regarding the Alps program as ‘the most advanced operating border park now in existence’.

What of the future? There have been a number of occasions on which the program has made major steps forward, as in the early 1990s and with the 1998 revision of the MOU. Interviews conducted over recent months suggest that the program may currently be on something of a ‘plateau’ and in need of some re-invigoration. In this context, three issues are relevant, though they can be mentioned only briefly.

Firstly, although the MOU is written only in terms of the ‘national significance’ of the Australian Alps, much effort has been expended in establishing their international significance and endeavouring to achieve international recognition. For example, major reviews covering the international significance of the natural and cultural values of the Alps have been prepared for the AALC (Kirkpatrick 1994; Lennon 1999). Secondly, there is the future role of the Commonwealth, not only because of the withdrawal of its funding, but also in the light of the new Commonwealth heritage legislation and the assuming of Commonwealth involvement in the cooperative program by the heritage section in Environment Australia. Thirdly, there is the Victorian-proposed concept of ‘one park’ or ‘one plan’. Whilst nothing is really impossible, ‘one park’ is unlikely, for a whole range of legal, constitutional and political reasons. ‘One plan’ is much more achievable. At present, significant cooperation is taking place with the reviews of the management plans for Kosciuszko and Namadgi National Parks, to be followed by that for the Alpine National Park. Such cooperation is a significant positive outcome, but it could go much further. The next step from these three revisions could be one plan for all the Australian Alps national parks, with sub-sections for each individual park.

‘One plan’ and/or ‘one park’ will take time, but it is a worthwhile goal, whatever the obstacles. But, going back to the beginning, when the pioneers of cooperative management were told they would get nowhere with their ideas, ‘one park’ may well have been the ultimate objective of ‘trying to do things better’.
References


Day One – Mountains Of Meaning
Mountain Motivations - The High Andes And Other Endeavours

Serge Domicelj, Em. Prof.

This paper follows a personal life-long interest in mountains, which materialised in climbs and walks on several mountain ranges but, particularly, in the Andes. It is written in this vein.

Introduction

This brief paper has two parts. The first, analyses the mountain environment of the Inca empire, mostly in the Atacama desert of Argentina. The second, records some early motivations of climbers and explorers for exploring mountains, world-wide from the mid-XIX C to the mid-XX C.

Specifically, it explores the life experiences of climbers and their resulting perceptions, which lead to particular meanings for them. These may be the product of intense emotions, derived from the sheer presence of mountains or from the cultural perspective of the observers, be they mystics, climbers or adventurers. The difference between ‘being’ and ‘doing’ the mountains is telling and the paper analyses motivation as a central theme. Furthermore, the socially-constructed meaning of space (Lefebvre, 1991) will be briefly applied to the case of sixteenth century Inca perceptions and use of space in the high Andes, in the Atacama Desert of Argentina, as well as in other cases.

Significant in this evaluation is the cultural interpretation of mountain spaces and their territorial and temporal continuity - and the impressions made upon climbers and mountain visitors. How are the inherent qualities of mountains best understood and apprehended, by which form of involvement and movement? The ultimate purpose of this analysis is to uphold mountains of meaning, by recognising their intrinsic value as icons and resources and so promoting ethical behaviour in users of mountain environments. Collective recognition, by like-minded mountain spirits, should strengthen progressive geo-political policies for the use of upland resources and cultural visitation - the themes of the other two sections of this Conference.

A Conceptual Framework

An introductory framework may help the analysis of the different motivations for activities in mountain environments. Mountains can be variously seen as alluring magnets, as playgrounds for enterprise or as channels of communication. Religious or spiritual meanings have been attributed to prominent mountains for centuries, notable examples being Mt. Fuji in Japan and Mt. Kailash in Nepal. Such peaks engender on-going pilgrimages whether formal or informal, thereby consolidating meaning and safe-guarding cultural practices associated with the mountain. A different but no less powerful attraction, that of climbing to the summit has engendered a separate meaning, based on singular, topographical prominence, measured by comparative statistics whether on height, latitude or geo-physical configuration. Examples are Everest, Aconcagua and Kosciuszko. However, the outcomes of such popularity have been at times devastating, as portrayed in Simpson’s records of the collective attempts to climb Everest during the 1990s. This affects meaning.
In contemporary times, during the XIX and XX centuries, mountains have been seen by Westerners as the playgrounds of enterprise and competition, with motivations ranging from pioneering exploration to sport and recreation, scientific work and commercial exploitation. These have often combined in multi-purpose pursuits, such as frequent European initiatives to spear-head seemingly heroic ventures to other continents, driven by the combined aims of experimental science, the testing of physical endurance and geopolitics. Amongst local populations, such foreign enterprises have promoted either indifference or strong reaction; at times, adhering to the visitors’ aims, albeit in a less intense form, increasing over time. Examples abound, with competitive sporting aims prevailing in British and German groups attempting the ascent of high Andean peaks during the 1890s-1900s while, in more recent decades, the mountains of Borneo have become the scene of commercial exchange in which mountain resources are denuded and geographic conflicts exacerbated. In many such cases, events may have altered the original meaning of mountains and affected their image.

Finally, over centuries, mountains have been communication channels, acting as trade routes, transportation spines or mere convenient territorial linkages between centres of activity. In this function they resemble other recognised cultural routes, such as the extensive Silk route across Central Asia. Examples of mountain channels are routes over passes in Northern India and on to Tibet or those followed by smugglers across the Andes. Mountains, symbolised as ridges, plateaux or passes, often acquire precise meanings, ranging from routes of convenience, to viewing platforms or mystical journeys.

A. The Inca Empire’s Mountain Settlements

The Inca Empire, during the XV and XVI centuries, extended over a vast mountainous area, which on today’s geopolitical map extends over the Andes from Colombia to the north to Chile in the south, across some 3000 kms. From its high-altitude capital Cuzco, located at 3,300mts, a strict socio-political and religious system dominated distant indigenous communities. Communications took place through a road system in which two broadly parallel main paths ran along mountainous valleys and ridges, one along the uplands, one near the coast. Their purpose was the enacting ceremonies and rituals and the engagement in commercial exchanges with regional communities. A system of military posts, religious buildings, housing complexes and cattle enclosures dotted the semi-settled area, extending dominant practices into distant peripheral jurisdictions.

Ian Farrington (1992), scholar of Inca archaeology, analyses the symbology of the Inca settlements, stating: “A state such as the Inca, had the opportunity to impose at a broader scale its own perceptions of a ritual landscape which justify and legitimate its own gods, history, social order and authority. It was empowered to transform that landscape by moving people around within it and, indeed, by moving around the land itself in the form of terraces, river and spring modifications, and rock carvings to create the required benign settings for legends to be told and rituals enacted, that the well-being of the empire might thus be preserved”… He added “validation of Inca rule came about through acceptance and performance of commonly understood myths and ceremony” (in Stehberg, 2002).

The Empire had most expert builders and craftsmen who used stone for their finest structures, while potters and metalworkers excelled in the creation of artworks, regal and domestic objects. The Incas established a sophisticated, hierarchical social system, that worshiped mountains as the embodiment of their gods. Through an advanced service infrastructure, and with llamas as carriers of goods, they developed a support system that enabled priests to reach extraordinary altitudes on the highest peaks of the Andes. People, usually young children or adolescents were sacrificed there and buried in deep graves, which became sacred offerings to the mountain gods. Fine objects were ritually buried in the graves.

Inca Sanctuaries In The Atacama Desert

The Puna de Atacama plateau is a vast scree desert, located in the NW Argentine Andes, with a base altitude of some 3,000mts and peaks rising well above 6,000mts. During the XVI century it was part of the southern end of the Inca Empire and included the highest peaks of the continental Andes mountain range - Aconcagua, Ojos del Salado and Llullaillaco, with altitudes from 7,000 to 6,700mts. The region has attracted European expeditions since the last decade of the XIX Century, in which the ascent of peaks and scientific observations were the aims. From 1956 to 1965, the eminent Austrian mountaineer Mathias Rebbitsch carried out four expeditions to the Atacama desert, to climb remote peaks and search for remains of Inca settlement at high altitude. I participated in three of these expeditions (Joan Domicelj participated in 1965), during which remains of settlement, wood and pots were found on several summits over
The existence of many high peaks and the distinct geo-morphological configuration of the region of Atacama increasingly attracted scientists and climbers during the late decades of the XX Century. In 1999, an archaeological expedition was carried out to Llullaillaco by the North-American anthropologist Johan Reinhard, assisted by the Argentine archaeologist Constanza Ceruti. After a thorough search, on the mountain summit at 6,715mts, the group excavated a sacred burial complex in which three mummified bodies were buried. Besides these graves and the ruins below the summit, remains of walls, a cemetery and enclosures for llamas were found at the base and route towards the volcano. The surveys indicated a network of permanent and temporary settlements, staged and equipped for major movements of people, animals and goods, directed towards the mountain.

**Inca And Contemporary Meanings**

Following the earlier discovery of several other mummies on prominent mountains of Argentina and Chile, the above findings have confirmed the existence of an extended network of ritual sites and burial grounds, a veritable ‘sacred geography’ (Stehberg, 2002). Rebitsch, Reinhard and Ceruti, together with other Argentine and Chilean climbers and scientists, have pioneered the field of high-altitude archaeology, which has given new evidence on the religious practices of the Incas and of the central role of high mountains as the subject of veneration and the offering of life itself, the ultimate, meaningful ritual. Stehberg (2002), while studying other Inca complexes has noted that “Andean men and women perceived that certain places were more important than others”, due to special morphological characteristics coupled with strategic functional factors. These were apparent in the case of Llullaillaco, in both the upper and lower mountain, in which settlements nestled in mountain cavities but also climaxed in platforms with total summit exposure. Pertinent places in cosmological Inca space, each with a particular significance.

Lefebvre (1996) has observed that the production of space, and its transformation over time, requires (a) purpose, (b) process, (c) outcome and, (d) meaning. The seemingly natural and empty space of the Atacama desert, on the evidence available, follows these steps. Its purpose, of satisfying deep religious needs, has been met; the process of production, in using resources and skilled inputs, appears fulfilled; the outcome, measured by the nature and scale of usage is like-wise complete. Finally, the meaning is clear and powerful, from the recent discoveries but also from extensive prior studies of Inca culture and mountain life. The Atacama space, with its many conical volcanoes rising above the upland desert, many with evidence of human presence, has proved to be a ‘spiritual bowl’. The abstract form of its natural space has in a sense given way to a superimposed cultural reality, replete with meaning.

Religious meanings continue to this day, often mixed with Christian beliefs, yet still expressed in ritual ceremonies performed at high altitudes - although not summits. Intricate paths have become folkways of tradition along Andean uplands, also responding to the exigencies of modern life. As for the mountaineers of the Atacama ranges, Ceruti (2000) has noted that, in spite of having no formal archaeological training, they have proved to be respectful of the findings, through spiritual beliefs and understanding. She emphasises the current development of a ‘mystical archaeology’ on mountains, reflecting, no doubt, the prior Inca belief system in a contemporary fashion. Though in modified form, spiritual interpretation of the meaning of mountains continues to evolve in the former territories of the Incas.

**B. A Historical Review Of Motivation Towards Mountains**

The Inca beliefs in the sacred nature of mountains need to be canvassed within a referential framework of diverse motivations, including the spiritual and practical factors. The purposes of action and contemplation differ, leading either to precise acts or to a more indefinite, experiential presence in the mountains. Popular accounts exalt the ‘attack’ or ‘assault’ on mountains or, their ‘ascent’, thus ranging from militarism to spirituality. Emphasis may be laid on the ‘mountain’, or just on the ‘peak’, the first comprehensive, the second singular. A recent review of the collection of Himalayan Journals at the India International Centre, in Delhi, gave me the opportunity to study its rare book collection, which covers the history of contemporary mountaineering, starting in the early XIX Century. The 545 items in the collection have an understandable Western bias, not without a dose of British, Alpine Club enterprise. Motivations for accessing mountains have varied widely over time and with changing cultural
circumstances. The seven selected references provide an insight into their diversity over some 100 years, from 1829 to 1935. The authors are Swiss, British and Austrian and they record climbs and explorations in their own countries, in Argentina and widely across Europe.

Motivations Mid-1800s: Social Enterprise
Two publications, from Switzerland and Britain respectively, portray quite different perspectives on how mountain environments were affecting the national identity: inclusive and preoccupied with class considerations - the former (Latrobe, 1829), outward-looking and exploration seeking the latter (Kennedy, 1862). Latrobe, in a telling title of ‘Swiss scenery and manners’ shows concern over the effects travellers have ‘upon the morals of the peasantry’, describes the isolated life of young herdsmen and hunters in the valleys, partly as a backdrop for the mountain journeys of ‘pedestrian travellers’. There is, however, a common feature in the alpenstock, the ‘long-iron spiked pole’, viewed ‘not as an unfitting symbol of the pursuits of travellers’. Swiss mountains thus influence the social configuration of the national society.

Kennedy, considers the configuration of mountains themselves in his book entitled ‘peaks, passes and glaciers’ and reviews excursions by members of the British Alpine Club in various European countries. His keen interest lies in detailed description of routes and of instruments for measuring heights and distances and he encourages the geographical explorations of areas beyond Britain. There was then already a preoccupation with the features of mountainous terrains and the technological means to be deployed in overcoming difficulties. In addition, there was early interest in the variety of mountain environments, from Scandinavia to the Pyrenees, in which mountains appear as the structuring element in the geography of exploration.

Motivations 1900: Global Enterprise
Two references at the turn of the XX Century portray the adventurous nature of British mountain enterprises. Two prominent British mountaineers, Fitzgerald and Conway, became keen recorders of their climbing adventures in the central Andes of Argentina, as leaders of two separate expeditions. Fitzgerald (1899), in his book ‘the highest Andes’, records the first ascent of Aconcagua, and his own climb. His aim was scientific and his expedition gathered rocks and fossils. A further account details the visits to the area, decades earlier, of noted scientists Charles Darwin and the German Paul Gussfeldt, the latter also an expert mountaineer. He analyses the effects of the local ‘puna’, or mountain sickness, and the difficulties of the ascent to the summit. Conway’s book (1902) records extended climbing, travel and exploration on Aconcagua and in Tierra del Fuego. He also records the first climb of Aconcagua and his own ascent, in great detail, describing the logistical and physical difficulties.

There are commonalities between the two accounts. Both Fitzgerald and Conway were expert climbers on European terrains, but found the high Andes to be a completely different environment. Higher, more isolated and with support of a different cultural nature, these early climbs of Aconcagua became painful exercises in rarefied air. (Having climbed to the summit of Aconcagua myself in 1952, I felt sympathy for these early explorers, equipped in different terms). Organisationally, the British party had Swiss guides and Italian porters, complemented by local guides who best knew the area. These were grand enterprises to foreign mountains, facing new challenges. Though their aims were comprehensive, to reach the summit of the highest mountain in the Americas was clearly of priority and the competitive spirit was high. It was also an early international test for British mountaineering. In this context, the popular meaning of mountains, as in the case of international Himalayan expeditions over subsequent decades, became both exalted and blurred.

Motivations 1935: Romance And Mechanisation
Two further references, during the early decades of the XX C, review both the spiritual depth and the technology of mountaineering and its powerful evolution. Irving’s book (1935) is a magnificent history of its evolution, both in philosophical and operational terms. “The Romance of Mountaineering” is the ‘story of the great heritage of adventure and enjoyment’, open to all climbers. He gives the word romance two interpretations, as the story of adventure and ‘of the relationship of mountain to man’, to be experienced in freedom and without mountain guides, in the world-wide playground. He denounced the ‘obsession with new routes’, the ‘mechanisation’ of mountaineering and the pursuit of ‘danger as a cult’. He also questioned the use of oxygen, which he felt was experiential isolation.

Furthermore, Irving strongly stated that ‘mountaineering is not public entertainment’, and that the ‘responsibility for encouraging the highest climbing is an honourable burden’. While remarking from a
British stance on the inclusiveness of honourable mountain pursuits, he acknowledged the contributions to mountaineering of climbers of other nationalities, such as the Germans and Austrians for their precise development of mountain gear and the Italians for their climbing skills. This perspective also affords multicultural interpretations on how driven, emotional or otherwise cool the various groups of climbers were and what value they gave to particular climbs. Irving discusses the ‘intellectual construct’ of mountains, sustained at the time by leading British academics who were also climbers. He added that ‘mountaineering is a mean to an end’, thus emphasising the ethical and moral dimension that leads to the character building and honour that true mountaineers should have. Irving thus made a classic contribution to the responsible interpretation of the value of mountains.

A second exponent in this category is Kugy (1934), an Austrian lawyer from Trieste, who wrote his mountain memoirs under the title of ‘Alpine Pilgrimage’. He loved the Julian Alps, the ‘sovereign Alps with the sea beneath them’. Thinking of the Triglav, highest peak of the range, he stated ‘once I had climbed a peak, its spell enveloped me and I haunted its neighbourhood, as if in search of something lost or forgotten’; he was compelled to ‘learn every side and every feature of the mountain’. He did however on occasions use a guide, the formidable Joseph Croux, his servant but also his master on dangerous climbs. Kugy had a truly romantic feeling for nature, and for mountains and their beauty in particular. It was a matter of unencumbered romanticism: mountains give so much that one loves them in return.

Motivations 1935: The Distinguished Travellers

A final reference focuses upon the needs of travellers when mountaineering had become more popular in Europe and new measuring instruments were being made available. These were aimed, as Reeves (1935) put it, ‘for distinguished travellers’, those imbued with the honourable determination to explore. The publication discusses the requirements of surveys and field astronomy and had the support of professional geographers. It is a comprehensive guide for the practical needs of walkers and campers, the early home preparations, health care, coping with disease and injury. It is also a compendium on meteorology, geology, natural history, anthropology and antiquities. No doubt, a precursor of the plethora of current travel guides, but with a clear bias towards coming to grips with untamed natural country, to apprehend new wild space - a prime need for climbers, with an opportunity to extend their field skills.

Conclusions

The Inca experience, with its daring incursions to the summits of the Atacama mountains, offers valuable lessons in how wild nature may become appropriated domain and, ultimately, sacred geography. The routes to the summits were strategically staged through obstacles, boundaries and horizons, and were woven into a progression of constructed spaces leading to summits and other destinations. The strong symbolism of the journey was no doubt coupled with the satisfaction of human needs in the harsh environment. Over thousands of kilometres, the Inca roads maintained their function and symbolism through known sequences of mountain spaces, dotted with stations for human occupation which ‘marked’ the land and, no doubt, the minds of settlers and passers-by. There is evidence to say that the strength of mountain scenery transcends cultures and centuries and can be transferred across different mountain environments to engender empathy and respect.

The above-mentioned framework for analysing motivations towards mountains categorised mountains as magnets, playgrounds and channels of communication. There is evidence that, since the 1970s, an awareness of the significance and attraction of mountains has spread more widely, with culturally-based constituencies developing new meanings, sometimes at last based on respect for indigenous beliefs. This has engendered a broader based usage of mountain spaces, with some benefits but also with the potential risk of disruption and the blurring of meaning. Policy encouragement could well be directed towards those cultural interpretations which acknowledge and respect the integrity and dignity of mountain environments and their custodians, whether residents or visitors (the latter, a much better term than tourists).

Such meanings should be culturally sustained, with implications for the environmental protection of mountains, underpinned by the identification of cultural, ecological and spatial thresholds. Spaces related to mountains are naturally ‘apprehended’ by people and, with the right attitude, may then be ‘appropriated’. This requires a comprehensive approach, a common empathy and co-operation amongst those mountain constituencies, which already share this outlook. Recent studies by the NSW NPWS on the cultural interpretations of open space by Macedonian and Vietnamese communities offers promise for...
the development of such an approach. The cultural ‘construction of (mountain) spaces’, following Lefebvre, offers an opportunity and a challenge for mountain environments to be better identified, understood and ultimately respected. Appropriately, this spatial approach also calls for a revival in the interpretation of time-cycles, known to indigenous communities but now all but forgotten.

As Kugy said, you love mountains and they’ll offer more.

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Introduction

“Ridges in horizontal view become peaks in vertical view,
And heights differentiate seen afar and at close quarters.
You are not capable to realize the true beauty of Lushan,
Only because you yourself are in this Mountain”

(Su Shi, Yuan Dynasty in The People’s Republic of China, 1995: 110)

For many centuries, mountains all over the World have been the focus of religious veneration and artistic production and are, what could be called, Mountains of Meaning. These are mountains that have special meanings or spiritual values attributed to them, or places that inspire creative works or thoughts.

The purpose of this conference is to celebrate mountains. There can, perhaps, be no greater accolade than for a mountain to be included on the UNESCO’s World Heritage List.

"sacred mountains are the World Heritage sites that enshrine the highest physical and spiritual values”

(Bernbaum, 1997:34)

There are four major aims of this paper. Firstly, to review the mechanisms that are in place to accommodate the inclusion of Mountains of Meaning on the World Heritage List (List). This will involve an examination of the criteria for World Heritage inscription that allows for the inclusion of non-material, intangible heritage values on the List. Secondly this paper is to look at Mountains of Meaning that have been included on the List and to consider their outstanding, intangible heritage values. Thirdly, this paper will look at World Heritage mountains that have intangible cultural heritage values ascribed to them but which are not inscribed on the List for such values.

Fourthly, this paper will consider the types of Mountains of Meaning that might be included on the list in the future and in particular those that might be included for their ‘inspirational’ qualities rather than their spiritual associations. This last section of the paper will consider some theory associated with the selection of such places and posit some questions for further reflection.
Review of World Heritage Inscription

The World Heritage Convention—properly entitled The Convention Concerning the Protection of the World Cultural and Natural Heritage, (the Convention) was first adopted by UNESCO in 1972. It is an international treaty that endeavours to identify and protect the natural and cultural heritage of ‘mankind as a whole’ that is of ‘outstanding universal value’.

The Convention identifies two types of heritage that can be included on the World Heritage List (List) natural and cultural.

Article 1 of the Convention identifies the types of cultural heritage to be included: monuments, groups of buildings and sites, ‘sites’ are:

“works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view” (UNESCO, 1972).

Article 2 of the Convention identifies the types of natural heritage to be included: ‘natural features’, ‘geological and physiographical formations’ and ‘natural sites’. Natural Sites are:

“natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty” (UNESCO, 1972).

It is these two types of sites that are relevant to the inscription of Mountains of Meaning on the World Heritage List.

In order for a property to be inscribed on the World Heritage List it is nominated under one, or more, of four natural or six cultural criteria or a combination of them both. These criteria are the benchmark for the inclusion of properties on the List.

Cultural criterion (vi) is the World Heritage cultural criterion that is used to identify non-material, associative, intangible heritage values of places/sites’. Intangible heritage value is an ascribed value that is related to an association with a place. It is the “special connections that exist between people and a place”¹ and the meanings that people attribute to a place; often this is related to a spiritual association.

(vi) be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance (the Committee considers that this criterion should justify inclusion in the List only in exceptional circumstances and in conjunction with other criteria cultural or natural) (UNESCO, 2000)

Natural criterion (iii), like cultural criterion (vi), can be interpreted as a criterion that identifies ‘intangible’ heritage values of a place:

N (iii) “Contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance” (UNESCO, 1994).

Natural criterion (iii) is included in the Operational Guidelines for the Implementation of the World Heritage Convention (Operational Guidelines) (UNESCO, 2000) under the criteria for the inclusion of natural properties on the List. The assessment of ‘exceptional natural beauty’ is, however, a cultural construction, or social preference and it must therefore be considered as an intangible cultural heritage value, not a natural one.

Mountains of Meaning can be included on the List as cultural ‘sites’. This includes individual places and also the sub category of cultural landscapes developed by the World Heritage Committee in 1992.

¹ The Australian ICOMOS Burra Charter, 1999, para 1.15
There are three types of cultural landscape categories defined by the Operational Guidelines but it is the ‘associative’ cultural landscape that is of interest in relation to *Mountains of Meaning*:

“The inclusion of such landscapes on the World Heritage List is justifiable by virtue of the powerful religious, artistic, or cultural associations of the natural element rather than material cultural evidence, which may be insignificant or even absent”

(UNESCO, 2000)

The category of associative cultural landscapes encapsulates two types of landscape that have come to be known, within World Heritage circles, as ‘spiritual’ ie those with religious associations and ‘inspirational’ ie those with artistic or cultural associations. It is these types of landscapes, in addition to individual ‘site’ based nominations, that might be used to identify *Mountains of Meaning* for inclusion on the List.

Of places already considered as, World Heritage, associative cultural landscapes, only Tongariro National Park, New Zealand, Uluru – Kata Tjuta National Park, Australia and the Lake District National Park, UK are associated with *Mountains of Meaning*.

Tongariro National Park in 1993 and Uluru-Kata Tjuta in 1994, were inscribed on the List as ‘spiritual’ landscapes because of their significance to their indigenous communities and their associated belief systems and were the first to be recognised as associative cultural landscapes.

The Lake District National Park, is being proposed to the List as an ‘inspirational’ cultural landscape because of its associations with Wordsworth and the Lake Poets. This will be the first landscape to be evaluated for these types of ‘inspirational’ values and will set a precedent in World Heritage practice.

It is the ‘associations’ in these landscapes that represent the ‘non-material’, or ‘intangible’ heritage values of ‘associative’ cultural landscapes and which facilitate the inclusion of mountain landscapes on the List.

**Mountains of Meaning – Listed Intangible Heritage Values**

In addition to the mountains included in the associative cultural landscape inscriptions of Tongariro, and Uluru - Kata Tjuta, seven *Mountains of Meaning* have been included on the List for their intangible cultural heritage associations. All these mountains have been inscribed using cultural criterion (vi) and some have been inscribed using natural criterion (iii) for their ‘exceptional natural beauty’.


Mount Taishan:

Mount Taishan is in the Province of Shadong, China. It has played an important part in the cultural and religious history of China since the 17th century B.C. and is the most sacred of the five sacred mountains in traditional China. The mountain is most importantly associated with the Confucianism. Taoists and Buddhists also consider the mountain to be sacred (IUCN, 1987). It is also associated with artistic/literary works and is the place where a new form of Chinese calligraphy occurred in 219BC (ICOMOS, 1987).

Mount Taishan was inscribed on the list for its natural values under natural criterion (iii) as:

“Superlative natural and cultural beauty. Mt Taishan is a majestic site, its dense forests and ancient temples complementing each other”

(IUCN, 1987)

Thus, in this inscription the inspirational link of man and nature is recognised.
Mount Lushan:
Mount Lushan is an area in the Jiangxi Province and was the first of the Chinese sacred mountains to be the inspiration for artistic works. Lushan was the home and inspiration to great Chinese poets, painters and calligraphers. The pioneer of the Chinese sect of Buddhism also worked at Lushan (ICOMOS, 1996). Mount Lushan is inscribed under cultural criterion (vi) for these inspirational and spiritual associations. It is not, however, inscribed for its natural values which are not considered to be of ‘outstanding universal value’.

Mount Emei:
Mount Emei is another of the five sacred Chinese Mountains it is in Sichuan Province and it was inscribed for both its cultural and natural values (but not for its natural beauty). It was described by ICOMOS as:

“an area of exceptional cultural significance, since it is the place where Buddhism first became established on Chinese territory and from where it spread widely throughout the east. It is also an area of natural beauty into which the human element has been integrated with skill and subtlety, to produce a cultural landscape of outstanding quality”

(ICOMOS, 1996)

There are more than 30 temples on Mount Emei some of them very ancient and they reflect the sacredness of the mountain and of the relationship between the man made and natural elements.

Mount Wuyi:
The justification for the inscription of Mount Wuyi under cultural criterion (vi) was:

“Mount Wuyi was the cradle of Neo-Confucianism, a doctrine that played a dominant role in the countries of Eastern and South-Eastern Asia for many centuries and influenced philosophy and government over much of the world.

(WHC-99/CONF.209/22)

and under natural criterion (iii) for

“The riverine landscape of Nine-Bend Stream (lower gorge) is also of exceptional scenic quality in its juxtaposition of smooth rock cliffs with clear, deep water."

(WHC-99/CONF.209/22).

It is interesting to note that cultural criterion (vi) and natural criterion (iii) are used together to capture the natural beauty and the sacred values of this Chinese Mountain of Meaning as it was with Mount Taishan.

Mount Qincheng:
Mount Qincheng, Sichuan Province, was the place that (in 142 CE) Zhan Ling founded the doctrine of Taoism, which has been a long standing religion of East Asia. Later temples were built on Qincheng and it became the centre of Taoist teachings. (ICOMOS, 2000). Qincheng is not inscribed for any natural World Heritage values.

A brief analysis of the Mountains of Meaning in China show that they are closely related to some of the major religions of the world, Buddhism, Hinduism and Taoism. Their natural beauty and elevation attracted the holy men of these religions and in turn these attracted pilgrims, artists and writers to capture the sacredness of the place in artistic forms.

These then are truly Mountains of Meaning and have been included on the World Heritage List, not as cultural landscapes, although some of them combine “the highest physical and spiritual values” (Bernbaum, 1997:34), but as individual ‘sites’ as defined by the Convention.
In Europe there are two mountains that have been inscribed for their spiritual values and associations, Mount Athos, Greece and Mount Sinai, Egypt (St Catherine Area)

Mount Athos:
Mount Athos was inscribed under cultural criterion (vi) because of its spiritual association which have existed since 1054 AD and because of its influence on the Orthodox art. (UNESCO, 2002)

It was also inscribed under natural criterion (iii) by the Committee because:

“The Committee accepted the ICOMOS proposal to add natural criterion (iii) - outstanding universal value from the point of view of natural beauty - to cultural criteria, since this site involves a humanized landscape the characteristics of which are due to persistence of farming practices and traditional arts and crafts linked to the stringent observance of monastic rules” (SC-88/CONF.001/13)

Mount Sinai:
Mount Sinai was inscribed on the World Heritage list in 2002 under cultural criterion (vi) because of its associations with Christianity, Islam and Judaism.

“The St Catherine's area, centred on the holy mountain of Mount Sinaï (Jebel Musa, Mount Horeb), like the Old City of Jerusalem, is sacred to three world religions: Christianity, Islam, and Judaism.” (WHC-02/CONF.202/25).

This brief overview of the Mountains of Meaning that have been included on the World Heritage List to date shows that, in spite of the introduction of the Global Strategy in 1994, for a more representative and credible list, the List, in relation to mountains, still reflect the values of main stream religions and arts. What then of indigenous belief systems and artistic production associated with mountains and their representation on the List? It would appear that these values are not adequately represented and, in fact, only the inscription of the associative mountain landscape of Tongariro National Park and Uluru - Kata Tjuta National Park recognise such values. I would suggest that this is as result of the individual States Parties being slow to re-evaluate properties already on the list for wider World Heritage values, in response to the more plural approach to the identification of culture by UNESCO (UNESCO, 1995). This may be as a result of a lack of direct political will and/or perhaps as a lack of capacity and understanding of the broader themes of the World Heritage Committee’s Global Strategy for a more balanced and representative List.

Mountains of Meaning – Unlisted Intangible Heritage Values

There are many mountains inscribed on the World Heritage List, which although imbued with sacred or spiritual values are inscribed only for their natural values. Mount Everest also known as Sagarmatha in Nepali, “whose head touches the sky” (Nepal, 1979) in Sagarmatha National Park, India, the heighest place in the world, is one such mountain. It was inscribed in 1979 not for its sacred values but for its natural values under natural criterion (iii) including its exceptional natural beauty.3

In spite of the fact that Mount Sagarmatha was inscribed for its natural values alone, to the local Sherpa people who call it Chomolongma, “Goddess Mother of the World” (Nepal, 1979) it holds spiritual values. Thus, Sagarmatha National Park could also have been inscribed using cultural criterion (vi) to reflect the intangible, spiritual value of these mountains and the interaction of man and nature.

Another such mountain on the World Heritage List, inscribed in 1988 for its natural values alone, is Nanda Devi in Nanda Devi National Park. Nanda Devi is in the Indian part of the Himalya and these mountain landscapes are referred to in ancient Hindu scriptures as “Dev Bhumi” the land of the Gods (Ramakrishnan, 2000).

2 by this I mean national governments signatory to the World Heritage Convention.
3 “It contains unique, rare or superlative natural phenomena, formations or features of areas of exceptional natural beauty. There can be no doubt that their unsurpassed elevation qualifies Sagarmatha and the Great Himalayan Range as unique. In addition, the park includes a mountain complex of superlative grandeur, beauty and challenge complemented by cultural elements of great interest” (Nepal; 39, 1979)
4 it is a sacred mountain. Sherpa culture has developed in close association with the mountains in the area and it is reflected in their folklore and belief systems. (Sherpa, 2001).
With these two examples alone, it can be seen that *Mountains of Meaning* exist within the World Heritage List beyond those explicitly inscribed for such meanings. Other mountains inscribed on the World Heritage List for natural values alone, but which have recorded spiritual values, are: Mount Kinabalu, Malaysia, Mount Kenya, Kenya and Yakushima, Japan and there are undoubtedly others. There is a need for States Parties to the Convention to consider an extension of the World Heritage values of some of these mountains. These should include consideration of intangible heritage values, of outstanding universal value, under cultural criterion (vi) in order that a true reflection of their cultural significance is provided.

**Inspirational Mountains of the Future**

The final part of this paper will briefly consider the inclusion of ‘inspirational’ mountains, or mountain landscapes, on the World Heritage List. It will highlight issues that might arise when attempting to inscribe such mountains on the List because of their intangible heritage values associated with artistic or literary works.

The Lake District National Park, UK, is being proposed for inscription partially on the grounds of its inspirational qualities (Department of Culture Media and Sport, 1998, 2002). Mountains that could be given the same consideration, and have been mooted in World Heritage circles for inscription are, Montaigne Sainte Victoire, France, the mountain Cezanne painted many times, and Mount Fuji, Japan, which has been the focus of much art work, as well as a focus of spiritual values.

One of the major issues concerning ‘inspirational’ landscapes and places such as mountains, is the theoretical and methodological process to be used in their identification. It will be recalled that no ‘inspirational’ landscapes or mountains have yet been explicitly inscribed on the World Heritage List. These landscapes are identified because “of the powerful......artistic or cultural associations of the natural element” and inscribed using criterion (vi) “be directly or tangibly associated with........with artistic and literary works of outstanding universal significance”

Dr Henry Cleere, former World Heritage Convenor of the International Council on Monuments and Sites (ICOMOS), which evaluates cultural properties and makes recommendations to the World Heritage Committee for inscription, said the following of the assessment and inclusion of ‘inspirational’ landscapes:

“The evaluation of landscapes with artistic or cultural associations remains to be considered by ICOMOS. The basic criterion must surely be that of the ‘outstanding universal value’ of the artist concerned. The success of a hypothetical nomination of the Montaigne Sainte Victoire would depend upon the evaluation of the universal significance of Cezanne who painted it so often....This is an aspect of the concept of associative cultural landscapes that requires long and deep consideration, and by an organization other than ICOMOS, which is not equipped to pronounce upon matters of non-material culture of this kind”

(Cleere, 1995:56).

The idea of the artist being of ‘outstanding universal value’ highlights some crucial issues in the consideration of ‘inspirational’ landscapes and mountains for inclusion on the List. Using the theories of the French sociologist, and theorist, Pierre Bourdieu (Bourdieu, 1993) these issues can be looked at in a more dispassionate way.

Cleere (1995) has suggested that, through the mechanisms of World Heritage inscription, the ‘consecration’ of the artist (ie being of outstanding universal value) confers ‘sacredness’ on a landscape or place depicted by such an artist (ie its inclusion on the World Heritage List under cultural criterion (vi)) Bourdieu would argue that the merit of the artistic creation lay in the representation, not in the thing represented. This also raises the issues of cultural production and the acceptance of the art-work as a

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5 Mount Lushan, China was inscribed in 1996 and was recognised by ICOMOS as a cultural landscape of outstanding aesthetic value and ‘powerful associations with Chinese spiritual and cultural life’ but this has not been formally recognised by the World Heritage Committee (WHC-96/CONF.201/21).
fetish, ie art is only considered to be art, if the artist is known (Bourdieu, 1993). Thus, inspirational qualities of landscapes and places are only valid if they inspire great artists to produce art.

The identification of artists of ‘outstanding universal value’, in World Heritage evaluation, plays to the ‘charismatic ideology’ as Bourdieu calls it, that of the artist as the genius (Bourdieu, 1993). With this follows the World Heritage Committee’s approach that if the artist is not of ‘outstanding universal value’ then the subject of his/her cultural production will be unworthy of consideration.

A question to be asked is, is the World Heritage Committee including mountains, landscapes and places on the List that are admired, on purely aesthetic grounds, and is it using the connection with a ‘consecrated’ artist to construct some form of ‘bar’ or ‘cultural bench mark’ in order to justify their identification and evaluation for inclusion on the List? Conversely, would the World Heritage Committee inscribe a landscape used as a subject by a ‘consecrated’ artist in his/her ‘cultural production’ if the Committee did not admire it on aesthetic grounds? A linked but very important question is ‘what is the methodology of choosing one ‘consecrated’ artist and their field and subject of cultural production over another?

These theories of Bourdieu are ones that I present to you as food for thought in relation to inspirational qualities of mountains, landscapes and places for inclusion on the World Heritage List and ones that need further detailed consideration by the World Heritage Committee and its Advisory Bodies, including ICOMOS.

It may perhaps be more constructive to think of the art works themselves as ‘indicators’ of the intangible values associated with a mountain or landscape rather than the artist who made them as holding the ‘outstanding universal value’. If this approach is adopted, what it is that makes a place special and therefore justify its inscription on the World Heritage List, must still identified.

**Conclusion**

The World Heritage Convention has, through its inscription process, identified *Mountains of Meaning* for inclusion on the World Heritage List. The protection of the values for which a World Heritage property is inscribed is a key issue in the management of a World Heritage area.

The protection of intangible heritage values is no less of an issue, but poses more of a problem, than for example, the protection of material fabric or wildlife habitat. To protect the meanings and associations of a *Mountain of Meaning* requires, not only the protection of the natural landscape from inappropriate development, or natural erosion, but also the protection of the culture that ascribes meanings and associations to that location. In the case of all the *Mountains of Meaning* discussed in this paper, this would require the continuity of religious/spiritual practice and observance at these mountains. This is, of course, without the power of any State Party or International body and highlights the mutable quality of intangible heritage values and how they may change over time as different groups ascribe different values. The suggestion here, therefore, is that it is not possible to protect the intangible heritage values of a place through the World Heritage List but only record their currency. This posits a wider question as to whether the World Heritage List should be reviewed on a cyclical basis to ensure the authenticity of its inscriptions. Unfortunately this is not something that I can explore this afternoon and must be the subject of another paper.
Table 1: Mountains Discussed in Text Illustrating Criteria for Inscription and Identified Values

<table>
<thead>
<tr>
<th>Property</th>
<th>Cultural Criterion</th>
<th>Living Traditions</th>
<th>Ideas</th>
<th>Beliefs</th>
<th>Artistic/Literary Works</th>
<th>Natural Criterion</th>
<th>Beauty</th>
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WHC-99/CONF.209/22

Fact Or Fantasy – Celebrating Mountain Heritage Today

Marilyn Truscott
Heritage Consultant

I’m here to talk about celebrating mountain heritage – its Facts and Fantasies – its Myths and Legends – its associations and meanings – or rather one legend in particular and its expression today. In doing so I shall touch briefly on such expressions elsewhere and possible tensions or conflicts that may arise in the management of such associations and meanings.

And down by Kosciusko, where the pine-clad ridges raise
Their torn and rugged battlements on high,
Where the air is clear as crystal, and the white stars fairly blaze
At midnight in the cold and frosty sky,
And where around the Overflow the reedbeds sweep and sway
To the breezes, and the rolling plains are wide,
The man from Snowy River is a household word today,
And the stockmen tell the story of his ride.

This ballad, *The Man from Snowy River* was written by Andrew Barton Paterson – ‘Banjo’ Paterson - in 1895. The publication sold out within a week and the poem forms part of Australia’s myth and national cultural identity (as mentioned by Jane Lennon in her paper). It is worth noting that a legend is a non-historical or unverifiable story handed down by tradition from earlier times and popularly accepted as historical.

I will return to the poem later, for the focus of my paper is Craig’s Hut. Found in the Alpine NP above Mansfield in Victoria just beyond the Mt Buller ski resort, Craig’s Hut sits high on a ridge in a spectacular alpine setting with fine views of Victoria’s high country and of Mount Cobbler. The hut itself is said to be a replica of a pioneer’s hut.

Craig’s Hut was built in 1982 as a replica of a pioneer hut for the Australian film *The Man from Snowy River*, then in a sequel film and television series. The hut was later rebuilt in 1995 as a tourist attraction. In Mansfield pictures of Craig's Hut are displayed prominently, featuring in posters in shop windows, post cards, and on the front of tourism information materials.

However, the hut is not a replica, neither its form nor its location replicate the construction of a pioneer or mountain hut and its siting on a mountain ridge exposed to the weather is not where any self-respecting pioneer and Mountain Cattleman would locate any such structure. Also, the graves around the hut are fake.

Craig’s Hut was found to have social value in the Regional Forest Agreement process that included consultation with communities about their heritage values (Context 1997). Both the Mansfield community and others, in fact the High Country community generally clearly found it the most important
of all the Mountain Huts; the statement of significance drafted for the Australian Heritage Commission Register of the National Estate outlines its heritage values:

Craig's Hut is of aesthetic significance because of its aesthetic appeal, spectacular setting and evocative association with a major Australian film. The Hut is constructed in a bush vernacular style in a dramatic mountaintop location with extensive panoramic views. It is a replica of a pioneer's hut built for the film 'Man from Snowy River' in 1982 and later rebuilt as major tourist attraction. The hut is frequently visited by the local community and others because of its values, and is depicted in tourism publications. (Criterion E1)

The legend of The Man from Snowy River is an interesting example of myth-making and its role in forming cultural identity, even in nation-building. The poem itself was at a time of intense discussion at the end of the 19th century regarding the Australian character. Paterson and Henry Lawson, both writing for The Bulletin at the time, were debating the urban character and the Bush Myth with Paterson fostering the notion of the Bush Man - the larrikin - the anti-authoritarian, egalitarian Australian we so treasure as part of our identity today. It was only 20 years later that the ANZAC story took place to add to this legendary aspect of the Australian personality.

Even the horse in the poem reflects this character:

He was hard and tough and wiry – just the sort that won’t say die –
There was courage in his quick impatient tread;
And he bore the badge of gameness in his bright and fiery eye,
And the proud and lofty carriage of his head.

The poem The Man from Snowy River very clearly expresses this aspect of the Australian character. It must be noted that even at the time of writing it was as a symbol, not as an account of any true event. Nonetheless its very iconic nature has meant that its meaning is repeatedly revisited and used, such as the films in the 1980s, taking place at a time when we celebrated our Bicentennial. The 1980s was also the height of the conflict in Victoria regarding ongoing cattle-grazing in national parks, something that had ended in New South Wales in the late 1960s.

It is still revisited, such as recently in other Mountain celebrations, for example in the adoption of The Man from Snowy River as its own in Corryong in North East Victoria, which has an annual Man from Snowy River Bush Festival, as well as a Man from Snowy River Museum. The town also claims one of its own, Jack Riley, as the original Man from Snowy River. This claim is hotly debated, with many other individuals also identified as the original ‘Man’.

I do not wish to debate whether such appropriations of the Man are genuine celebrations or cynical commercial uses to tempt cultural tourism. But it is clear that the Man from Snowy River is now a cultural icon expressed not only in poem, film but in spectacular events, such as seen in the 2000 Olympics in Sydney and since at the Sydney Royal Easter Show in 2001 and 2002 as well as in a recent musical. Even the names at the venue of this conference, The Station Resort, reflect the romance of the High Country Cattleman. And its expression in a place such as Craig’s Hut.

There are other examples of building new places to express symbols and cultural icons that have influenced cultural identity and how a nation sees itself:

A famous one is the Romantic neo-medieval castles built by mad Ludwig II of Bavaria, such as Neuschwanstein built in the foothills of the European Alps. Built in 1869, Neuschwanstein is a fantasy castle decorated in images that draw on Nordic sagas that supposedly took place many hundreds of miles from Bavaria along the Romantic Rhine. Ludwig's obsession influenced Wagner as seen in his Nibelungen Lied operas. Such symbols of the past came at the time of the unification of Germany under Bismarck for the first time ever in 1871. Again later such symbols were taken up and favoured by Nazi Germany.
Such romantic notions of nation were also used elsewhere such as in Hungary and the Czech republic later in the 19th C to stake a claim of cultural identity separate form the domination of the Austrian Empire. Churches, palaces and public buildings were nationaalistically decorated with heroes from medieval mythic sagas staking claims to the land and a past based on ethnicity and autonomy.

Such reference to and use of past myths is also seen in the appropriation of an extant place for rituals and celebrations without historical fact. A well known example of this is found at Stonehenge with the Druid festivals at the summer solstice that started in the 19th century. Today Stonehenge is as well known for its New Age symbolism including the ongoing Druid ceremonies as for its historic and archaeological importance.

Much of this myth has thus now become fact, even protected as heritage, telling historical stories of past social value. For example, Neuschwanstein has a huge annual visitation with most people totally unaware of or ignoring the nearby real castle ruin dating from the Middle Ages on the nearby hillside.

Similarly in South Africa in Zululand, the ‘fake’ village of King Shaka, Shakaland, attracts more visitors than the many villages with impoverished Zulu in the surrounding landscape (p. comm A Hall, Nov 2002).

Does such mythologising matter? Lowenthal confirms in his article "Fabricating Heritage" (no date) that:

“Heritage should not be confused with history. History seeks to convince by truth, and succumbs to falsehood. Heritage exaggerates and omits, candidly invents and frankly forgets, and thrives on ignorance and error. Time and hindsight alter history, too. ... Heritage uses historical traces and tells historical tales. But these tales and traces are stitched into fables closed to critical scrutiny.”

I am not sure that this is how heritage significance is viewed in Australia but Lowenthal reminds us of Renan’s statement to his fellow French:

*Getting its history wrong is crucial for the creation of a nation and that Australians are said to spend more of their spiritual energy in quests for enshrined symbols of identity than in any other pursuit; worship of the past in Australia is one of the great secular religions.*

Certainly this is manifest at Craig’s Hut, which has probably a higher visitation than the approximately 200 ‘real’ mountain huts in the Australian Alps and mountains; some of them, a few, pre-dating Paterson’s poem of 1895, such as Wallaces Hut also in the Alpine National Park dating from 1889, or Bluff Hut that was built much later but is still a working Mountain Cattlemen’s Hut, or other genuine remnants of Mountain Cattlemen’s way of life such as at Wonnangatta Station.

Such mythologising or fabrication of the past may matter when it comes to the allocation of resources and community energy, for example, Craig’s Hut has an active 4WD club that maintains it regularly. Some historical huts have similar Friends Groups co-ordinated by Parks Victoria, but very few of them, and they all urgently need maintenance and active care.

This situation potentially creates conflict and tension between the real and the recreated – the fact and the fantasy – and is a problem to heritage managers in deciding how do deal with it. As such, whilst I find the associations and meanings of Craig’s Hut living evidence of our cultural icons, I am also aware the Paterson’s ballad is itself NOT history, but is part of a fabricated heritage that was created in the name of national identity. I trust therefore that Craig’s Hut and its like serve a purpose as a symbol, but not hopefully at the expense of those places with authentic fabric.
**Postscript**

A postcard seen at Jindabyne during the conference show Craig's Hut as one of a series of photographs titled "Kosciuszko National Park" a fine example of how the myth of the Man from Snowy River is now transcending even its location as a physical symbol in Victoria!!

**References**

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Lowenthal, D (no date) "Fabricating Heritage" *History and Memory* Volume 10, Number 1.
Day One – Mountains For The Future
The Mountain Mires Of Southern New South Wales And The Australian Capital Territory: Their History And Future

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Abstract

The southern tablelands and alps of New South Wales support the most varied and extensive peatlands and mires of mainland Australia even though conditions today are marginal for mire growth. Mires huddle in valley bottoms particularly where there is run on and deep soil mantles to bring them water. Peat has accumulated with average depths of 1-3m although greater depths of up to 8m of sedge peat occur in a few cases. The mires are sensitive to trampling and drainage but are important for moderating runoff and maintaining summer flows in streams.

The peat-bearing mires are unusual in generally eroding mountain landscapes because they preserve their own history in the organic matter that accumulates in them. Many bogs formed as a result of post-glacial climate change about 12-8000 years ago when increasing rainfall offset the drying caused by rising temperatures. Drier conditions in the last 5000 years has seen some bogs cease to grow while for others there have been a major growth phase over the last 2-3000 years. Charcoal in the peat shows that the catchments have always experienced fire but an analysis of the last 9000 years in most sites shows that the largest change occurs with the arrival of European settlers, their grazing animals and weeds.

Bibliographic Note

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Peatlands in Southeastern Australia

Australia is a temperate to tropical continent of high evaporation, unreliable rainfall and relatively subdued relief. Except in the coolest and wettest areas organic matter produced by vegetation will decay. The accumulation of peat or humus requires permanent inflows of water to maintain waterlogged conditions. Accordingly, almost all peat forming mires in Australia occupy low places in the landscape, and are termed topogenous mires (caused by topography). Other than estuarine infills, it is in wet, cool montane areas that low gradient valleys develop mires and peats may form. Near the alpine treeline these valley sites may extend onto gentle slopes to form ombrogenous (formed by cloud) blanket bog. There are almost no large raised bogs in Australia, in contrast to the cold wet areas of northern Europe, North...
America, southern Chile and southern New Zealand where sedge or moss bogs may be many thousands of hectares in extent, and often over 8m in depth. The average topogenous montane mire in southern New South Wales preserves 1-3 m of peat, emphasising the very marginal conditions for peat growth in Australia.

New South Wales is thus poor in peatlands, and the variety of types is not as great as in other countries. Nevertheless there is a rich mire flora and a wide range of vegetation communities, many growing in isolation from the nearest similar vegetation. The peatlands of Australia have been only briefly described (eg Campbell 1983, Kershaw et al 1993, Whinam et al 1989, in press) and merit further study. Although the total area covered by peatland is only small (<2% in the subalpine), the ecosystem is distinguished by preserving a record of the development of the site and surrounding vegetation in the organic remains. Peatlands are thus archives whose records are only beginning to be read.

Raw peat consists of up to 90% water, and peatlands are very efficient at trapping rainwater or surface flow. Dr A. Costin (pers. comm.) regards peat deposits as important in New South Wales and Australian Capital Territory catchments because they moderate runoff and, being thermally insulating, retain warmer groundwater than would otherwise be the case. For example Snowy Flat Bog is yielding 2.1 megalitres per day after 6 months of drought (A. Wade pers. comm.). Water moves through peatlands as groundwater, in narrow deep channels or across the surface in wide shallow channels floored by depressions (Siegel 1992). The surface vegetation filters out mineral sediment and releases clear water, although it also uses up water in transpiration. The fibrous surface vegetation and top sediment layer are tough and resistant to erosion, which is often not very active on the flats and gentle slopes (Wimbush and Costin 1983).

Many terms exist to describe peaty wetlands, for example, bog, fen, mire, moor, marsh, swamp, morass. Of these, only bog, fen and moor have specialist definitions (Birks and Birks 1980, Bridle 1993):

**Bog:** characterised by complex vegetation with little free water surface: stagnant water; usually acidic and of low nutrition

**Fen:** simple vegetation with some open water: groundwater is moving and mineral matter often present, giving better nutrition.

**Moor:** simple sedge or open sedge-shrubland on slopes with shallow muck or fibrous peats: forming an organic soil.

In the absence of data on nutritional status, the terms are best used in relation to the structure of the major vegetation community on the site. Bogs may have cushion plants, including mosses, and often low shrubs or even trees. Fens have graminoid (grass-like) plants, especially sedges (Cyperaceae) or rushes (Juncaceae, Typhaceae, Restionaceae). However, grass or sedge bogs are known, for example *Gymnoschoenus* (button grass) bog, in which densely packed graminoid hummocks provide a complex structure.

Definitions of organic deposits are complex and highly variable internationally (Bridle 1992), because they can be viewed as sediments, soils and biological systems. Classifications of peatlands may include the physical peat typology, floristics, topographic setting, water inputs and chemistry (Moore 1984). Peat is one of several types of organic sediment which form from the dead remains of plants, both large and microscopic, almost always accumulating in permanently waterlogged conditions in which breakdown is hindered. The presence of a high proportion of organic material creates reducing conditions which prevent microbial action, and the porous, relatively light matrix retains water readily. This moisture allows continued accumulation of organic matter. Peat is not just dead sediment but is also a component of a living ecosystem, the net production of which forms the substrate on which the living part depends. The surfaces of organic deposits provide specialised habitats for plants and animals tolerant of aquatic, or wet, reducing conditions. An organic deposit preserves some of the remains of plants and animals that have lived there through the period (or periods) over which the deposit forms. In this paper the term "peat" will be used for all organic sediments containing >40% dry weight of organic material. Moore and Bellamy (1974), define peat types more precisely. A peatland is an area in which at least 40 cm of peat has accumulated.
The vegetation forming the organic material varies according to availability and nutritional status of the water (Table 1). At one extreme, bogs dominated by slow growing mosses occur in very wet, cool climates in sites where groundwater is minimal, so that growth depends on nutrients brought in with rain water. Peat formed in these bogs is termed "terrestrial". If increased nutrition, for example from groundwater, is available, shrubs and sedges will invade and co-exist with the moss, or exclude it. If the watertable occurs at the surface for a substantial time, many shrubs will not survive, and shallow rooted sedges, grasses, twig rushes etc. will form an open cover. Peat forming at the watertable is termed "telmatic". Finally, in deeper water, aquatic species such as cumbungi (bulrushes), reeds, sedges, water lilies, strap rushes and pond weeds will dominate, and the organic material will contain plant debris and organic muds (limnic or lake sediment).

Table 1: Characteristics of organic deposits in southern Australia.

<table>
<thead>
<tr>
<th>Surface vegetation</th>
<th>Moss cushions</th>
<th>Heath</th>
<th>Sedge fen</th>
<th>Open water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface sediment</td>
<td>Fibrous moss</td>
<td>Wood peat</td>
<td>Fibrous sedge peat</td>
<td>Organic mud</td>
</tr>
<tr>
<td>Deep sediment</td>
<td>Humic peat</td>
<td>Humic peat</td>
<td>Humic peat (amorphic)</td>
<td>Organic mud (gyttya)</td>
</tr>
<tr>
<td>Water Table</td>
<td>Raised</td>
<td>Near surface</td>
<td>At surface</td>
<td>Above surface</td>
</tr>
<tr>
<td>Surface peat type</td>
<td>Terrestrial</td>
<td>Terrestrial</td>
<td>Telmatic</td>
<td>Limnic</td>
</tr>
<tr>
<td>Site type</td>
<td>Ombrogenous</td>
<td>Topogenous</td>
<td>Topogenous</td>
<td>Topogenous</td>
</tr>
<tr>
<td>Example</td>
<td>Blanket Bog</td>
<td>Valley Bog</td>
<td>Lake Edge</td>
<td>Tam</td>
</tr>
<tr>
<td>Mineral Nutrition</td>
<td>Poor (Oligotrophic)</td>
<td>Medium (Mesotrophic)</td>
<td>Medium-good (Eutrophic)</td>
<td>Various</td>
</tr>
<tr>
<td>Source of minerals</td>
<td>Rainwater</td>
<td>Groundwater</td>
<td>Ground water and streams</td>
<td>Streams into lake</td>
</tr>
</tbody>
</table>

Growth of peat deposits

A mire will build up organic horizons if plant material build up exceeds losses due to decay and removal. Most Australian peat deposits represent a very slight positive balance, giving rise to long-term accumulation rates in the order of 0.01-1.0 mm per year (commonly expressed as 0.1- 10 cm/century). Production is increased by high temperatures, abundant water, light and nutrients and an absence of herbivores. However, the decay rate rises even more quickly with temperature and a good supply of mineral nutrients. This explains why peat deposits are rare in the subtropics. In cool, humid climates the rate of production is reduced, but a relative absence of decay by soil bacteria and fungi allows accumulation. Such peat bogs may be very slow to regenerate, once stripped of vegetation. Parts of a bog may collect litter at a fast rate, but this does not represent rapid growth of the peat because organic matter at the surface is uncompacted and less decayed than that at greater depth.

Clark (1983) has reviewed growth rates for Sphagnum bogs and made observations on Ginini Bog (ACT) over several seasons. She found that while the moss surface might increase by 30 cm in a good growing season, all this height can be lost in a single winter due to compression by snow or animal trampling, and that the current net growth in the bog is almost nil or perhaps negative. The long-term growth rates for moss bogs in good conditions rarely exceed 5 cm century; for Ginini Bog the long-term growth rate is 3.5 cm century. Sedge fens in extremely good conditions may reach 10 cm/century. For example the upper 25 cm of peat at Nursery Swamp, (ACT) has accumulated in less than 250 years. Again decay and compression result in a long-term accumulation rate of less than 4.0 cm/century of fibrous sedge peat.

Major hindrances to growth are caused by erosion, gullying or fire. Increases in the rate of loss or of decay may prevent further growth by drying out the entire surface, which may then become hydrophobic. Some peat bog taxa are intolerant of too much or too little nutrition, so that pollution or changes in water supply may affect accumulation rates. Growth may not be continuous because the establishment of a species may lead to change in hydrology, for example moss hummocks may block the drainage.
Continued accumulation at any spot leads to a hummocky microtopography. The vegetation tends to be a mosaic which is not static but changes with the microhabitats of the site. The most detailed study of this process in Australia has been carried out in a subalpine bog in Victoria by Ashton and Hargreaves (1983). They found that moss hummocks several times replaced shrublands over 4,000 years. Fire was important in causing changes to surface topography. Also zinc was shown to be a limiting micronutrient and fires resulted in net losses of stored nutrients which probably impeded shrub re-invasion. Drainage-impeding growth gradually raises the local watertable and maintains wet conditions and further growth. In this sense peatlands represent a renewable resource, but the growth is too slow to allow Australian peat to be "harvested" on any commercial timescale.

Stability

Peat bogs in Australia are delicately balanced, and relatively minor changes may have large responses. Change can take place in the following ways (Table 2).

<table>
<thead>
<tr>
<th>Change</th>
<th>Possible Cause</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased production</td>
<td>Cool moist conditions</td>
<td>Growth on drainage lines, local flooding and fen development</td>
</tr>
<tr>
<td>Decreased production</td>
<td>Hot dry conditions, increasing drainage</td>
<td>Growth ceases, dry-land plants invade</td>
</tr>
<tr>
<td>Increased nutrition</td>
<td>Catchment erosion spreading on to the peatland; animal manuring</td>
<td>Death of oligotrophic taxa, eg. Sphagnum, weed growth</td>
</tr>
<tr>
<td>Increased drainage</td>
<td>Gullying or drains; growth of trees</td>
<td>Growth ceases, top layers dry out, become water repellent, liable to fire</td>
</tr>
<tr>
<td>Clearance in catchment</td>
<td>Agriculture or forestry</td>
<td>Higher peak discharges, incision by streams increases drainage. Mineral matter covers swamp.</td>
</tr>
<tr>
<td>Stream incision</td>
<td>Clearance, compaction</td>
<td>Bank collapse by groundwater under-mining. Peat bursts</td>
</tr>
<tr>
<td>Surface compaction</td>
<td>Grazing or traffic</td>
<td>Infiltration reduced, increased surface runoff and erosion, elimination of taxa</td>
</tr>
<tr>
<td>Loss of surface peats</td>
<td>(1) Fire following lowered watertable</td>
<td>Peat fires slow but hot, totally kill all surface plants, erosion follows</td>
</tr>
<tr>
<td></td>
<td>(2) Oxidation</td>
<td>Peat decays to ash, and becomes compact by loss of moisture. Erosion follows</td>
</tr>
<tr>
<td>Collapse and slumping</td>
<td>Heavy runon, reduced strength due to ditching and mining</td>
<td>Bogs may catastrophically slump, the fibrous layers shearing above weaker layers.</td>
</tr>
<tr>
<td>Flooding, water diversion</td>
<td>Water supply dams, catchment clearance</td>
<td>Death of plant cover, erosion</td>
</tr>
</tbody>
</table>

Fires can totally remove peat deposits and are very difficult to stop once established. Several peatlands in Australia have been destroyed by fire, for example blanket bog in the Central Plateau of Tasmania smouldered for five months in 1961 and over 20,000 ha were reduced to mineral soil. This quickly eroded into creeks and rivers, and plant regrowth in the area has been extremely slow (Jackson 1973). At Wyrie Swamp, a peat mine in South Australia, attempts by bulldozing and pumping water failed to control a fire. It was only extinguished by totally flooding the site by blocking the outfall drains (Dodson 1977). The extent of peatlands destroyed by fire following drainage in Australia is unknown, but is probably very great.

The reason for the persistence of under surface fires in peat derives from the changes in properties in peats once they dry out. The infiltration capacity may become low, and the large void space allows combustion to proceed slowly. Hosing down the area will not extinguish the fire because peat is an excellent insulator and this protects the fire from chilling as well as smothering. Water reaching these fires will react with the burning peat to produce carbon monoxide and hydrogen which can eventually
burn. From time to time the surface peat will collapse into the firehole and a normal fire can result, with a risk of spreading fire into adjacent vegetation. Raised bogs are at greater risk from fire than valley bogs.

Increased drainage also allows peat to oxidise and become compressed or decay to organic loams. However, fibrous peat is quite resistant to streamflow erosion. Ditches cut in Mulloon Swamp still retain the scoop marks after 12 years, although the ditches have precipitated headward erosion at the the downstream end. Catastrophic peat losses are known to occur when undercutting of the trenches by upwelling water is followed by slumping. Once disturbed, breakdown and erosion may be rapid and complete. Topogenous mires such as valley bogs with substantial catchments are particularly at risk. Remnant stacks of peat occur for 3 km down stream of Jackson’s Bog, N.S.W., and indicate that up to 20 ha of peat have been eroded completely by a stream now flowing on bedrock (Kershaw et al. 1993). The cause of incision by the stream is unknown, but stock damage to watercourses and possibly fire may have been important. The largest montane mire in southeastern Australia, Wingecarribee Swamp, lost about 1,600,000 cu m of peat on 9 August 1998 after very heavy rains (Whinam et al in press). Rain swelled the peat, possibly allowing hydrostatic pressure in the underlying gravels to lift the upper layers of the mire, which then slumped into the cut mine ponds starting a catastrophic failure that reached to the head of the bog. A stream now flows through the former peatland. Dewatering of the peat reduced it from 6m to ca 2m blocks.

**Peatland in the Australian mountains**

A national survey of wetlands has been completed (Australian Nature Conservation Agency 1996). The ANCA report lists two Interim Biogeographic Regions for the montane area, Australian Alps and South Eastern Highlands of NSW. These are equivalent to montane (>500m) and subalpine (>1400m) zones. The ANCA report extracted data from an earlier survey of montane peatlands (Hope and Southern 1983), and further research on mires has taken place since then, with about 165 sites being investigated, the majority of which do not retain peat forming mires at present.

Table 3. Peatlands noted in surveys and nominations

<table>
<thead>
<tr>
<th>Area (Bioregion)</th>
<th>This Report</th>
<th>ANCA 1996</th>
<th>RAMSAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT Alps (AA)</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>ACT highlands (SEH)</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>NSW Alps (AA)</td>
<td>5</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>NSW Southern Highlands (SEH)</td>
<td>15</td>
<td>8</td>
<td>?1</td>
</tr>
</tbody>
</table>

Peatlands in montane southern New South Wales show a striking distribution pattern. Most obvious is the lack of peatbearing deposits in the central plains between the ranges presumably because this area is within a general rainshadow. Most sites occur on the western, eastern and southern ranges of the region, notably at altitudes of about 1000 m above sea level.

There are 12 large peatlands (with greater than 1,000,000 cubic metres of peat) and a further 45 minor peatlands. (Figure 1).
One or two clusters of sites do emerge, specifically in the southeast (Jackson's Bog, Craigie Bog, Killarney, Badger's and Bega Swamps) and the western ranges (Tomney's Plain, Spencers Bog, Tarcutta, Micalong, Couragago, Tumorrama and Yaouk Swamps). According to Costin's (1954) map of soils for the Monaro Tablelands there is also a dense cluster of small peat deposits around the Badja Swamps, including Pepper's Swamp to the west.

Fens (those where the watertable is at the surface for much of the year) in southern montane New South Wales are largely dominated by sedges (Cyperaceae), especially *Carex gaudichaudiana*. Costin (1954) distinguishes rich and poor fen peat with *Carex* dominating the formation of both. The difference between these peats lies within the acidity of the sediments: rich fen peat being slightly acid to alkaline and poor fen peat being moderately to strongly acid. Costin also notes an altitudinal separation of these peats with the latter mainly in the alpine and subalpine areas. Average pH values for fen peat are 5.6 - 5.8. Good examples of deep fen peat were found at Wingecarribee, Killarney and Nursery Swamps, Jackson's Bog, Micalong, Tarcutta and Yaouk Swamps. Restionaceae (*Anarthria, Baliskion, Empodisma*) may contribute to some swamps.

The best development of such sites is seen in areas with granite as basement parent material, as these produce coarse sands that underly the peat and act as aquifers. The major exception to this rule is Wingecarribee Swamp which has developed to a remarkable degree upon a sandstone and shale base. A gently sloping landscape helps to explain its presence but the singularity of this site in terms of size, volume and distance from other major peatlands suggests a geological explanation connected with aquifer discharge into gravels from beneath the basalt flows on the eastern margin. Long Swamp, west of Moss Vale, is also unusual, being a *Carex gaudichaudiana* fen peatland infilling a sandstone cliffed valley.

The development of shrub-*Sphagnum* bogs is best in small catchments with only minor streams since it thrives in conditions of deprived nutrient intake while having sufficient moisture to maintain growth.

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Figure 1 Location of major peatlands in southern montane New South Wales. Where available an ANCA reference number is provided (ANCA 1996).
Below altitudes of about 1100 m the development of such peats is relatively uncommon (Whinam and Chilcott in press) although *Sphagnum* is found almost to sea level. Shading and local groundwater may limit the lower altitude bogs to the base of valley slopes where it is shaded. *Sphagnum* grows only where sheltered by valley sides and forest at Nursery Swamp and Tom Gregory Bog. Small *Sphagnum* bogs occur along subalpine creek lines with increasing frequency above 1100 m altitude. A rough estimate is that collectively these bogs may make up about 1% of the area above 1300 m. Shrub richness increases with altitude, lower altitude bogs having *Leptospermum* and *Epacris* species. Above 1400 m *Richea continentis* is often dominant with *Baeckia gunniana*. Peat depth is not so great as for fens, being generally 1-2m and they are more acid, pH < 4.5. *Sphagnum* moss often develops into hummocks which can attain heights of up to a metre as at Snowy Flat. The moisture balance within the hummocks is maintained by the capillary action of *Sphagnum*. During summer the surface of the hummocks may show severe drying but the subsurface moss is moist and green. Destruction of the living *Sphagnum* quickly results in the decomposition of underlying peats since the mechanism which maintains the moisture level in the hummocks is lost. Once exposed to the dry aerobic conditions the peats rapidly decompose and lose their characteristic structure.

The alpine region above the treeline has extensions of shrub bogs and *Carex* fens which resemble those of the montane southern group, though usually these communities are shorter, and lacking several subalpine species such as *Hakea microcarpa*. *Carex gaudichaudiana* fens are widespread, but shrub bog tends to be riparian. Unlike the montane area, wet habitats extend out onto slopes and below long lasting snow patches, so that the alpine mires include the moist areas of sod tussock grassland and alpine herbfield. These are highly related to topography but the low evaporation and high precipitation give rise to areas of poorly developed blanket bog, dominated by *Empodisma minus*, tussock grasses and snow daisies.

**Mire Histories**

**Peatland initiation**

Current research based on carbon dating, fossil pollen and spores, and microscopic charcoal suggests that the majority of peatlands in the region post-date the last period of glaciation which occurred from 26-16,000 years ago (Barrows et al 2001) and owe their origin to the post-glacial amelioration of climatic conditions. At the end of the Pleistocene most montane streams lay above the treeline and their channels were choked infilled by sands and gravels. Increasing temperature and precipitation allowed grasslands to stabilise the catchments permitting the establishment of many swamp plants on the river flats. The plants blocked streams and the wet conditions created of anaerobic conditions and peat accumulation followed.

Some valley wetlands may formerly have held peat bogs which were lost through erosion, fire or drying. Wood in black clays below sands at Wingecarribee Swamp provides an age of 37,000 BP for a probable early swamp building phase. One remarkable Victorian site, Caledonia Fen has preserved a deep deposit with repeated phases of bog formation (M. MacKenzie personal communication).

There is no clear correlation between the onset of peat formation and mire altitude. Early sites at 14-15000 BP occur at all altitudes and must reflect topographically favourable locations (Table 4). By 10,000 BP peat formation was extremely widespread; thus we can conclude that slopes had become increasingly stabilised between 15,000 and 10,000 years ago. The pollen analyses at montane sites (eg Delegate River Crystal Bog Jacksons Bog Rennex Gap) show that forest vegetation developed in the region after 11,000 BP while in alpine sites (Blue Lake, Mt Twynham, Raine 1974), original fjeldmark was replaced by alpine herbfields or heaths by about 9000 BP.

There is thus good reason for presuming that climatic conditions and well developed vegetation generally resembled present day environments by 9000-10,000 BP. This broad conclusion needs a great deal of further research on a geographical range of sites to obtain detail on the processes of environmental change. The reasons for the variation in ages for the initiation of peat are not yet understood. Possibly the early sites are those in the most humid regions and increasing rainfall probably played a part.
### Table 4. Dates for the Initiation of Peat Formation in Montane Sites

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Locality</th>
<th>Altitude</th>
<th>Date (years BP)</th>
<th>Lab Number</th>
<th>Peat (cm)</th>
<th>Material</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bega Swamp</td>
<td>30 km E of Nimmitabel</td>
<td>1080</td>
<td>13,400±280</td>
<td>ANU-1216</td>
<td>268</td>
<td>Humic peat</td>
<td>Polach and Singh (1980)</td>
</tr>
<tr>
<td>Big Badja Swamp</td>
<td>35 km E of Cooma</td>
<td>1030</td>
<td>9760±170</td>
<td>GRN-3523</td>
<td>218</td>
<td>Humic peat</td>
<td>Martin, unpubl.</td>
</tr>
<tr>
<td>Black Swamp</td>
<td>Barrington Tops</td>
<td>1550</td>
<td>8,865±120</td>
<td>SUA-1414</td>
<td>180</td>
<td>Humic peat</td>
<td>Dodson, (1987)</td>
</tr>
<tr>
<td>Bogong Swamp</td>
<td>Mt. Kosciuszko</td>
<td>1590</td>
<td>2,750±970</td>
<td>SUA-1623</td>
<td>220</td>
<td>Core peat</td>
<td>Martin, unpubl.</td>
</tr>
<tr>
<td>Bunyip Bog</td>
<td>Mt Buffalo, Vic</td>
<td>1330</td>
<td>10,250±220</td>
<td>GX-3981</td>
<td>300</td>
<td>Sphagnum peat</td>
<td>Binder (1978)</td>
</tr>
<tr>
<td>Caledonia Fen</td>
<td>Mt Buller, Vic</td>
<td>1280</td>
<td>&gt;80,000</td>
<td>OSL</td>
<td>1900</td>
<td>Organic clay</td>
<td>MacKenzie unpubl.</td>
</tr>
<tr>
<td>Club Lake</td>
<td>Mt Kosciuszko</td>
<td>1955</td>
<td>9,770±140</td>
<td>SUA-1259</td>
<td>265</td>
<td>Peaty silts</td>
<td>Martin 1986</td>
</tr>
<tr>
<td>Cotter Source A</td>
<td>Mt Scabby, ACT</td>
<td>1720</td>
<td>9040±80</td>
<td>ANU 10194</td>
<td>115</td>
<td>Peaty sand</td>
<td>Hope unpubl.</td>
</tr>
<tr>
<td>Crystal Bog</td>
<td>Mt Buffalo, Vic</td>
<td>1350</td>
<td>14,190±170</td>
<td>GX-5234</td>
<td>285</td>
<td>Organic clay</td>
<td>Williams(1980)</td>
</tr>
<tr>
<td>Delegate River</td>
<td>12 km S Bendoc, Vic</td>
<td>1000</td>
<td>12,160±310</td>
<td>GaK-5846</td>
<td>298</td>
<td>Organic sands</td>
<td>Ladd (1979)</td>
</tr>
<tr>
<td>Diggers Creek</td>
<td>Mt Kosciuszko</td>
<td>1755</td>
<td>10,170±100</td>
<td>GaK-3929</td>
<td>132</td>
<td>Sandy peat</td>
<td>Martin (1999)</td>
</tr>
<tr>
<td>Echo Flat</td>
<td>13 km E Lake Mt Vic</td>
<td>1370</td>
<td>5,380±160</td>
<td>GaK</td>
<td>160</td>
<td>Sphagnum peat</td>
<td>Ashton and Hargreaves (1993)</td>
</tr>
<tr>
<td>Ginini Bog</td>
<td>Mt Ginini, ACT</td>
<td>1590</td>
<td>3,280±70</td>
<td>GRN 2491</td>
<td>120</td>
<td>Sphagnum</td>
<td>Costin unpubl.</td>
</tr>
<tr>
<td>Ginini Bog</td>
<td>35 km SW Canberra ACT</td>
<td>1590</td>
<td>3,280±70</td>
<td>GRN-2491</td>
<td>220</td>
<td>Sphagnum peat</td>
<td>Costin (1972)</td>
</tr>
<tr>
<td>Horse Swamp</td>
<td>Barrington Tops</td>
<td>1260</td>
<td>10,725±130</td>
<td>SUA-1415A</td>
<td>150</td>
<td>Organic clay</td>
<td>Dodson (1987)</td>
</tr>
<tr>
<td>Jacksions Bog</td>
<td>30 km SW Bombala</td>
<td>780</td>
<td>11,725±460</td>
<td>GX-7301</td>
<td>320</td>
<td>Organic sands</td>
<td>Southern (1982)</td>
</tr>
<tr>
<td>Micalong Swamp</td>
<td>35 km E Tumut</td>
<td>1100</td>
<td>12,330±250</td>
<td>ANU-3342</td>
<td>390</td>
<td>Sedge peat</td>
<td>Kemp (1993)</td>
</tr>
<tr>
<td>Mullion Swamp</td>
<td>25km west of Braidwood</td>
<td>799</td>
<td>3440±90</td>
<td>ANU 10753</td>
<td>345</td>
<td>Peaty clay</td>
<td>Hope, unpubl.</td>
</tr>
<tr>
<td>Nursery Swamp</td>
<td>40 km SW Canberra, ACT</td>
<td>1100</td>
<td>8,200±250</td>
<td>ANU-3357A</td>
<td>298</td>
<td>Carex peat</td>
<td>Hope unpubl.</td>
</tr>
<tr>
<td>Rennex Gap</td>
<td>Mt Kosciuszko</td>
<td>1575</td>
<td>10,600±135</td>
<td>ANU-2177</td>
<td>150</td>
<td>Humic peat</td>
<td>Hope unpub.</td>
</tr>
<tr>
<td>Rotten Swamp</td>
<td>Northeast of Mt Kelly, ACT</td>
<td>1445</td>
<td>5,500±90</td>
<td>ANU 9484</td>
<td>60</td>
<td>Peaty sand</td>
<td>Clark 1986</td>
</tr>
<tr>
<td>Snowy Flat</td>
<td>Mt Gingera, ACT</td>
<td>1618</td>
<td>7,130±70</td>
<td>ANU 11464</td>
<td>205</td>
<td>Muck peat</td>
<td>Macphail, unpubl.</td>
</tr>
<tr>
<td>Tarcutia Swamp</td>
<td>South of Batlow</td>
<td>780</td>
<td>9420±110</td>
<td>ANU 4384</td>
<td>525</td>
<td>Peaty clay</td>
<td>Williams, unpubl.</td>
</tr>
<tr>
<td>Upper Snowy River</td>
<td>Mt Kosciuszko</td>
<td>1830</td>
<td>15,000±350</td>
<td>NZ-399</td>
<td>ca50</td>
<td>Sedge peat</td>
<td>Costin (1972)</td>
</tr>
<tr>
<td>Wilsons Valley</td>
<td>Mt Kosciuszko</td>
<td>1460</td>
<td>1,600±80</td>
<td>GaK-3923</td>
<td>53</td>
<td>Sphagnum peat</td>
<td>Martin, unpubl.</td>
</tr>
<tr>
<td>Wingeearreebe</td>
<td>20 km E Moss Vale</td>
<td>670</td>
<td>2,520±80</td>
<td>ANU-1452</td>
<td>605</td>
<td>Sedge peat</td>
<td>Singh, unpubl.</td>
</tr>
<tr>
<td>Wingeearreebe B</td>
<td>20 km E Moss Vale</td>
<td>670</td>
<td>14,900±1200</td>
<td>ANU-1257</td>
<td>995</td>
<td>Humic peat</td>
<td>Singh, unpubl.</td>
</tr>
<tr>
<td>Yaouk Swamp</td>
<td>Scabby nature reserve</td>
<td>1100</td>
<td>9250±40</td>
<td>ANU 11439H</td>
<td>195</td>
<td>Peaty clay</td>
<td>Keany, unpubl.</td>
</tr>
</tbody>
</table>
**Holocene histories**

Some subalpine mires, for example Ginini Flats and Rotten Swamp, have not preserved their earlier Holocene fill. Both peatlands rest on gravelly slope deposits of probable late Pleistocene age. A lower altitude Carex fen, Nursery Swamp, preserves humic clays from the early Holocene period, but the bulk of the sediment there is fibrous peats formed within the last 3000 years. Wingeecarribee has old organic clays, but the upper 6m of the peatland also seems to have formed within the last 3000 years (Kodela 1997). At about this time there is a probable development or expansion of Sphagnum moss bogs. Bunyip and Crystal Bogs have an expansion event dated at 2050 and 2650 years ago respectively (Binder 1978; Williams 1980). At Jackson's Bog the presence of Sphagnum is first detected 2800 years ago (Southern 1982). Costin (1972) gives a basal date of 3280 years BP for the Sphagnum peats at Ginini Bog. Similarly the Lake Mountain bog commenced growth about 3500 BP. There is a possibility that these changes represent inherent instability or fire events. The preliminary data hints that peat growth was a regional event and hence probably related directly or indirectly to climate (Macphail and Hope 1985).

Yaouk Swamp, and possibly Snowy Flat, have peaty sediments that are early Holocene. A suggestion is that since wet sclerophyll forest expanded in the mid-Holocene to altitudes beyond present limits, wetter conditions than present may have occurred from 9000 to about 4000 years BP. This may have been a time of consistent peat formation and the late Holocene growth phase did not occur at these sites. A few swamps, such as Bega Swamp, Rennex Gap Bog and possibly Cotter Source Bog provide full records of the Holocene.

**European land management**

The impact of European pastoralism can be discerned in virtually every record that has been examined, and that impact is the greatest alteration to the environment that can be seen in the Holocene. Several records have been completed at high resolution, including Bega Swamp (Hope unpublished), Cotter Source Bog (Hope unpublished), Brooks Ridge Fen (Mooney et al 1997) and Club Lake (Dodson et al 1994). Pine pollen forms a useful marker as it occurs in all sites within the last 100 years. Usually introduced daisies such as Hypochoeris increase before the appearance of pine, and in some sites (but not Brooks Ridge) charcoal reaches a peak soon after this. Sites in reserves, such as Rennex Gap and Cotter Source Bog, show a decline in charcoal to low levels after pine is well established, probably around 1935. This indicates that Europeans were responsible for a considerable shift in fire regimes throughout the mountains and elsewhere (Dodson and Mooney 2002). Figure 2 shows a pine and charcoal curve from Top Flat, just below Cotter Source Bog in the ACT, which has these features. There is a rise in charcoal near the top of the section which may be a result of the 1983 fire that burnt across the bog. Post fire stream incision started to dry out the shrub bog so planks were placed across the channels to block the drainage. This was partially successful and bog regeneration has occurred in some sections.
Management considerations

Southern montane New South Wales has the largest biologically distinctive montane peatlands on the mainland. This relative richness compared to the rest of inland Australia creates a good case for optimising the catchment conservation and scientific values of the peatlands as a whole. The agricultural use of these bogs is not compatible with high conservation values and extractive mining demonstrably is a considerable risk to them. Although considerably altered from pre-disturbance state, regeneration is possible, as the communities are adapted to change and colonisation. Causes of disturbance must first be removed, by fencing the perimeter if necessary. The main aim is to return the watertable and flow regime can be returned to pre-drainage conditions. Above the nick points on artificial drains or incising channels this can be achieved by blocking the drains at intervals determined by the natural fall of the bog. The effect of these barriers would be to direct flow out onto the bog surface where it would disperse amongst the vegetation. *Carex* and other sedges would thrive and the peats will expand as water re-enters the dry sediment. Barriers should be extended above the present upstream limit of peat formation so that sediment load can be caught before it enters the mire.

Below the nickpoints the aim is to raise the watertable and reduce the hydraulic gradient which is causing wall slumping. In some cases an earth wall with a downstream dissipative slope would create a pond. Alternatively grading an even slope from the bog to the downstream channel would allow the generalised flow to wet the entire area, propagating the bog downstream. Shrubs such as *Leptospermum lanigerum* might be used there to create a stable vegetation tolerant of intermittent flooding. Re-wetting the bog will solve most weed problems.
Acknowledgements

This work rests on several unpublished analyses of mountain peatlands. In particular I acknowledge help from Debbie Argue, Robin Clark, Alec Costin, Dominique O’Dea, Ben Keaney, Justine Kemp, Phillip Kodela, Michael Macphail, Tony Martin, Ian Raine, John Rogers, the late Gurdip Singh and Dave Wheeler. I am grateful to Roger Good, Ian Pulsford and Rob Hunt of the NSW National Parks and Wildlife Service and Trish MacDonald, Brett MacNamara and Virginia Logan of Namadgi National Park, ACT for their active encouragement and help.

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Frog declines in the Snowy Mountains: what do we know after fifteen years?

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Abstract

Alpine regions of Australia support a number of fascinating and unique species of frogs. They include such renowned species as the Southern Corroboree Frog (Pseudophryne corroboree), Alpine Tree Frog (Litoria verreauxii alpina) and the Baw Baw Frog (Philoria frosti). The rapidly growing list of frogs, which have suffered from population declines, and extinctions has raised considerable international concern. Whilst the decline of some species have been attributed directly to the activities of humans (e.g. draining wetlands, habitat destruction, competition with introduced species), many disappearances of amphibians have occurred in apparently undisturbed habitats, particularly at high altitudes. In 1985 we commenced research and annual monitoring of populations of Australian alpine frogs, particularly in the Snowy Mountains. Over this period we have witnessed the decline and virtual disappearance of the Southern Corroboree Frog and several other alpine species. This observation has led us to document the extent of population declines in alpine frogs and to discover the cause of the decline. Failure to identify the cause of these declines has lead to much speculation as to whether they are the result of long-term natural cycles, population fluctuations or are a sign of some form of human impact on amphibians. The lack of consensus on this debate has been compounded by our lack of knowledge of the biology of most species. We have focussed our research on three species that are in serious decline in high altitude regions of the Snowy Mountains and adjacent mountain ranges (Fiery Range, Bimberi Range, Brindabella Range). We have attempted address the question of whether each species really has declined to a critical level and then, through a combination of observation and experimental work, have attempted to establish the factors that might be leading to the population declines. Finally we have initiated a joint program with the NSW National Parks and Wildlife Service to attempt to experimentally increase the size of remnant populations of the Southern Corroboree Frog. This is being done by a combination of captive husbandry and in situ manipulation of pond water levels to prevent egg and tadpole mortality.

Introduction

The growing list of Australian frogs reported to have suffered from severe declines in their populations, or even extinctions, has raised considerable international concern (Campbell 1999). While the decline of some species has been attributed directly to the activities of humans (e.g. draining wetlands, habitat destruction, competition with introduced species), many disappearances of amphibians have occurred in apparently undisturbed habitats, particularly at high altitudes. Unexplained declines and disappearances of amphibians at high elevations have occurred in many mountainous regions along the eastern coast of Australia, from the Wet Tropics to the southern Australian Alps (Campbell 1999). Failure to identify the cause of these declines has lead to much speculation as to whether they are the result of long-term natural
cycles, population fluctuations or are a sign of some form of human impact on amphibians. The lack of consensus on this debate has been compounded by our lack of knowledge of the biology of most species.

Some of the most restricted and unusual species of frogs in Australia occur in alpine and subalpine environments where they have a particular association with the sphagnum-dominated wetlands characteristic of these upland regions. In the Snowy Mountains of NSW these frogs include two species of Corroboree Frog (*Pseudophryne corroboree* and *P. pengilleyi*) and the Alpine Tree Frog (*Litoria verreauxii alpina*). Each of the species has been carefully monitored at representative sites since 1986, with reliable records for some sites dating back to 1966 (Osborne *et al.* 1999). Unfortunately these frogs have suffered extensive and prolonged declines and concern is now held for their survival in the wild. One species, the Spotted Tree Frog (*Litoria spenceri*), is now quite possibly extinct in New South Wales, having disappeared precipitously from the one site it was abundant at in Kosciuszko National Park (Gillespie and Hines 1999). The declines have not been confined to subalpine and alpine areas; at tableland elevations in the Canberra and Monaro region three other taxa (*Litoria aurea, L. reniformis* and *L. castanea*) disappeared - all were members of the Green and Golden Bell Frog complex (Osborne *et al.* 1996).

A global trend for declines in frog populations has become apparent in recent years (e.g., Wyman, 1990; Blaustein *et al*., 1994; Ferraro and Burgin, 1994; Laurance, 1995; Stebbins and Cohen, 1995). Several potential causal factors have been suggested, including long-term population fluctuations, habitat destruction, climate change, ozone depletion, increased levels of ultra-violet radiation, and disease (Ferraro and Burgin, 1994). Changes in climatic conditions, such as extreme drought, have been implicated in the decline of some species (e.g., Osborne, 1989; Pounds and Crump, 1994; Stewart, 1995; Osborne *et al*., 1996; Osborne and Davis, 1997). In contrast, other authors have rejected climatic change as a causal factor in the declines of some frog species (e.g., Laurance, 1996).

A feature of amphibian declines is that they appear to be most severe at high altitudes in mountainous regions, often in comparably pristine environments. Speculation about the reasons for this apparent trend has included consideration of unusual weather patterns (Corn and Fogleman 1984; Pounds and Crump 1994), acid precipitation (Dunson *et al.* 1992), increased UV-B radiation resulting from ozone depletion (Blaustein *et al.* 1994), deposition of pesticides (Colborn and Clement 1992) and virulent disease (Laurance 1996; Berger *et al.* 1999).

There is no evidence to date that acid precipitation is a problem in the Australian Alps - mainly due to the distant proximity of industrial areas and other sources of pollution, however, there is no information available on the levels of possible contaminants in precipitation and dust in this region. There is now some evidence to suggest that several species of frogs found in the Snowy Mountains have been infected by the chytrid fungus (Dr R. Speare James Cook University pers. comm.). However, the apparently slow, but progressive, decline rate in the alpine species in Australia (Osborne *et al.* 1999) is not typical of that observed in declines that are attributed to chytridiomycosis in North Queensland. Nevertheless it is highly likely that the decline in alpine frogs has been exacerbated by the chytrid fungus acting in concert with some other factor, such as changed weather patterns or increased UV-B radiation.

In this paper we report briefly on research and proactive experimental management aimed at understanding the reasons for declines in alpine frogs and in stemming further declines in field populations. As a last resort action, we acknowledge the considerable role that captive husbandry will now play in the conservation of these species as they move closer to extinction in the wild.

**Frog declines in the Snowy Mountains region**

Declines of frog populations in the Southern Highlands of New South Wales were first observed in the early 1980’s (Osborne 1986, 1989, 1990). The species involved included several pool-breeding species found at subalpine and alpine elevations: the Alpine Tree Frog (*Litoria verreauxii alpina*), the Southern Corroboree Frog (*Pseudophryne corroboree*), and the Northern Corroboree Frog (*Pseudophryne pengilleyi*).

The Alpine Tree Frog, a distinctive subalpine and alpine subspecies, has now disappeared entirely from the alpine zone in the Snowy Mountains where it was once abundant (Hunter *et al.* 1997; Osborne *et al.* 1999). It now persists at a few isolated sites associated with relatively deep, well-vegetated artificial
water bodies at lower elevations. In Victoria the subspecies has disappeared from the Bogong High Plains, but is still common on the slightly lower elevation Dargo High Plains and near Dinner Plain and Horsehair Plain east of Mount Hotham (Osborne et al. 1999).

The Southern Corroboree Frog has suffered an extensive decline throughout its range. Most remaining breeding populations are reduced to a few individuals and the species is in imminent danger of extinction (Osborne et al. 1999; Hunter 2000). The Northern Corroboree Frog has declined extensively at subalpine sites on the Bimberi Range, but persists in reasonable numbers at many montane sites (below about 1200m) in the Fiery Range (Osborne et al. 1999).

Understanding of population dynamics essential for informed management

One part of our research is directed at obtaining information on the population dynamics of declining alpine frog species. Prior to this research it was believed that the Southern Corroboree Frog only lived for three years (two years as a sub-adult and one year as a breeding adult), however through the use of skeletochronology (a technique for determining age by counting growth rings in bone cross-sections obtained from Museum specimens) we now believe this species may live for up to seven years. This data, and similar data obtained on the Northern Corroboree Frog and Alpine Tree Frog, is important for interpreting the results of the long term monitoring program for these species.

Information has also been obtained indicating that high levels of mortality during the egg and tadpole stages may be contributing to the continued decline in the Southern Corroboree Frog and that this level of mortality is probably being exacerbated by the small size of remnant populations. Reduced autumn and winter precipitation may be one explanation for the high over winter mortality of the eggs and tadpoles.

Is ultraviolet radiation responsible for declines in alpine frogs?

This research relates to our knowledge that there has been considerable depletion of stratospheric ozone over the past two decades, and that this has resulted in increased levels of ultraviolet-B radiation (UV-B). Ozone depletion appears to be most severe in the Southern Hemisphere and UV-B radiation may therefore be of particular concern for Australian amphibian declines. This is particularly likely to be the case at high altitudes where UV-B levels are significantly higher than in adjacent lowlands.

In research recently completed by Broomhall et al. (2000) experiments were conducted in artificial water bodies established at three altitudes (1360 m, 1600 m, and 1930 m) near Thredbo in the Snowy Mountains. Broomhall et al. (2000) compared the survival of eggs and embryonic tadpoles that were shielded from UV-B (by means of clear plastic UV-B filter) with the survival of other replicates not provided with filters and with controls which had a filter that actually let UV-B through. The results were quite dramatic. At all altitudes the blocking of ultraviolet-B significantly enhanced the survival of the declining species, the Alpine Tree Frog. Without protection from UV-B tadpoles of the Alpine Tree Frog invariably died. By contrast, a non-declining species, the Common Eastern Froglet (Crinia signifera) survived in much higher numbers under all treatments, although there was also a significant effect of UV-B, particularly at the higher altitude sites. The results strongly supported the hypothesis that ultraviolet radiation is a factor in the disappearance of the Alpine Tree Frog at high altitudes - it still persists at a few low altitude sites, usually in association with deep artificial ponds with somewhat murky water. This last observation is important because we know that murky water high in dissolved organic carbon provides a very effective shield against ultraviolet radiation.

More recently we (Hunter, Osborne and Green in prep.) completed similar field trials in enclosures in natural pools that allowed the hatched embryos access to the bottom of the pools. In this set of experiments there appeared to be little difference in the survival rate enclosures protected from UV-B radiation and those directly exposed to sunlight. Due to a lack of financial support we have been unable to continue these trials and further work is required to substantiate our preliminary findings.
Why climate change might lead to losses in frog populations at high elevations

Frogs are very likely candidate species that may be sensitive to climate change. They are dependent on moist environments for both physiological maintenance and reproduction (Duellman and Trueb 1994). Several long-term studies have correlated population fluctuations in amphibians with climatic variables, particularly with annual variation in precipitation patterns (Stewart 1995; Pechmann et al. 1991). The direct effect of climate on amphibians may include desiccation of both the larval and adult phases, while indirect effects include prevention of breeding activity and the lowering of the immune system making the frog more susceptible to pathogens (Pounds and Crump 1994).

The effects of global warming on our environment have continued to be an area of concern (Zhang, 1996). The surface temperature of the Earth is affected by the presence of minor trace gases (or greenhouse gases) such as carbon dioxide, methane, nitrous oxide, and chlorofluorocarbons (Scientific Aspects of Major Environmental Topics: Climate Change, 1992). As the levels of many greenhouse gases continue to increase in our atmosphere, some global warming is expected (Pearman, 1991; Brereton et al., 1995; State of the Environment Advisory Council, 1996; Zhang, 1996; Whetton 1998). Global warming resulting from increasing greenhouse gases will produce other environmental changes including alterations to rainfall and snowfall patterns (Brereton et al., 1995). It has been estimated that global warming of 1.5 - 4.5 °C is probable over the next 30-50 years, which will lead to regional changes in the hydrological cycle (Pearman, 1991; Salinger and Pittock 1991).

Whetton (1998) predicted the likely occurrence of decreasing natural snow-cover over the next eighty years; using a version of the snow-cover model presented by Galloway (1988) and current CSIRO climate change scenarios. However, using data to 1996, Osborne and Davis (1997) noted that an annual increase in maximum temperatures in south-eastern Australia of less than 0.1 °C has been recorded since 1951. Also, Ruddell et al. (1990) did not find any significant trends in temperature or precipitation in the Snowy Mountains region. Furthermore, Ruddell et al. (1990) found no trends in snow-cover in south-eastern Australia, as did Duus (1992) at Spencer’s Creek, New South Wales (between 1910 and 1991). These conclusions are, however, based on the data from very few weather stations and clearly an update and more sophisticated analysis is required.

Although there is no direct evidence yet for a general warming in the Alps (Snowy Mountains and Bogong High Plains) it does not necessarily imply that there has been no effect on alpine and subalpine areas. There is clear evidence of a recent warming trend at lower elevations in the region. Ruddell et al. (1990) note that at two low elevation stations, Mt Beauty and Rubicon, that are adjacent to alpine areas in Victoria, there are reliable long-term records clearly suggestive of warming trends. They observed that there has been an overall increase in temperature of between 0.2 and 0.4 °C every ten years since the mid-1940’s. More recently, Davis (1998) compared winter temperature trends (May to October) from Cabramurra with trends in upper air temperatures at Wagga Wagga. Davis found that there was a slight indication of warming at both locations, particularly evident in the Wagga Wagga record. It is feasible that even slight warming would be enough to increase evaporation from shallow seepages and directly from the ground surface near breeding sites. The high levels of insolation and lower air pressure in alpine areas would enhance the effect (Mani 1968).

Climatic changes of the magnitude predicted by climatologists may dramatically alter alpine ecosystems. Using BIOCLIM to model species occurrence and distribution, Brereton et al. (1995) found that the distribution of many of our species might be drastically altered, possibly to extinction, by global warming. Busby (1998) argued that increasing temperatures due to the greenhouse effect might result in the mass extinction of alpine species throughout south-eastern Australia. Species which are poor dispersers, have narrow habitat requirements, and/or inhabit montane and alpine habitats are possibly vulnerable to environmental changes such as global warming (Brereton et al., 1995). Montane and alpine frog species, due to their dependency on water, poor dispersal abilities and specific habitat requirements (Duellman and Trueb 1994) may succumb to changing climates more quickly than other species. The decline of up to seven species of frog in the higher altitude areas of south-eastern Australia (Gillespie et al., 1995) is suggestive of a regional influence (Osborne and Davis, 1997).
Monitoring of populations of the Southern Corroboree Frog over the last 12 years indicates that there has been a substantial decline in the population with a gradual contraction of the geographic range of the species to the wetter more easterly part of its former range. It is possible that long-term changes in weather patterns may be in some way involved in the decline of this species. Annual fluctuations and longer-term oscillations (related to the El Nino southern oscillation) characterise the precipitation record in the Australian Alps during all of the 20th century. Osborne and Davis (1997) found that found that the onset of the declines in alpine frogs coincided with particularly severe droughts during a long period of below average precipitation (1979-1987). What is surprising, though, is that there has been no sign of recovery in the frog populations despite a return to more favourable weather conditions during the 1990’s (excluding the recent drought which once again had a severe effect on both species of Corroboree Frog).

The need for predictive modelling at a landscape scale

Whilst temperature increases are difficult to detect at alpine elevations, perhaps due to the lack of sampling sites in this region, a clear trend of increasing temperature is reported for nearby lower elevation regions (ACT State of Environment Report) and the slight changes likely to have been experienced at higher elevations may still have had some impact. It is possible that combination of changed annual weather patterns - for example decreased winter precipitation - combined with slightly increased temperatures may cause pools to dry at this stage when tadpoles are present in the pools. It is also possible that subtle and localised differences in climate and weather patterns may act in concert with other causal agents (such as the pathogen chytridiomycosis (Berger et al. 1999) which has recently been detected in both species of corroboree frog) in the decline of alpine frogs.

Approaches to examining this possibility would include examining shifts in seasonality of precipitation, the distribution and magnitude of precipitation events and the intervals between precipitation events. On the ground, a landscape scale analysis is required to determine whether there is a link between local weather patterns and the pattern of declines.

Attempts to increase the size of small remnant populations of the Southern Corroboree Frog

In an attempt to ameliorate the continued decline and extinction of small remnant populations of the Southern Corroboree Frog, two additional projects commenced in 1997 - a population augmentation experiment (combination of field and ex situ actions) and captive breeding program in collaboration with the Amphibian Research Centre in Melbourne (a private centre run by Gerry Marantelli that is focussed on the captive husbandry and conservation of Australian frogs) (Hunter et al. 1999).

The aim of the population augmentation project is to increase the size of several small populations of this species through increasing the level of survivorship from egg to metamorphosis. This is being done by a combination of captive husbandry and in-situ manipulation of pond water levels to prevent egg and tadpole mortality. To confirm whether our captive rearing procedure is in fact reducing mortality during these early life-history stages, a comparison of survivorship between captive-reared and natural field-reared tadpoles was undertaken. The results demonstrated our ability to significantly increase survivorship via captive rearing, with the greatest level of field mortality occurring during the over-wintering stage – field mortality has been very high, with many clutches failing completely.

It appears that with reduced autumn rainfall the eggs are not hatching, and that the encapsulated tadpoles are then dying due to freezing of the oviposition site in early winter. By removing eggs and raising them in the lab, or by placing well-advanced eggs directly into the pools before winter, we have greatly increased survivorship through to metamorphosis the following summer. As the Southern Corroboree Frog takes from three to four years to reach sexual maturity, we will not be able to test the results of our efforts until the summer of this year (2002/2003); at this time we expect to see a significant increase in the number of adults at our experimental sites when compared to control sites where no manipulation is being undertaken.
Conclusion

Our research has focussed on three species (Southern Corroboree Frog, Northern Corroboree Frog and Alpine Tree Frog) that are in serious decline in high altitude regions of the Snowy Mountains and adjacent mountain ranges (Fiery Range, Bimberi Range, and Brindabella Range). We have attempted address the question of whether each species really has declined to a critical level and then, through a combination of observation and experimental work, we are in the process of attempting to establish the factors that might be leading to the population declines.

Research to date has addressed climate change and the influence of increased levels of ultraviolet radiation. For four years a joint effort has been conducted involving the University of Canberra (Applied Ecology Research Group), the NSW National Parks and Wildlife Service and the Amphibian Research Centre (in Melbourne) in an attempt to experimentally increase the size of remnant populations of the Southern Corroboree Frog. This is being done by a combination of captive husbandry and in situ manipulation of pond water levels to prevent egg and tadpole mortality. A similar program is now planned for some populations of the Northern Corroboree Frog. The recent discovery of the amphibian chytrid fungal pathogen in specimens of both species of corroboree frog highlights the need for urgent further action and support for ex situ conservation efforts.

Acknowledgements

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Rehabilitation of the Jounama Pine Plantation, Kosciuszko National Park

Andy Spate, Mick Pettitt and Jo Caldwell

Abstract

The 602 hectare Jounama Pine Plantation was progressively established between 1923 and 1935 in the then Jounama State Forest. In 1944 it became part of firstly, the Kosciusko State Park (in 1944) and, ultimately, Kosciuszko National Park. The Plantation lies at an altitude of about 1000-1200 metres. It is surrounded by a variety of forest communities and, nearby, the broad, open sod-tussock grasslands. There are a large number of coniferous species, chiefly Pinus laricio, P. ponderosa, P. contorta and P. lambertiana and other Pinus spp., within the Plantation.

During the 1970s, it was becoming increasingly apparent that the Plantation was having an impact on the native vegetation with the spread of Pinus wildings more than 20 kilometres across the Park. In the 1980s there was some belief that the Plantation was having some impact on karst values in the wider Yarrangobilly Management Unit.

Following the gazettal of the 1982 Plan of Management for the Park which specifically identified the need to address the Pinus problems, and the production of an Environmental Impact Statement, logging commenced in 1985 with active rehabilitation starting about a year later.

This paper describes the Plantation history and setting, outlines the problems presented by the Pinus wildings and describes the rehabilitation process.

Introduction

The 602 hectare Jounama Pine Plantation lies in the northern end of Kosciuszko National Park surrounded by a large variety of vegetation types including tall, moist forests, moist to dry sclerophyll subalpine forests and woodlands and tussock grasslands. Importantly, the Plantation is within the catchment of the nationally significant Yarrangobilly karst area (Map 1). Indeed, some 12-15% directly overlies the limestone karst which includes both caves and integrated karst drainage systems.

Three Pinus species predominate in the Plantation together with a large number of other coniferous species either planted in compartments or in an arboretum. The dominant species are Pinus ponderosa (354 ha), P. laricio (218 ha) and P. contorta (30 ha). There is a 1.4 ha coupe of P. lambertiana. Some

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1 The NSW Geographical Names Board has changed the spelling of ‘Kosciusko’ to Kosciuszko’. The latter spelling is used in this paper except where publications are cited or formal names are used.
planted coupes failed soon after planting and the pines, chiefly *P. jeffreyi*, have been replaced by fine stands of self-sown eucalypts such as *Eucalyptus viminalis*. There is no *P. radiata* among the 12 species of *Pinus* within the Plantation.

By the early 1970s it became apparent that the Plantation was providing a source for the spread of *Pinus* wildings across the northern part of the Park. The main species involved are *P. contorta, P. ponderosa* and *P. laricio*. Wilding pines that could only have come from Jounama were establishing in many ecological communities to the east of the Plantation. There were also concerns about the Plantation’s possible impacts on the karst systems both under the Plantation and further downstream.

Following growing concerns and some public submissions in the late 1970s the issue of the Plantation was directly addressed in the 1982 Plan of Management for Kosciusko National Park (Anon 1982). This led to the production of an Environmental Impact Statement (EIS) for the harvesting and rehabilitation of the Jounama Pine Plantation, which was prepared, jointly by the National Parks and Wildlife Service and the Forestry Commission (Anon 1983). Harvesting was to be carried out under the auspices of the Forestry Commission (now State Forests) with revenue being split with the National Parks and Wildlife Service (NPWS). The NPWS’s share of the revenue was earmarked for rehabilitation, which was aimed at returning the Plantation area into self-sustaining vegetation communities such as existed on the site before European settlement, and for the control of pine wildings.

Harvesting commenced in 1985 and rehabilitation in 1987. This paper describes the Plantation, its history and the harvesting and rehabilitation project. The Environmental Impact Statement (Anon 1983) remains the best source of information on the Plantation, its history, setting and environment as well as describing the philosophy and direction of the harvesting and rehabilitation project.

**Jounama Pine Plantation And Its Environment**

The desirability of pine plantations for the Tumut region, including in the Yarrangobilly area, was mooted as long ago as 1904. In spite of its almost total inaccessibility plantings began in 1923 and continued until 1935. A very small additional coupe was planted in 1954. Plantation planning included the definition of paddocks for the horse teams to be used in harvesting! Very little silvicultural work was carried out through the plantation’s lifetime although there was some minor logging, chiefly of *P. ponderosa*, for short-term projects or during highway reconstruction.

In 1944 the area was transferred to the then Kosciusko State Park (which became Kosciusko National Park in 1967) but management of the Plantation remained in the hands of the Forestry Commission.

The redevelopment of the Snowy Mountains Highway in the early 1970s provided a realistic logistic opportunity for harvesting the Plantation.

The Plantation lies at an altitude of between 1020 and 1190 metres. It is largely within the catchment of the Yarrangobilly River although it spills over into the headwaters of Jounama Creek. The drainage to Jounama Creek lies through the enigmatic and probably karst-related Jounama Ponds.

The Yarrangobilly Limestone underlies some 12-15% of the Plantation area with most of the remainder being shales and similar rocks of the Ravine Beds. There has been some contact and hydrothermal metamorphism, chiefly of the limestone, associated with the emplacement of the Bogong Granites to the north of the Plantation. There are very small areas of granites and volcanics. Slopes range from zero to 26° with most being well below 18°.

The Soil Conservation Service, as part of the EIS process, mapped the soils and identified six groups reflecting the geology. The most abundant were described as ‘Red Mudstone Soils’ and ‘Reddish Limestone Soils’. During the rehabilitation phase considerable variation in soil type, and plant response became apparent. None of the soils appears highly erodible but some are very shallow and poor in nutrients.

Although records are scant, it would appear that parts of the Plantation were both natural and artificial sod tussock grassland prior to planting. In other areas, eucalypt forest was deliberately felled and burnt for establishment. There may have been some prior clearing of subalpine woodlands and similar communities...
reaching back as far as the 1840s as the scant records do mention the establishment of pines in regrowth areas.

As mentioned above, the 1982 Plan of Management for the Park required the production of an Environmental Impact Statement for the harvesting and rehabilitation project. This followed canvassing of the issue in the draft plan exhibition period. There was public support for the project in all submissions to the exhibited plan as well as some local criticism - largely in the Tumut press.

Harvesting was to be carried out under the control of the Forestry Commission utilising the Tumut Forestry District’s Code of Logging Practices for Conifer Plantations with some additional proscriptions dealing with wet-weather and winter season operations.

The EIS spelt out a philosophy and directions for the rehabilitation works but, as such a project was unique in an Australian context, only general guidelines could be provided.

It is probably wise to examine the potential impacts that the Jounama Pine Plantation might have in its geographic context within Kosciuszko National Park. Firstly, there is an undoubtedly aesthetic impact of a major, non-natural and highly distinctive vegetation block dominating the scenic Yarrangobilly Village, visible from the high peaks of the Bogong Wilderness (although small compared to many other Pinus plantations visible from these peaks) and very much part of the viewscape from the Snowy Mountains Highway.

Secondly, the Plantation is the source for the spread of Pinus wildings across much of northern Kosciuszko. Surveys carried out as part of the development of the EIS suggested very high densities of various pine species around the Plantation. Subsequent objective surveys reinforced these estimates – indeed they proved that the earlier surveys considerably underestimated the problem. P. contorta has spread as much as 22 km from the Plantation. There have been a number of sightings of cockatoos carrying pinecones in their claws well away from the Plantation!

Earlier suggestions that the Plantation may have been having a substantial impact on the Yarrangobilly karst outside the planted area would seem unfounded. Inside the Plantation there are clear impacts on the karst including on surface karst features, on cave microclimates and on cave biota (Anon 1983, Spate unpublished).

Anecdotal, but well-substantiated, evidence from Naracoorte Caves and other areas in southeastern South Australia, and to a lesser extent from New Zealand, has demonstrated considerable impacts on caves from overlying Pinus species. These impacts have largely been on the hydrological regimes but also, significantly, on the vertical fluxes of water into caves. The pines have certainly had a direct impact on the caves underlying the Plantation. These impacts include changes in water and carbon dioxide regimes within the caves (Anon 1983, Spate unpublished) and on invertebrate cave faunas (Anon 1983). Interestingly once the pines have been harvesting some spalling of limestone outcrops takes place leading to similar impacts to that of fire on limestone (Holland 1994). The mechanism for this low temperature spalling is unknown.

Following the EIS process, and indeed well after the commencement of harvesting and rehabilitation activities, the Southern Branch (New South Wales) of the Institute of Foresters of Australia nominated about 50 ha of the Plantation for inclusion on the Register of the National Estate (Bratby 1995). The nomination proceeded to fruition and the area is now listed. From the current authors’ perspective this action, should the 50 ha of Plantation remain, means that the wilding source would remain within the Park and that the very considerable cost of rehabilitation had been squandered? Harvesting occurred in the nominated area in 2001/2002. But, prior to any harvesting, the area was photographed (for record purposes) and extensive seed collection was carried out. Seed from the nominated area is now being archived by State Forests of NSW as a biological record of the species planted.
**Harvesting**

Harvesting of the Plantation presented a number of problems over and above those normally encountered in a pine logging operation. These included various social interactions (for example, the logging season is the time of the busiest use of the Snowy Mountains Highway) and the fact that only one of the species (*P. ponderosa*) to be harvested was utilised in local sawlog and veneer mills. Different species have different mechanical and chemical characteristics and thus machines need to be reset, chemicals changed and so on during the utilisation process.

When the project was first mooted there was very considerable interest from mills at Tumut and Wagga Wagga for product from the Plantation. Through the life of the harvesting project the market has waxed and waned and in some years no market could be found and thus no logging took place. Much less of the timber resource has been utilised than was originally envisaged. The search for markets has resulted in some unusual destinations for timber from the Plantation with the recent supply of pit props to the South Korean mining industry being perhaps the most surprising.

Although there was some handfelling in the early years of harvesting it has been largely machine-based with product mainly going to Tumut processors for sawlogs, veneer and pulp although these latter have been harder to sell. In recent years markets within Canberra have been sourced for the larger material (although this market has now waned) and some hope rests with the construction of the new Visy paper mill at Tumut in utilising the pulp-sized wood.

Other than marketing problems there have been few problems with the logging operations with perhaps the most dramatic being one not foreseen in the EIS process. This was a substantial increase in kangaroo roadkill numbers along the Blowering foreshores sections of the Snowy Mountains Highway. In later years, rather more logging slash remains on site following harvesting than expected and this has lead to a greater use of fire in clearing the site.

**Rehabilitation**

The philosophy behind the rehabilitation project was to replace the pines with native species to provide opportunities to allow ecological processes to take the environment back to some sort of ecological equilibrium. This may seem like playing God (in Kosciuszko rather than Yellowstone, Chase 1986). The full rehabilitation would obviously require many decades, considerable dollar inputs and a dedication to see it through.

In the mid-1980s there was little experience in Australia, certainly not at the subalpine/montane boundary, in broad-acre landscape rehabilitation outside of the mining industry, which has had many innovative approaches to rehabilitation – usually backed by considerable financial backing. Mine site rehabilitation presents quite different problems to that of replacing an aggressive, virtual monoculture such as a pine plantation, with native communities.

Thus the approach had to be experimental. As modern parlance has it – ‘thinking outside the square’ – was very definitely needed. The rehabilitation process also had to be cheap and effective, and to be ecologically appropriate providing a durable cover using propagules of local provenance.

Experiments included sowing time trials, species trials, seed processing and storage methodologies, the cutting and spreading of ‘hay’ from the local grasslands and the planting of advanced stock into ripples and along drainage depressions. These limited plantings of advanced stock are far outweighed by broadacre establishment from sowing of untreated seed onto bare ground. In the early stages of the rehabilitation process, the seed was broadcast onto areas scraped clear of slash using rakehoes. In later years bobcats were used to produce the slash-free patches for seed broadcast. Trials demonstrated that seed is best broadcast in the late-autumn, early-winter period.

Before the project started there was some research into the presence and viability or otherwise of seed stored in the soil. This work indicated that regeneration from the soil seed store was unlikely to be a factor in the rehabilitation process. There has been a very large amount of self-sown species establishment particularly of shrubs such as *Pimelea pauciflora* and of various grasses. In most areas...
native species establishment has been adequate. In other areas it has not been as effective. This is presumably due to subtle soil and temperature factors.

As logging slash amounts to perhaps 150 tonnes per hectare, removal using fire has been increasingly utilised to assist in the rehabilitation process. This also provides a measure of weed control and allows better access for both sowing and other weed suppression activities.

Wildings provide a particular problem. There are wildings of varying degrees of maturity from immediately adjacent to the Plantation to as far as 25+ km away. It is not a simple gradient of maturity from Plantation to ‘natural’. The dispersal agents (such as Sulphur-crested Cockatoos) do not operate in a negative exponential relationship. When the project was first envisaged it was felt that low-intensity fire would control wildings in the communities adjacent to the Plantation. Experience since then has demonstrated that we cannot rely on low-intensity burns even for control of small-diameter wildings.

The Service, the Tumut/Brungle Aboriginal Land Council, contractors and volunteers have conducted many wilding control programs inside and outside the Plantation. The problem is huge – and short of a major, extreme bushfire-event may not be capable of solution.

Take, for example, the Yarrangobilly karst. Pinus wildings are widespread across the karst in a variety of topographic situations. Some are inaccessible because of the presence of cliffs. We know that much of the limestone area has not burnt since 1909 (Jack Bridle, Talbingo, and Clarrie Dunn, Talbingo, personal communications, November 2002). The riparian zone is unlikely to ever burn. Physical methods are therefore difficult or impossible in some areas and the use of fire is contraindicated or may not be possible. Thus wilding control has to be active and hands-on and likely to have to continue for many years.

The Future

The future of the harvesting and rehabilitation process depends very much on available markets for the remaining pine to reduce the source for the spread of Pinus wildings across the Park. Wildings outside the Plantation and regeneration of pines within the harvested areas will be an ongoing problem, as will other weeds, mainly blackberries. The National Parks and Wildlife Service will have Jounama Pine Plantation and its legacy facing it for many years to come.

Establishment of native species has been successful but full development of a pre-Plantation ecosystem will take many decades – perhaps centuries. In general, monitoring of the harvesting and rehabilitation operations has shown that environmental impacts of these have been minimal and not unexpected.

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From the Mountains to the Sea, Recovering a Lost River

Graeme Enders

Abstract

In 1967 the Snowy Scheme’s Jindabyne Dam was completed, and the final door came down on the wild flow of the Snowy River. Its high country snow-melt headwaters, the Eucumbene, the Thredbo, and the Snowy had been diverted west for the generation of electricity, for drought security in the Murray and Murrumbidgee Rivers, and for development of inland irrigation schemes. Not everyone agreed with the development of the Snowy Scheme, or with its effect on rivers. In fact, communities along the Snowy felt they had been short-changed by the political processes leading up to its total diversion. It was not until the Corporatisation process for the SMHEA provided opportunity that a long community campaign resulted in a decision of governments to restore environmental flows to the Snowy River, sourced from water savings made in irrigation areas. The governments of NSW and Victoria are now cooperating to source water savings for the Snowy, to rehabilitate the degraded river channel, and to involve communities in its recovery. This paper looks at a framework for river recovery, and discusses current recovery activities.

The views expressed in this paper are those of the Author and do not reflect the position or opinion of the NSW Government or its Agencies.

Introduction

I grew up exploring mountain rivers in the north east of Victoria; the Rose, Dandongadale, King, Buckland, and so on. I spent time in my teenage years canoeing the Ovens & Murray Rivers, and even in that short time I saw significant changes to catchment hydrology, infestation of willows and other riparian weeds, changes in fish such as native ‘greasies’ (blackfish) to redfin, and the movement of European carp into the upper Murray system. I later worked along the Murray River when its problems were becoming very apparent. So it is a privilege for me to come back to rivers, and be able to work with NSW Premier’s, DLWC and Snowy River people on the recovery of the Snowy River.

The title of this paper, is a trifle ambitious, given that the Snowy flows over 350 kilometres from Jindabyne to Marlo, and every km of the river is different, through a number of strikingly different sub-catchments. The river falls 2228 metres from Mt Kosciuszko to sea level (through alpine, sub-alpine, montane, tableland, coastal and estuarine ecosystems and their local variations) and nearly 1000m of that from Jindabyne. To do this justice in a short paper is not possible, so readers will have to discover the geography of the Snowy River for themselves. Recently I toured the Snowy with a group of people in buses, and after three long days we had only just scratched the surface of who or what the Snowy is, so when you go looking give yourself plenty of time.

So for a river where Chaos theory of infinitely unfolding inner margins holds true, I can only present a small view of this river, and perhaps a view of partial recovery.
The Snowy River

When we think of reduced scale, we are brought to George Seddon’s now famous simile for the modern Snowy – “a cot-sized trickle in king-sized bed”. More on the trickle later, but why “king-sized” - would not just “big bed” or even “double bed” do? Not for the Snowy, where “the river runs those giant hills between” (Banjo Paterson).

The huge landscapes created by the Snowy have provided for people ...ever since they formed the living spaces of the Gannawal, Ngarigo, Manero, Bidawaal and Gunna ancestors, and the many others whose songlines brought them to the mountains...
...ever since they threw up the most significant barriers to European, explorers, pioneers and prospectors beyond the encircling bluffs of the Blue Mountains...
...and ever since Australians laboured to convert the power of the River’s flow into a consumable currency (the Snowy Mountains Scheme). One way or another the Snowy is etched into our country, and into us. It is indeed “king-sized”.

This is a river that once flowed 1200GL of water in an average year, a lot of water. At average peak spring discharge, it probably flowed at near to 10,000 swimming pools, or 10 GL, per day at Jindabyne. During peak floods, there was more.

So the river captured our hearts, but also our imaginations, and in 1947 the Snowy Scheme was begun. 20 years later, in 1967, Jindabyne Dam was closed, and 2000 generations of connection to the snow-melt moods of the river were severed. Australians had to make do with their memories and the echoes of the Spirit of the Snowy.

But not permanently.

By 1997, 30 years on, people called loudly for the Snowy flows to be restored. “The River is our blood” the Koori people said. “The River is our life”. The people who commissioned a benchmarking study into the condition of the Snowy River agreed that the water was the life of the river, and those who formed the Snowy River Alliance, to lobby governments for return of Snowy water, agreed that the river was the life of its people.

By 2000, the NSW and Victorian Governments had agreed to restore up to 28% of the Snowy’s flows, sourced from water savings in irrigation areas – everyone wins.

By 2002, the first instalment of environmental flows (6%) was delivered (on 28th August).

By 2012, Snowy River people expect to have 22% of their river flowing again, nearly one quarter, or in units of Seddon, about a child’s single bed. With corporate investment, this could be lifted to 28%.

This paper is about what we can do to capitalise on environmental flows (with $300m of NSW and Victorian money being invested), what we do to ‘sing up the river’ and to bring it back into the lives of the people who felt wronged when the river was taken from them, and who struggled to be heard for 3 decades. The Snowy never was just a river of water running wasted to the sea, it is a river of life for people living with, or connected to, it. Friendly at times, relentless in its ferocity, a barrier, a pathway, a source of income, it is always their inspiration.

McKeller's Crossing on the Snowy River, Deddick, circa 1900. Photo kindly provided by Heather Livingstone.
Snowy River Recovery

The program I work with seeks to integrate community and economic outcomes with the environmental. After some time working with various themes, I think our river recovery model is well-covered by just four:

- Focus of Governments
- Rehabilitation of the River
- Economic opportunities, and
- Strong Snowy River communities.

Each is discussed in turn below, and some of the activities that are going on in relation to each, to demonstrate how river recovery might be achieved.

Focus of Governments

The scale of the Snowy River and the way in which it has influenced the lives of Australians, requires that Governments remain focussed on the challenges of its recovery in a way that reflects the priority that they have given to it in recent years.

Government coordination. Working together across governments, particularly NSW and Victoria across a state border, to improve the Snowy River, and to manage it as a complete entity. Within NSW there are four key natural resource and environment agencies in NSW with a role to play in river recovery. What do we need to do together and with communities to achieve better outcomes for the Snowy River?

Snowy Corporatisation agreements – implementing the outcomes of this lengthy government process which produced contracts between SHL and 3-4 governments (Acts of parliament, regulations, legal agreements), a need to establish commercial viability, to implement environmental debt recovery projects, and deliver environmental flows. A lot of the territory is new to institutions that have been in a fixed pattern in NSW since the last Hydro Agreements Act in 1957, so there is learning, innovation and change.

Linkage with other processes of Government – What else is happening in Snowy River country that presents opportunities (or barriers) to river recovery – e.g. Park POM reviews, Local Government plan review, catchment-management blueprints and strategies, Ski resort planning with an increased emphasis on water use, and broader demographic and economic changes?

Rafting the Lower Snowy - November 2001. Photo G Enders
Rehabilitation of the River

Environmental Flows is perhaps the simplest factor in river rehabilitation, “just add water” – however can be quite complex in its implementation, particularly to reconstruct a smaller river in the large, old Snowy river bed.

- **Principles**: Habitat Utilisation flows, Flushing Flows, Channel Maintenance Flows, Connectivity, river signature

- **The mosaic River**: – dynamic flow inputs to Snowy, each can overwhelm the other, base signature to the Snowy was the huge Spring thaw flows out of the snowmelt headwaters, Eucumbene, Thredbo then Snowy came down Sept – December. Mowamba River is now the functional headwater of the river (although connectivity is still an issue). The Delegate and Bombala come together at the Quidong with water from the northern side of the Errinundra, then a series of mountain river catchments including the Jacobs, Pinch, Deddick and Buchan Rivers, among others. Down in the Snowy estuary, the Brodribb River comes in from the southern (wet) side of the Errinundra. Each can run flows that eclipse the main river flow, e.g. the 1971 February flood flows that reached the deck of McKillops Bridge, 30m above the river.

- **Implementing Flow Agreements**: Snowy Recovery here is about recovering the snowmelt river signature, albeit at a much smaller scale, and fixing up the river channel. To do this water has first to be ‘saved’ in the western irrigation areas as through more efficient infrastructure, and then delivered from Snowy Scheme structures on the eastern side. The target Snowy environmental flows are 22% by 2012, or 28% with industry partnership, Mowamba flows are now 6%, a new outlet on Jindabyne Dam will be available in 3 years time.

River Channel Rehabilitation – precedes flows, but to unblock the blocked arteries of the Snowy in preparation for flows, there is a lot to be done.

- Renovation of riparian vegetation - Key elements are:
  - Willow removal,
  - Riparian weed removal, principally blackberry,
  - selective revegetation with pliant riparian species, stabilisation of the river channel and banks.

- Channel configuration
  - In quieter reaches of the river, use flows to scour out a deeper channel, through accumulations of sand – results in a smaller channel within the old bed,
  - Stabilise with vegetation. Controls the amount of sand moving downstream – more likely to move laterally.
Recovery of fish habitat and populations – Begins with reaching an understanding of fish populations from survey and anecdotal information – we now have a picture of a renowned Snowy River Bass fishery now depleted, similar for trout, River Blackfish populations extinct in Snowy, but remnant in some tributaries. Eels and goldfish abundant. Tupong (Congoli) still migratory to foot of Jindabyne Dam. Survey and collation of anecdotal information.

We are learning about the importance of fish in the river, such as the ecological importance of e.g. Tupong, Galaxids, and Smelt; the cultural importance of e.g. River Blackfish, the economic importance of e.g. Snowy River Bass, and Trout, and Problem Fish, such as Goldfish and redfin perch (there are no European Carp yet).

Reintroduction/‘re-wilding’ of fish populations is a desirable outcome for such a significant investment in the ecological recovery of a river. We can reach a greater understanding about what fish are there, barriers to fish movement (less drowning out with lower flows), we can improve in-stream and riparian habitat, introduce woody debris, and frame opportunities to reinforce or rebuild fish populations, perhaps from nursery populations.

![River Blackfish (Gadopsis marmoratus). Photo R.H. Kuitter.](image)

Benchmarking the ecological condition of the river

With river recovery it is very important to be able to describe the ecological results achieved, and give some measure of return to investment in environmental recovery. Rapid Expert Panel benchmarking of the Snowy was carried out in 1996, when the condition of the river was found to be very poor.

Since 1997, the baseline ecological condition of the Snowy River has been recorded in detail by the NSW Department of Land & Water Conservation (and before flows were released). Parameters that are periodically sampled include Geomorphology, Water quality and hydrology, Vegetation, Algae, Macroinvertebrates and Fish.

In brief, the benchmark findings are of reduced channel size, pools infilled with sand, loss of habitat diversity, increased algae, decreased native fish, a river typical of silty slow-flowing conditions, poorer than unregulated nearby rivers, and not what could be expected for a cold swift-flowing mountain river.

This program is now in a phase of flow response monitoring to find out and measure the changes expected from environmental flows in the river.
**Economic Opportunities**

There has been lots of speculation about economic benefits likely to arise from environmental flows in the Snowy. Although more quantitative work can always be carried out, the streams of economic activity that have existing kernels of activity include:

**River based recreation**: including *Recreational angling* – there is established demand for Snowy River Bass (‘perch’) angling in the lower river, trout angling in the headwaters, and the possibility of boutique native species catch-and-release conservation fisheries, and cultural fish conservation programs, and

**Wilderness recreation** – canoeing, river-rafting, horse riding, trekking, and inspirational activities abound. A number of operators are established (even with high insurance premiums), catering largely to educational and backpacker markets.

**Regional/river-corridor tourism** – exploring a diversity of landscapes and localities along the Snowy. May local operators are already offering a range of products. An interstate, community-based dialogue on tourism infrastructure and marketing are probably the next steps that need to be taken.

**Cultural interpretation** – Koori people of the Snowy River are looking at the feasibility of cultural activities with economic potential, including back-country cultural camps and cultural learning tours in Snowy River country.

**Heritage, Education and Knowledge activities** – Education group users are established, and the experience of recovering the first of Australia’s great rivers will build a unique set of data and knowledge. There is an existing market for the products of such knowledge, both domestically and internationally.

**River rehabilitation activities** – Natural Resource management agencies are currently investing in the Snowy River amounts of several hundred thousand dollars per year. Much of this investment is generating local employment, contracting and business opportunities.
Strong Communities

The investment of governments in ecological recovery of a River would be a diminished outcome without making some efforts to ensure that it was consistent with and linked to the perceptions, expectations and opportunities for people in river communities, and others with strong links to the river. Three examples are provided to illustrate how this area of river recovery is being addressed for the Snowy.

How do communities feel about their River? – in 2002 Jeanne Adeland surveyed three river towns and found that social capital and community motivation were very strong and that the Snowy River was very important to these communities, in differing ways. For example, in answer to the question "Is the Snowy River important to you for personal, leisure/recreation or business reasons?" a majority of persons expressed a response of personal or leisure, rather than business (see figure). It will be interesting to note if this response changes in the future as potential for business opportunities along the river is realised (or not).


What do people share along the river? – As a Year of mountains lead-up event, the Snowy River Journey took a group of community people and others with an interest in the future of the Snowy River on
a three day tour of the river, linking up with community events along the way. The event demonstrated that community spirit is very strong, there is cohesive social capital, and the Snowy River is important to these small communities. It also illustrated that Snowy River communities were generally accessing government services/decision making very effectively (via lobby, consultation, dialogue, local action), but that more could be done to facilitate community-government interactions. Outcomes of the 'Journey' included a celebration of community achievement, a “Spirit of the Snowy” booklet, increased cross-border collaboration, network building between river communities, demonstration of potential for future events and festivals, exploration of tourism potential, and the collection of a bottle of symbolic Snowy River Water. This water was presented to the Jindabyne Conference from the Snowy River Journey travellers to symbolise the importance of water from mountains to all people.


**How can community linkage to the Snowy be strengthened?** The Snowy River Care Pilot Program provides an example of how government agencies and communities can enter cooperative partnerships to develop stronger links.

A meeting in Jindabyne in October 2001 brought Aboriginal people together from Sydney, the South Coast, and East Gippsland for talks about the Snowy River environmental flows. That meeting called for practical economic outcomes, and for inclusion in rehabilitation of the Snowy River. The meeting called for acknowledgment of the cultural loss to Aboriginal people caused by losing the waters of the Snowy River to hydro scheme diversion. NSW Premier’s Department, Department of Land and Water Conservation and NSW Department of Technical and Further Education are now working in a partnership with the Bega - Eden - Merrimans Federation of Elders to develop a Snowy River Care training and contract package.

A NSW Department of Education and Training Elsa Dixon Program grant facilitates the partnership by covering the costs of community involvement. DLWC as host partner is providing practical training and contract opportunities in River Care. TAFE as training provider is supporting a Certificate II in Bushland Regeneration for participants. The program aims to develop skills and capacity within communities for the care, rehabilitation and management of rivers.

Outcomes for the participants will include a TAFE Level II Certificate (Bush Regeneration), including First Aid, Chemical Safety and Chainsaw operation, entry level to continuing TAFE learning, practical skills in a range of river rehabilitation techniques, an improved capacity to compete for employment and contract work in river rehabilitation, and an opportunity to enter small business in land and river rehabilitation.

The lessons of this partnership have been to have a flexible approach, to enter all discussions with goodwill and overall to “Work Together - Work Strong”.

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Celebrating Mountains – An International Year of Mountains Conference
Jindabyne, New South Wales, Australia
Conclusion

The Snowy demonstrates that River Recovery cannot be undertaken as a scientific ecological rehabilitation alone, although science must be there. Recovery must be a partnership between the relevant governments and the people who hold connection to the river.

Enough has already been achieved to show that river rehabilitation is about community agreement on outcomes, about hard work, and about focus on the job for considerable periods of time. The Snowy below Jindabyne slowly choked for 30 years, it might take several decades to get a healthy river back, but the trend-lines have been cast.

Once flows are provided, the Snowy is a relatively simple Australian river to rehabilitate, compared with say the Murray River. Much of the river's length flows through National Parks and rocky gorges, its communities are passionate about it, it has only localised water-dependent industries, and it does not yet have European Carp.

Successful rehabilitation of the Snowy will give us a useful gauge on the costs of settling environmental debts, and will undoubtedly become a benchmark for improvement of the health of other rivers both here and overseas.

And for the future - perhaps a Snowy River Biosphere Reserve, managed to protect its landscapes and provide for its people? A great corridor, with National Parks at its core, and sustainably managed land surrounding, that brings you down from the Alps to the East Gippsland coastline, and in doing so generates an economy driven by knowledge, heritage, recreation, tourism, innovative agriculture and great wild and peaceful spaces.

The Snowy River belongs to its people. We are all its people. What becomes of the Snowy is up to us.
The Australian Alps And The Great Escarpment Of Eastern Australia Conservation Corridors

Ian Pulsford, Graeme Worboys, Jane Gough and Tim Shepherd

Abstract

Two outstanding Australian conservation corridors have been established in south eastern Australia during 60 years of conservation land use decisions. The establishment of these two conservation corridors is presented. The Australian Alps conservation corridor straddles the Great Dividing Range and extends along natural lands from central Victoria through south eastern New South Wales to the Australian Capital Territory. This corridor includes the highest peaks of Australia. The southern section of another conservation corridor is located along the Great Escarpment of Eastern Australia. This geomorphic feature extends north-south from East Gippsland in Victoria to the north of Cairns in Queensland. These conservation corridors are described and their potential role in strategic biodiversity conservation at a continental scale discussed. The conservation corridors form the core around which further integrated landscape conservation management outcomes can be achieved. The benefits of an integrated landscape conservation system are being driven through a range of public and community initiatives. The national and international context for expansion of these conservation corridors is presented. The national benefits of this initiative and the steps necessary to achieve the outcome are discussed. The paper advocates long term biodiversity conservation advantages to Australia, if the southern section of the Great Escarpment of Eastern Australia conservation corridor is linked with the Australian Alps conservation corridor, to create a continental scale conservation corridor.

Introduction

Two outstanding Australian conservation corridors have been established in south eastern Australia during the last 60 years, the Australian Alps conservation corridor and the Great Escarpment of Eastern Australia conservation corridor (southern section). This paper discusses these conservation corridors and their potential role in strategic biodiversity conservation at a continental scale and at a local scale.
Biodiversity conservation, a global imperative

Worldwide, habitat loss and habitat fragmentation have been a major cause of loss of biodiversity and species extinctions:

“Global biodiversity is being lost at a rate many times higher than that of natural extinction due to land conversion, climate change, pollution, unsustainable harvesting of natural resources and the introduction of exotic species. ….. Over the last three decades decline and extinction of species have emerged as major environmental issues……about 24% (1130) of mammals and 12% (1183) of bird species are currently regarded as globally threatened.” (UNEP 2002, p xxi).

Australia also has serious problems as portrayed by the Australian State of the Environment Committee (2001a). This report found land clearing to be the single greatest threat to Australian terrestrial biodiversity, with an estimated 565,000 hectares cleared in 2000 and 470,000 hectares cleared in 1999. This rate of clearing is only exceeded by 4 other countries globally, being Brazil, Indonesia, the Democratic Republic of the Congo and Bolivia (Australian State of the Environment Committee 2001a p. 73). In evaluating ecosystems and land clearing, the report inter alia found:

“The loss and depletion of plants through clearance destroys the habitat of thousands of other species. For example, 1000 to 2000 birds permanently lose their habitat for every 100 ha of woodland that is cleared, while the clearing of mallee for wheat farming kills, on average, more than 85% of resident reptiles and more than 200 reptiles per hectare. Broad-scale clearance can fundamentally change the functioning of ecosystems, including regional climate, and in the medium to long term undermines agricultural production and regional economies”. (Australian State of the Environment Committee 2001a p. 74).

A conservation response

The Convention on Global Biodiversity (ratified by Australia in 1993) is a significant global response to dealing with the continuing loss of biodiversity. It is a multi tiered approach to biodiversity conservation, with Article 8 of the Convention specifically requiring each signatory party to pursue in-situ conservation through the establishment of a system of protected areas (Worboys et al 2001 p 65.). This initiative has helped to establish some 44,000 terrestrial protected areas globally covering some 10% of the earth’s surface (Stanton 2002). However, global biodiversity conservation action is seen as too slow by some (McNeely 2002), with critical biodiversity being lost due to the pace of global development change. Australian action also has been slower than the pace of development change. Biodiversity conservation is still very much a national imperative.

Establishing protected areas is one effective response for biodiversity conservation. No other land-use classification has had the same capacity to stem the tide of development and environmental destruction (Worboys et al 2001, p. 354). For Australia, the expansion of protected areas has increased from 1% in 1968 to 8% in 1999 (Worboys et al 2001 p. 33).

Protected areas play a critical biodiversity conservation role. However their size, shape, degree of modification, and impacts of threatening processes (Worboys et al 2001, pp 229 – 249) have an influence on their effectiveness to conserve biodiversity. Protected areas as islands in an altered or fragmented landscape, are more likely to see the extinction of species over time (Soule 1986 p. 234) than large protected areas or protected areas in a natural and un-fragmented landscape.

Conservation corridors

Conservation corridors are an important tool in the conservation of biodiversity. They retain an un-fragmented landscape of natural habitat between two or more (usually) larger areas of natural habitat. Typically, they are protected areas or interlink protected areas and have a legal status that guarantees their existence. Conservation corridors have been embraced worldwide by conservationists, planners and managers as an effective conservation tool (Hamilton 1997).
Conservation corridors globally are relevant at a local scale, local government, national or international scale, for biodiversity conservation. They are natural, sustainable landscapes which commonly involve human use. They may include a range of land tenures.

Global initiatives at a national, international and continental scale include the Central Appenines in Italy spreading out from the Abruzzo National Park (Hamilton 1997); the Yellowstone to Yukon initiative linking the USA mainland through Canada to Alaska along the Rocky Mountains (Chadwick 2000); and the Paseo Pantera project and Meso-American Biological Corridor linking protected areas in Central America (Boza 2002). More recently, the EcoAmericas or Ecological Corridor of the Americas has been suggested (Boza 2002).

“Imagine this: a continuous biological corridor extending 20,000 kilometres along the mountain backbone of the Americas, from Alaska to Tierra del Fuego that protects a significant proportion of the biodiversity of two continents” (Boza 2002).

In Australia, the concept of conservation corridors has gained steady acceptance over the past 20 years. The value of roadside corridors and remnant vegetation has been reinforced by researchers (Saunders and Hobbs, 1991), and the importance of connectivity between natural areas of vegetation has been emphasised (Burgman and Lindenmayer 1998, p.183; Lindemayer and Nix 1993. From the 1990’s, the concept of retaining interconnected natural lands through conservation corridors was becoming more established in local government planning schemes (Worboys et al 1996 p. 59) and the design of new protected area reserves including the establishment of the 90,000 hectare South East Forests National Park in NSW in 1997 which was extended in 1998 to 115,000 hectares (Worboys et al 2000;Worboys et al 2001, p 18). There were also some continental scale conservation corridor initiatives in Australia including the Great Barrier Reef Marine Park and the Regional Reserve system of South Australia.

A natural conservation corridor of continental dimensions

In south eastern Australia, many protected areas have been established. There is also the potential for the establishment of a continental scale conservation corridor based on essentially natural public lands remaining. It can be created through visionary and nationally focused policy decisions of governments. It requires the interconnection of natural lands of the southern parts of the 2800 kilometre north-south Great Escarpment of Eastern Australia (Ollier 1982) with the Australian Alps. The Australian Alps conservation corridor is formed by the established and interconnected national parks and reserves found along the Great Dividing Range within Victoria, the Australian Capital Territory and New South Wales. The Great Escarpment conservation corridor is formed by interconnected national parks along the southern section of the Great Escarpment. The component parts of this potential continental scale conservation corridor, their genesis and their biological setting are described further. The simple steps needed to merge the two to form a conservation corridor of continental dimensions are presented, as are the long-term economic and social benefits of such an initiative.

The Great Escarpment of eastern Australia conservation corridor

The Great Escapement of Eastern Australia is a major landform feature described by Ollier (1982). It lies to the east of the Great Dividing Range watershed for 2,800 km between Cairns in far north tropical Queensland and the NSW/Victorian border near Eden (Figure 1). Typically separating the tableland from the coast, the Great Escarpment of Eastern Australia may be prominent in form, rising abruptly from the coastal plains by several hundred to over 1000 metres in many places. It may also be obscure and at some locations, absent (Worboys 1996a).

Much of the Great Escarpment receives in excess of 1,000 mm of rainfall per year due to the elevated terrain and onshore winds that prevail along the east coast. It is the headwaters for hundreds of small easterly flowing streams which extend from the escarpment to the coast and which support a great proportion of the human population of eastern Australia. Due to the vast geographic extent, climatic variation and rugged topography, the Great Escarpment contains a variety of habitats. These range from the World Heritage listed Wet Tropics tropical rainforest communities of far northern Queensland, the disjunct protected areas of the Central Eastern Rainforest Reserves World Heritage Area and their

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diversity of cool temperate and tropical rainforests to tall wet eucalypt forests, dry open forests, heathlands, wetlands, swamps, woodlands and grassland communities (Worboys 1996a).

The Great Escarpment, with its very diverse range of habitats, is particularly species rich and parallels in biodiversity conservation importance with the flora and fauna communities of south west Western Australian. It supports very high numbers of birds, mammals, reptiles and other species (Pianka and Schall 1981; State of the Environment Advisory Council 1996). This species richness which included the presence of over 90 Eucalypt species (NSW National Parks and Wildlife Service 1998) was internationally recognised by the inscription of the Greater Blue Mountains area onto the World Heritage list in 2000.

The southern extent of the Great Escarpment has a number of interconnected protected areas in Victoria and NSW currently forming a north-south conservation corridor of over 350 kilometres. It is these reserves which form the current conservation corridor. The linking of this conservation corridor and its several connections to the coast and tablelands has only been achieved since 1997 (see Table 1).

The Australian Alps conservation corridor

The Australian Alps conservation corridor extends north-south along the spine of the watershed of the Great Dividing Range of Australia (Figures 1 and 3). It stretches 690 km south from Wee Jasper through the Brindabella Range on the Australian Capital Territory/NSW border, through the Snowy Mountains of NSW and along the Great Dividing Range through Victoria. The Alps form a 1,657,570 hectare continuous conservation corridor of nine protected areas crossing State and Territory borders along the highest parts of the Australian continent.

The protected area network of the Australian Alps has developed gradually since 1906. In 1944, the former Premier of NSW, Sir William McKell, responding to growing pressure caused by the impact on catchments of alpine grazing as well as the needs of the proposed Snowy Mountains Hydro Electric Scheme, established the first great alpine park in Australia (Byles and Dunphy 1966; Stanley 1983) (Figure 2). It contains the continent’s highest mountain (Mt Kosciuszko - 2228m) as well as including the entire alpine and most of the subalpine areas in NSW. It also encompasses a wide variety of montane eucalypt forest, open woodland, rain forest, heathlands, wetlands and dry semi arid callitris forests.

In Victoria, smaller icon parks were initially established. These were then linked by the Victorian Government to create the Alpine National Park (646,000ha) in 1989 from the controversial recommendations of the Land Conservation Council. Further work of the Council resulted in the creation of additional parks such as Avon Wilderness and Snowy River in the 1980’s and 1990’s. Alpine, Snowy River and Avon Wilderness National Parks extend to the south and south west and contain the alpine areas, subalpine woodland, heathlands and montane forests of the Victoria Alps (Figure 2).

The declarations of Namadgi National Park in the ACT in 1984 and Brindabella National Park in NSW (1996) extended the corridor of Australian Alps protected areas. north from the core of the Alps (Figure 2). Together these parks are now managed under a tri-state Australian Alps Parks Memorandum of Understanding for Cooperative Management.
Figure 1. The Great Escarpment of Eastern Australia and the Great Dividing Range extending from Victoria to far north Queensland.
Table 1. Time line and milestones for the establishment of the Great Escarpment and Australian Alps conservation corridor reserves in south eastern Australia.

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1878</td>
<td>Royal National Park</td>
<td>World's 2nd national park</td>
</tr>
<tr>
<td>1896</td>
<td>Mount Buffalo NP 1152 ha</td>
<td>1st Victorian national park</td>
</tr>
<tr>
<td>1900</td>
<td>Snowy Mountains</td>
<td>National Park 160 sq miles</td>
</tr>
<tr>
<td>1925</td>
<td>Snowy Mountains</td>
<td>National Park 175 sq miles</td>
</tr>
<tr>
<td>1930</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1944</td>
<td>Kosciusko State Park 1,3050,758 ac</td>
<td>Iconic large parks</td>
</tr>
<tr>
<td>1957</td>
<td>Nardoo Fauna Reserve 21,000 ha</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>NSW National Parks and Wildlife Service created</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>Morton NP 1,848,000 ha</td>
<td></td>
</tr>
<tr>
<td>1977</td>
<td>Bundawang NP</td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td>Nardoo Grasslands</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>Victorian Alpine Park</td>
<td>Victorian LCC process</td>
</tr>
<tr>
<td>1981</td>
<td>Blue Mountains NP</td>
<td>Alps parks corridor links</td>
</tr>
<tr>
<td>1994</td>
<td>Namadgi NP 1,095,900 ha</td>
<td>Australian Capital Territory</td>
</tr>
<tr>
<td>1990</td>
<td>Transboundary Cooperative management</td>
<td>Australian Alps Memorandum of Understanding</td>
</tr>
<tr>
<td>1995</td>
<td>9 protected areas 1,848,000 ha</td>
<td>over 9 protected areas 1,848,000 ha</td>
</tr>
<tr>
<td>1997</td>
<td>Arco Wildlife NP 40,000 ha</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>Alpine NP 1,0450 sq km</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>Snowy River NP (38,700 ha)</td>
<td>National Forest Policy Statement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Commonwealth of Australia)</td>
</tr>
<tr>
<td>1997</td>
<td>SE Forest NP 90,000 ha</td>
<td>Eden Regional Forest Agreement</td>
</tr>
<tr>
<td>1998</td>
<td>SE Forest NP extended to 115,000 ha</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>Greater Blue Mountains World International recognition</td>
<td></td>
</tr>
</tbody>
</table>

Heritage Areas listing: 2001 Great Escarpment conservation corridor - Southern Regional Forest Agreement parks with coastal links.

Future: Sydney Catchment Authority and other linking Crown and protected reserves?

Catchment management blue prints

Achieving Integrated Landscape Conservation?

National Heritage amendments to Commonwealth Environmental Protection & Biodiversity Conservation Act passed?
Potential for nomination of Alps for National Heritage listing?
Potential for nomination of Great Escarpment conservation corridor for National Heritage listing - under the Eucalypt frame?
Alps - World Heritage nomination?

2010 Catchment Blueprint Biodiversity/Landscape targets Voluntary incentive stewardship payments and partnerships mechanisms in place?
Figure 2. Three indicative maps illustrating progress in the expansion of the reserve system and establishment of conservation corridor linkages south eastern Australia 1944, 1980 and 2002 (Please note: Digital data were not available for reserves in Victoria or the ACT prior to 2000).
Figure 3. Extent of bioregions included in conservation reserves of the Australian Alps and the Great Escarpment of Eastern Australia conservation corridors.
**Biodiversity conservation sampling for the conservation corridors**

Australia is a mega-biodiverse country. National surveys undertaken through the Interim Biogeographic Regionalisation for Australia (IBRA) (Environment Australia 2000) have determined that there are 85 discreet bioregions for the nation. The Australian Alps conservation corridor includes nearly 80% of the Australian Alps Bioregion while the southern section of the Great Escarpment of Eastern Australia conservation corridor protected areas (to the Hunter Valley) sample a significant proportion of three bioregions in NSW and Victoria (Figure 3, Table 2).

**Table 2.** Area of IBRA* Bioregions included in protected areas in the Australian Alps and Great Escarpment of Eastern Australia conservation corridors

<table>
<thead>
<tr>
<th>IBRA* Bioregion</th>
<th>Area of bioregion (ha)</th>
<th>Area (ha) of conservation reserves in each bioregion</th>
<th>Percent of IBRA bioregion in conservation reserves</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUSTRALIAN ALPS</td>
<td>787,432</td>
<td>629,399</td>
<td>79.9%</td>
</tr>
<tr>
<td>Australian Alps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GREAT ESCARPMENT</td>
<td>8,573,975</td>
<td>1,431,209</td>
<td>16.7%</td>
</tr>
<tr>
<td>South Eastern Highlands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sydney Basin</td>
<td>3,607,502</td>
<td>1,678,326</td>
<td>46.5%</td>
</tr>
<tr>
<td>South East Corner</td>
<td>2,703,706</td>
<td>753,816</td>
<td>27.9%</td>
</tr>
</tbody>
</table>

IBRA – Interim Bioregionalisation of Australia (Thackway & Cresswell, 1995)

The Greater Blue Mountains National Parks located at the northern end of the Great Escarpment conservation corridor were inscribed on the World Heritage list in 2000. The Greater Blue Mountains Area provides outstanding examples representing on-going ecological and biological processes significant in the evolution of Australia’s highly diverse ecosystems and communities of plants and animals, particularly eucalypt-dominated ecosystems. Ninety one Eucalypt taxa are represented in this area (NSW National Parks and Wildlife Service 2000) Table 3 compares the number of Eucalypt taxa in the Great Escarpment conservation corridor and Australian Alps and provides an an indication as to the comparative richness and importance of the biodiversity of these conservation corridors.
Table 3. Comparison of Eucalypt taxa represented in the Great Escarpment conservation corridor (southern section) and the Australian Alps and that are also found in Greater Blue Mountains World Heritage Area section of the Great Escarpment. Ninety one Eucalypt taxa are found in the Greater Blue Mountains Area.

<table>
<thead>
<tr>
<th>Region</th>
<th>Total No. of Eucalypt taxa</th>
<th>Eucalypt taxa that also occurring in the Greater Blue Mountains World Heritage Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great Escarpment</td>
<td>78</td>
<td>37</td>
</tr>
<tr>
<td>Australian Alps</td>
<td>32</td>
<td>16</td>
</tr>
<tr>
<td>Escarpment &amp; Alps</td>
<td>92</td>
<td>39</td>
</tr>
<tr>
<td>Taxa common to both</td>
<td>18</td>
<td>14</td>
</tr>
</tbody>
</table>

A conservation corridor of continental dimensions

The interlinking of the Australian Alps conservation corridor with the Great Escarpment of Eastern Australia southern conservation corridor may be achieved by policy decisions over public lands. The principle connection needed is in Victoria and is on public lands. The Victorian Snowy River National Park interconnected with the Erinundra National Park and then connected to the Coopracambra National Park (Figure 4) achieves an interconnection between the two conservation corridors. It is considered to be the most practical connection. The status of the public lands does not have to change. Rather, there needs to be a government policy commitment that recognises the presence and status of a nationally important conservation corridor and its long term sustainability needs.

The Great Escarpment of Eastern Australia Conservation Corridor can also be extended by policy decision by government. Currently it extends some 350 kilometres north from Coopracambra National Park in Victoria to Buderoo National Park (Figure 4). The gaps in the conservation corridor are located along the escarpment in the upper Jamberoo Valley and between Bargo State Recreation Area and Sydney Catchment Authority protected land. These connections (Figure 4) can extend the conservation corridor all the way to the Hunter Valley and Muswellbrook, a north-south inter-connection of over 600 kilometres. Such an initiative would need to be linked to a management framework that protects the integrity of the conservation corridor concept. In the future, it may even be possible to achieve a conservation corridor north of the Liverpool ranges in NSW to the Queensland Border and Lamington National Park along the Great Escarpment of Eastern Australia.

The two conservation corridors combined would achieve an interconnected series of public lands of national significance. They would extend from Mansfield in Victoria along the Great Dividing Range to Tumut in NSW and along the Great Escarpment of NSW to Muswellbrook in the Hunter Valley. Coastal regions near Bega would be interconnected to the Australian Alps achieving a coast to alpine area conservation sampling for the eucalyptus genus. Some of the finest conservation samplings of Australian moist eucalypt forests would be interconnected. A World Heritage Area (Greater Blue Mountains) and a Man and Biosphere Reserve (Kosciuszko National Park) would be interconnected.

The core conservation corridor and integrated landscape conservation

The benefits of a significant north-south conservation corridor from eastern Victoria, the ACT and half the length of NSW, potentially extend well beyond the reserve boundaries. The conservation corridor complements landscape conservation initiatives actively underway in Australia and it is useful to briefly illustrate what is happening at a local level in many communities.
In response to a rural environment of droughts, soil loss, rising salt, water shortages, habitat decline and declining agricultural productivity, Australian governments are currently facilitating a range of measures to achieve more sustainable land use outcomes. Governments, communities and individual property owners have embraced the Landcare program nationally, and visible progress has been made for many areas of Australia. Integrated landscape conservation is also an important approach. It is underpinned by leadership from government organisations and incentives for individual property owners to contribute to improved environments.

Catchment management reforms are a national process. Throughout NSW for example, water and native vegetation management regulatory plans are currently being developed to improve catchment protection, provide river systems with environmental flows and help conserve biodiversity and cultural heritage. In 2001, the NSW Government passed the NSW Catchment Management Amendment Act. Eighteen catchment boards established under this Act are charged with preparing “integrated” catchment management blueprints. The blueprints identify catchment objectives, targets and actions for partnerships between land managers, community members and government agencies to manage catchments, native vegetation and water sources. Through these partnerships the big issues such as salinity and clearing of native vegetation are to be tackled and to inform decisions to achieve “an optimal balance of environmental, social and economic outcomes” (Amery 2001). State Forests through audited ecologically sustainable forest management and the NPWS through voluntary conservation agreements partnerships with landholders are contributing to this approach.

Catchment boards in the south east of NSW, for example, have embraced biodiversity conservation targets which significantly complement the biodiversity conservation targets for the establishment of a comprehensive, adequate and representative reserve system. Biodiversity targets have been set to protect, connect, and manage for biodiversity conservation at a minimum of 30% of the original distribution of each native vegetation community type for the area (Southern Catchment Management Board 2002). A range of incentives are proposed, such as stewardship payments for voluntary partnerships between Government agencies and landholders, will help with this process.

These detailed local processes all benefit directly from the ecological services the conservation corridor provides. The core conservation corridor provides catchments that do not need rehabilitation. They should provide ecological services sustainably. They provide the core for the framework for integrated landscape conservation actions.
Figure 4. Conservation corridors and connections still to be achieved.
**National benefits of a continental scale conservation corridor**

A combined Australian Alps-Great Escarpment of Eastern Australia conservation corridor is the last chance where a significant north-south unfragmented sampling of four bioregions is possible. It is the only remaining opportunity for the retention of contiguous north-south natural lands in NSW from the Victorian border to Muswellbrook. There are national benefits in implementing this initiative.

Economically, the conservation corridor will help to underpin the basic ecological services that natural lands provide. At a landscape scale the core conservation corridor will provide critical help for the rehabilitation and sustainable use of adjoining and regional agricultural lands.

Socially, the conservation corridor will benefit Australians. It will help to conserve Australian native fauna and flora within the immediate proximity of some of the most closely settled areas of Australia. It will help maintain air quality and provide clean water and other essential ecological services. It will provide open space for recreation and add to the quality of life.

Environmentally, it will help to conserve habitats and ecosystems in one of the most biologically important areas of Australia. It will help to prevent extinctions. It will provide an ability for species to survive the perturbations of climate change. It will provide a capacity to survive the increased perturbations of disturbance through human interventions.

Politically, the initiative would see the Commonwealth, two State (and possibly three) and one Territory governments working together to achieve the conservation management of a conservation corridor in the national interest.

**Conclusion**

A combined Great Escarpment of Eastern Australia and Australian Alps conservation corridor is a strategic conservation investment for the future at national and local levels. It is a finite opportunity. Vital interconnections are currently at risk through incremental land-use changes. There is no alternative possible remaining for such a continental scale initiative in south eastern Australia and a continuous unfragmented system will provide economic, social, environmental and political benefits for Australia. The outcome is a better Australia, richer for the retention of its natural heritage resources and the ecological services they maintain. Completion of the corridor would be a nationally and internationally significant conservation achievement, rivalled in few locations world wide.

New opportunities for national recognition of the combined Australian Alps and Great Escarpment of Eastern Australia conservation corridors are emerging as a result of new Commonwealth Heritage legislation to amend the *Environmental Protection and Biodiversity Conservation Act 1999*. If passed, these will provide an opportunity for nomination of the combined Australian Alps and Great Escarpment of Eastern Australia conservation corridor to the Commonwealth for consideration for listing as National Heritage as a “national exemplar” potentially under the eucalypt theme. It is a basis for further action.

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Day One – Mountains For Tourism
Management Of Tourism In The Kosciuszko Alpine Area

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Abstract

The alpine area around Mt Kosciuszko is of high scenic, scientific, educational and nature conservation significance. As a result of past management achievements the area, in 2002, is a major tourism destination, especially for summer day-walkers to the highest peak on the Australian continent. The popularity of this natural heritage not only vindicates the historical vision for its conservation but has also created a new conservation management imperative. Managing tourism for this very confined area is placing pressure on both infrastructure and the heritage values of the region. Numbers of tourists in the snow-free months have increased from 20,000 per year in the late 1970s to around 64,000 people per year in 2000. Around 21,000 of these visitors walk to the very confined area of the summit of Mt Kosciuszko. Tourism will continue to increase as it is actively promoted by tourism organisations. Within this operating environment, the New South Wales National Parks and Wildlife Service (NSW NPWS) has undertaken management planning and is implementing works to help conserve the alpine area and to achieve sustainable tourism. This will mean dealing with many challenges.

A new Management Plan for Kosciuszko National Park is expected to be completed for exhibition in 2003. The issues raised in this paper illustrate new conservation milestones that need to be reached to ensure that the NSW NPWS conserves and sustains this scientifically significant and limited alpine area for current and future generations to enjoy.

Introduction

The most extensive contiguous alpine area in mainland Australia is found around Mt Kosciuszko in the Snowy Mountains, which are part of the Great Dividing Range and associated mountains in the south east of Australia (Costin 1989; Figure 1). The area is protected within the Kosciuszko National Park (698,000 ha) in New South Wales, one of a series of linked Australian Alps National Parks that conserve around 62% (15,000 km²) of the mainland alpine and subalpine region (Worboys 1996).
The alpine region around Mt Kosciuszko extends from the upper limits of tree vegetation, at about 1830 metres, to the summit of Mt Kosciuszko, at 2228 metres, and covers around 100 km², or less than 0.001%, of Australia (Costin 1989). Unlike the steep saw-tooth mountain ranges characteristic of many alpine areas elsewhere in the world, the alpine region around Mt Kosciuszko consists of an undulating plateau with a gradual stepped fall to the east, and a steeper western slope (Costin 1989).

Mt Kosciuszko and its contiguous alpine area (Figure 1) are considered to be of outstanding natural value, and this contributes to its potential for World Heritage listing, as part of a possible Australian Alps World Heritage nomination in the future (Mosley 1992; Costin et al. 2000). The alpine area is recognised as an ‘Outstanding Natural Area’ by the 1982 Kosciuszko Plan of Management. Along with the rest of the park it has also been recognised as a World Biosphere Reserve, under the UNESCO Man and the Biosphere Program, since 1977 (NSW NPWS 1982; Costin et al. 2000). The management of this area is the responsibility of the New South Wales National Parks and Wildlife Service (NSW NPWS). The vision for its management is to conserve the natural and cultural heritage values that make the area of such outstanding conservation value.

**History Of Tourism Management For The Alpine Area**

The outstanding natural scenery of the alpine area has been a major drawcard for visitors (Good 1992; Figure 2). As early as 1906, improvements to access for tourism resulted in the construction of a road to the summit of Mt Kosciuszko. Other tourism facilities that were developed during this early period include the Hotel Kosciusko at Diggers Creek, constructed in 1909, and the Chalet at Charlotte Pass, constructed in 1931 (Good 1992). The advent of the Snowy Mountains Hydro-electric Scheme resulted in a rapid expansion in mountain tourism, with the Scheme actively encouraging tourists to visit the area to view construction works. Employees of the Scheme, many of whom were post-war migrants from Europe, were also frequent users of the park, particularly in winter. Many would become pioneers of the Australian ski industry. As a result of the increased interest in ski tourism, a series of ski resorts was established in the subalpine areas of the park (Good 1992). By the late 1950s, visitors to Kosciusko State Park, as it was then named, were in the order of 100,000 per annum (Gare, pers. com.).
Figure 1. Mt Kosciuszko alpine area. (Adapted from Scherrer 2001, with base data provided by New South Wales National Parks and Wildlife Service).
Within the Kosciuszko alpine area, early pioneering skiers in the 1950s had received permission from the Kosciusko State Park Trust to construct Lake Albina Lodge (on the western facing slopes of the Lake Albina Valley) and Kunama Lodge, near Mt Northcote (located between Mt Kosciuszko and Mt Twynam). Materials for the lodges were transported using a bulldozer and sled provided by the Trust, with the resultant track marks still apparent in 2002 (Worboys et al. 1995; authors' pers. obs.). Kunama Lodge was destroyed by an avalanche in 1956 and was never reconstructed. Professional park managers, who had been appointed by the Trust in 1959, recognised that the locations of Kunama and several other proposed lodges were inappropriate, and they prevented the reconstruction of Kunama. This was also the start of a new era of active planning and conservation of the alpine area and the park. Following the 1982 Plan of Management process and extensive public consultation, Lake Albina Lodge was removed in the early 1980s. This was done to prevent further sewage pollution of Lake Albina, one of the purest fresh water bodies in Australia and one of only five glacial lakes in the highest parts of the mountains (Virtanen 1993; Worboys et al. 1995). The importance of natural scenery and pure lake water was given precedence over a recreation facility.

Tourism in Kosciuszko National Park increased in the 1970s with substantial increases in summer tourism in the alpine area (Virtanen 1993). By the early 1970s traffic jams were common along the old gravel Summit Road. A proposal for upgrading this road was the “obvious solution”, as was development of a larger car park at Rawson Pass (just below the summit) and a back-up car park at the Snowy River bridge. Only the Rawson Pass car park was completed, despite the fact that road realignment and expansion had been surveyed and pegged ready for construction. Because of the congestion, private vehicles to the summit were banned during this time, and a shuttle bus system was used to ferry people from Charlotte Pass to Rawson Pass (Figure 2). The NSW NPWS developed a planning discussion paper for the community in the late 1970s, outlining a different solution (Worboys 1978; NSW NPWS 1980). Despite some sceptical personal views expressed by several very senior staff members in the park agency, the public discussion papers advocated a vehicle-free alpine area. There was overwhelming public support for this and for the closure of the Summit Road at Charlotte Pass. This was accomplished legally in 1982, with the adoption of the 1982 Plan of Management. Restrictions on camping in the catchment of the glacial lakes were introduced in 1988, in response to degradation of the area (Virtanen 1993; Figure 2).

**Current Tourism In The Alpine Area**

In 2002, tourism is the single largest form of land use for the alpine area (Good 1992). It is a multi-million dollar industry, and supports the economies of the principal towns surrounding the park. Tourism for Kosciuszko National Park has grown from 100,000 visitors in the late 1950s to around one million visitors in 2000 (Worboys and Pickering 2002b). The small alpine area of Kosciuszko National Park shows a similar trend, with growth in summer visitor use from an estimated 20,000 in 1977-78 (Worboys 1978) to 64,000 in 1999-2000, (Johnston, S. and Pickering 2001; Figure 3). At variance with these measures, figures from the chairlift at Thredbo apparently do not show an increase in visitor use in the last decade (Denise Allardice, Kosciuszko-Thredbo Pty Ltd, pers. comm. 2002).
Summit Road constructed. Vehicles to the highest peak in Australia\textsuperscript{1}.

Car park constructed at Rawson Pass\textsuperscript{3}.

Steel mesh walkway between Thredbo Top-station and Rawson Pass constructed\textsuperscript{6}.

Rapid expansion of ski resorts at Thredbo and Kosciusko. Chain of ski huts across the Alpine Area stopped by Kosciusko State Park Trust staff\textsuperscript{2}.

Threat of upgrading of the Summit Road and expansion of the car park at Rawson Pass from 1973 eliminated in 1982 with the road closure at Charlotte Pass\textsuperscript{4}.

Impacts to the Alpine Area through rapidly increasing visitor use include expansion of disturbed areas, further proliferation of tracks, the spread of weeds, garbage, and contamination from urine and faeces\textsuperscript{9,10,11}.

Water pollution, Lake Albina Hut removed as recommended in 1982 plan of management, camping within the catchments of the glacial lakes prohibited\textsuperscript{4}.

Strong spread of weeds a new threat\textsuperscript{9}.

Potential expansion of ski resorts onto the Main Range of the park stopped as part of 1982 Plan of Management\textsuperscript{7}.

Mt Kosciuszko Outstanding Natural Area Plan developed\textsuperscript{5}.


Characteristics of Tourism

Winter tourism to the alpine area involves snow boarding, ice climbing, cross-country skiing and independent snow camping, with most people accessing the area from the adjacent subalpine resorts (Buckley et al. 2000; Pickering et al. 2002). Alpine skiing based in the ski resorts is the dominant recreation activity for the park.

Tourism to the alpine area during the snow-free period is also very popular and involves a greater range of activities and areas. Popular activities include day walks, often to the summit of Kosciuszko (81% of visitors); sightseeing (10%); bike riding (3%); camping (2%); and other pursuits such as running, late season snowpatch skiing, photography, painting, rock climbing, abseiling, fishing, and educational activities (collectively 4% of visitors to the area) (Johnston, S. and Pickering 2001).

During the snow-free period, tourists tend to access the alpine area from just two sites: the top of the Crackenback Chairlift at Thredbo Village (68%), and the road-head at Charlotte Pass (31%). Recreationists with more detailed local knowledge also utilise the Snowy River Valley via Guthega. Within the alpine area itself the most popular walk is from the Crackenback Chairlift to the summit of Mt Kosciuszko, with around 16,000 people undertaking the 10 km return trip along the raised metal walkway to Rawson Pass and then on to the summit. Many people do not complete the full walk, but turn back before the first lookout (34%), or stop once they can see Mt Kosciuszko (10%). Eleven percent turn off the track and descend into the subalpine along the Dead Horse Gap walk (Arkle 2000).

The most popular days for visiting the alpine area during the snow-free period are the main public holidays (Christmas, New Year, the Australia Day Weekend in January, and Easter). On any given day at these times around 1500 people visit the area, with 700 reaching the summit of Mt Kosciuszko. The next busiest times are weekends, particularly during the school holidays, when around 234 people per day visit the summit. Low visitation days are during school time, when only around 134 people per day visit the summit (Arkle 2000).

There is considerable variation in usage patterns within a day. This is particularly apparent on the summit of Mt Kosciuszko, with about half of all tourists (48%) arriving between 1200 and 1330 hours. As a result there is crowding, resulting in people spreading out onto rehabilitated and natural areas and damaging native vegetation (Arkle 2000).
Benefits of Tourism

Tourism is big business in the Snowy Mountains, and it benefits local towns and a range of tourism ventures. It is an important source of employment, providing seasonal (winter and summer) work for a large number of casual workers, and jobs for a smaller permanent core of employees. There is bipartisan political support for tourism, with an expectation that tourism will continue to increase. Equally, it is viewed that the NSW NPWS will manage tourism in an ecologically sustainable manner. The effective management of tourism to the park is critical for the wellbeing of the local economy and a sustainable tourism industry (Good 1992). Poor leadership and unmanaged tourism can threaten a financially and ecologically sustainable tourism industry.

Sustainable Tourism: The Conservation Management Challenge

There have been major gains for conservation in the alpine area in the last century (Worboys and Pickering, 2002c). This has been to the major advantage of the tourism industry, given that it has underpinned the tourism and recreation values of Kosciuszko National Park. (Worboys and Pickering 2002b). However, management is a continuous process that operates in a dynamic environment. Since the last major planning statement was produced for the alpine area in 1993, there appears to have been a steady growth in visitor numbers and activities, and a resultant increase in associated environmental impacts. The current major challenge for the alpine area is to ensure that tourism is ecologically sustainable.

Impacts of Tourism

Tourism to the alpine area is having a range of negative environmental impacts. Direct impacts include: compaction of soil; erosion; trampling of vegetation; urine and faecal contamination of waterways, particularly the glacial lakes; disturbance to wildlife; noise pollution; and increased feral animal activity (Edwards 1977; Keane et al. 1979; Hardie 1993; Virtanen 1993; Good and Grenier 1994; Good 1995; CDT 1997; Parr Smith and Polley 1998; Arkle 2000; Buckley et al. 2000; Scherrer and Pickering 2001; Pickering et al. 2002). Some management infrastructure provided to facilitate tourism, such as walking tracks and huts, is also having impacts. These include compaction of soil, clearing of vegetation, assisting the introduction of alien plants, leaching of nutrients into adjacent areas, and visual impacts (Virtanen 1993; Good and Grenier 1994; Johnston F. and Pickering 2001a, 2001b; Pickering et al. 2002).

The spread of weeds is a serious issue for the alpine area. Gravel roads and walking tracks, combined with regular pedestrian and vehicle (bike and motor vehicle) disturbance, have been shown to favour weeds such as yarrow (Achillea millefolium), white clover (Trifolium repens), browntop bent (Agrostis capillaris), flat weed (Hypochaeris radicata), cocksfoot (Dactylis glomerata), dandelion (Taraxacum officinale), and pellet clover (Trifolium ambiguum) (Mallen-Cooper 1990; Johnston, F. and Pickering 2001a, 2001b; Pickering et al. These proceedings; Hill and Pickering Draft manuscript). Research has shown that weeds readily colonise gravel track verges and road disturbance sites. This results in a bright-green weed verge commonly found on parts of the gravel-based and paved tourist walking track system in the alpine area. It is a green “fuse” of weed introductions to the very core of the alpine area.

Whilst the existing weed problem is bad enough, it is potentially being made worse with current NSW NPWS gravel track construction activities being made in the name of tourism development works. Such works could potentially be exacerbating the problem, while alternative raised steel mesh walkway techniques have demonstrated their weed free success (Pickering et al. This proceedings; Pickering and Hill Unpublished data). Given that weeds are still spreading in areas of natural and human disturbance in the alpine area, (Mallen-Cooper 1990; Johnston F. and Pickering 2001a, 2001b; Pickering et al. This proceedings; Hill and Pickering Draft manuscript), limiting the spread of these weeds should be the primary conservation goal of management.

We can also state the obvious. Limiting the spread of new tracks and of erosion areas caused through overuse, and preventing trampling disturbance to the most sensitive of the plant communities, such as the wetland and short alpine herbfield, is critical.

Human waste is also an important issue, as it contributes to increased nutrification and contamination of pristine waterways and has negative impacts on the tourism experience. Temporary toilets at Rawson Pass have helped to deal with some of the problems of human waste, but not adequately (Leary 2000). The
withdrawal of camping from within the catchment areas of the glacial lakes has also helped, but increasing usage of other areas by campers may result in new areas being impacted (Figure 5).

**Management Response in 2002**
The NSW NPWS is currently focusing on the provision of permanent toilet facilities at Rawson Pass and the continued construction of gravel walking tracks in the alpine area, based on the recommendations/priorities of the 1993 Virtanen report. In designing a toilet facility for Rawson Pass, the NSW NPWS must plan carefully to protect the visual integrity of the site. The aesthetically magnificent, natural and gentle concave sweep of the Rawson Pass landscape must be maintained. Therefore an appropriate temporary facility that does not need to be serviced by road access should be established.

Both Rawson Pass and the old Summit Road from Charlotte Pass to Mt Kosciuszko need to be rehabilitated to a weed free walking route, in keeping with the vision to rehabilitate the natural alpine landscape.

**Management Lag Effect**
It takes time to achieve planned outcomes: sometimes it takes too long. This is a leadership issue which will determine whether tourism to the alpine area remains a threat or not. Timely management responses are crucial. Management of issues such as appropriate levels of tourism requires leadership, constant attention and sustained and adequate investment, in preference to low frequency but big effort approaches. Research and adaptive management can also play a critical role. Improved information about the outcome of management interventions and their relative success can guide the nature of management responses.

**Adaptive Management**
Recent research in the alpine area provides valuable information that can contribute to effective management. It provides an opportunity for current management practices to be considered and reassessed, and for ongoing monitoring and adaptation. This information has been provided to the NPWS.

Some of the most recent tourism research in alpine areas in Australia has focused on pollution, weeds and walking tracks, and has shown that:

- Gravel tracks and roads provide habitats for weeds in the Mt Kosciuszko alpine area (Mallen-Cooper 1990; Johnston F. and Pickering 2001a, 2001b; Pickering et al. This proceedings; Hill and Pickering Draft Manuscript).
- The Thredbo Top Station to Rawson Pass raised steel mesh walkway provides a weed free environment and socially is a far more acceptable surface for visitors (Johnston S. and Pickering 2001; Hill and Pickering Draft Manuscript).
- Human waste is a serious long term problem for alpine areas (AALC 2000; Bridle and Kirkpatrick 2001).
- Visitor use is concentrated at fixed times of the year (Christmas, New Year, Australia Day weekend, Easter), and specific times of day (lunch time). This pattern of use of the alpine area exacerbates impacts (Arkle 2000).

In the light of current research and historical information (Good 1992; Worboys et al. 1995; Worboys and Pickering 2002a), future management responses to the provision of access for tourists to the Mt Kosciuszko alpine area need to consider (Figures 5 and 6):

- Minimising the spread of weeds by:
  - rapidly evaluating where weeds are found in the alpine area, including their presence in relation to the walking track/old road system
  - assessing the potential for the spread of weeds to new track construction sites and adjacent natural areas
  - making a careful evaluation of the nature, cost and impacts of different methods of weed control.
- Reviewing the real cost of the range of walking track surfaces over a long-term time-frame. For example, the construction of gravel tracks continues, with their inbuilt lifetime costs of gravel replacement, weed control on track verges and adjacent natural areas, and drainage maintenance. The steel mesh walkway
track, by comparison, inhibits the establishment and spread of weeds, and is relatively low maintenance (Authors' pers. obs.).

- Determining a sustainable tourism use limit for the track system and summit destinations, as well as maximum tourist use numbers for specific days and time of day. Managing visitor use limits for the summit may be expected to increase tourism yields for the local tourism industry.
- Establishing a ‘keep to the track’ policy.
- Reviewing how the tourism industry can work with the NSW NPWS to achieve the goal of ecologically sustainable visitor use, as well as contributing to the costs of providing and maintaining an access system which services visitor use of the alpine area.
Soil impacts
Impacts in the alpine area through site soil compaction, vegetation loss, degradation of catchments, and soil erosion.

Marketing
Preferential marketing of the summit of Mt Kosciusko and alpine area by tourism organisations: ‘the highest mountain on the continent’.

Endangered species impacts
Large numbers of visitors walking in a dispersed manner in the confined area of the alpine area at peak times. Includes damage to the most vulnerable feldmark plant communities.

Proliferation of tracks
Creation of secondary tracks: to remnant snow patches and lookout sites, despite requests for visitors to remain on primary tracks.

Pollution of water and soils
Impacts at high visitor use areas, through urine (high nitrogen values) and introduction and spread of Giardia and Cryptosporidium from faeces, despite toilet facilities and educational information.

Sustainable visitor use
Achieving the management of visitor numbers within the capacity of the official walking track system and destinations for any given day.

Vision
Managing to conserve and protect the natural and cultural heritage of the Kosciuszko alpine area

Weeds
Weeds are a real threat to the integrity of the Alpine Area. They are occupying disturbed sites and have not yet achieved their ecological potential. Management disturbance and visitor use disturbance are two key agents of weed dispersal.

Soil erosion
Some 20 years after the finish of the Soil Conservation Works, further soil stabilisation works are required to fix the old works. New erosion problems need to be addressed.

Ski tourism encroachments
Pressures for further encroachment of the alpine area by the ski industry may arise as global warming limits snow extent and duration.

Research and adaptive management
Management needs to respond to issues such as visitor use pressures. Researchers, and management, working together on the implementation of adaptive management practices and monitoring, will facilitate environmentally sustainable tourism

Scenery protection
Management has a special responsibility to continue to rehabilitate past damage to natural scenic landscapes.

Rehabilitation
Rehabilitation works need to continue.

Figure 5. Tourism planning considerations for the Kosciuszko alpine area: direct and indirect impacts.

Figure 6. Management challenges of the next 20 years for the Kosciuszko alpine area.
**Future Management Of Sustainable Tourism For The Alpine Area**

Tourism use of the alpine area is expected to continue to grow. It is the principal future management challenge for the NSW NPWS in this area. The target is simply to achieve ecologically sustainable visitor use for the alpine area, and this involves minimising/eliminating direct and indirect impacts of tourism. This will mean dealing with many management challenges, some of which have been identified (Figure 6). A necessary approach for the future is for the NSW NPWS to work with the tourism industry more closely. It could also see industry bodies clearly understanding how they, as individual organisations, can help to contribute to a sustainable future for the alpine area. A new Management Plan for Kosciuszko National Park is expected to be completed in 2003. The issues raised by this paper illustrate the types of new conservation goals that must be formulated and achieved, to ensure that the rare and valuable alpine environment of Kosciuszko National Park is conserved for current and future generations to enjoy.

Figure 6. Management challenges of the next 20 years for the Kosciuszko alpine area.

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NSW NPWS See New South Wales National Parks and Wildlife Service.


Managing The Overland Track As A Sustainable Mountain Walk

Janet Mackay

Janet Mackay and Associates

Background and introduction

The Overland Track is Tasmania’s premier long-distance walking track with a significant national and international reputation. Since the inclusion of the Cradle Mountain-Lake St Clair National Park in the Tasmanian Wilderness World Heritage Area (WHA) in 1982, walker numbers have significantly increased. The track is now walked by in excess of 8,000 people each year with a high proportion from outside Tasmania.

The Track is popular for the outstanding scenery it offers in a remote area where walking is reasonably safe and easy on a good track with few major climbs and a range of accommodation options. It is the best known, most developed and most popular of Tasmania's long distance walking tracks. For many locals and visitors the Overland Track is their first extended bushwalking experience.

The Track provides a predominantly high standard of walking surface which is comfortable for the average walker. Infrastructure development has not, however, been based on a single "strategic" planning document for the Track. Accordingly, it was decided to develop a vision statement for the Overland Track, to provide a high-level strategic direction for the desired user experience and to develop strategies to achieve this vision.

The Overland Track

The total length of the Track from Cradle Valley in the north to Cynthia Bay at the southern end of Lake St Clair is around 80 kilometres. Most walkers walk the Track in its entirety with almost 90% of all walkers travelling from north to south. Whilst the recommended walking time is 5 days, the trip may also be extended by varying numbers of days to undertake side trips to significant features.

The Track is also often walked in part, either for day walks at either end of the walk, or from other access tracks. There are several access tracks into the ‘centre’ of the Overland Track from the east.

Two types of huts are provided to accommodate walkers on the Track. These are basic shelter huts available to all walkers provided by the Parks and Wildlife Service, and the huts operated by Cradle Huts Pty Ltd.

The Parks and Wildlife Service huts provide basic facilities, such as sleeping benches (no mattresses provided), cooking benches or tables (no cooking facilities provided), some seating and space heating (gas or coal stove). Water tanks outside each of the modern huts provide a rain water supply and grease traps under the outside taps provide a degree of environmental protection in the disposal of grey water.
The bulk of the camping along the track also occurs around the seven major Parks and Wildlife Service huts. At these locations walkers take advantage of the facilities provided at the huts, particularly the rain water supply and toilets. In some cases hardened tent platforms are provided.

**Values of the Track**

**Natural values**
The Overland Track offers walkers the opportunity to experience a range of the significant natural values of the WHA during the course of walking the Track. The Cradle Valley is a spectacular landscape demonstrating to the visitor evidence of past glacial activity over the past two million years. Dove Lake, Lake Wilks, Crater Lake and Cradle Mountain are the most spectacular and obvious to walkers in the northern end.

**Cultural values**
The outstanding cultural value of the Tasmanian Wilderness WHA is the rich, undisturbed suite of Pleistocene Aboriginal sites dating back over 35,000 years which include cave paintings and cultural deposits bearing testimony to an Ice Age society. Lack of disturbance enhances the value of these sites.

Cultural values of the Tasmanian Wilderness WHA also include historic features from more recent activities. The WHA also contains remains of sites related to other historic themes including exploration, Huon pine logging, mining, hunting, high altitude grazing, hydro-electric development and recreation. These sites have significance in terms of the history of Tasmania’s development.

**Recreational values**
The recreational value of the Overland Track has developed over time and remains significant within a national and international perspective.

A combination of factors contribute to the high recreational value of the Track including:

- The wilderness values and apparent remoteness of the Track to a range of users
- The spectacular and accessible scenery ranging from peaks, to alpine moor-land, to lakes and forest
- The safety, comfort and relative ease of the walk
- The accommodation options available
- The distance combined with a through route track which provides a sense of achievement
- Opportunities for walking and photography

**Educational values**
The Overland Track is increasingly valued by school groups as a challenging recreational experience.

Educational value may also be attributed in terms of demonstrating and providing an understanding of natural events and environmental management practices including track management, visitor management, interpretation etc.

**Usage patterns**
There were approximately 8000 walkers on the Overland Track in 2000/1. This estimate is based on 4350 private Cradle registrations, 901 private Lake St Clair registrations, an allowance for 10% registration non compliance, plus 2250 walkers on commercial trips. Table 1 shows overnight walker registrations for 1997 to 2001.
Table 1- Overnight walker registration data summary for 2000/1, Cradle Mountain

<table>
<thead>
<tr>
<th></th>
<th>1997/8</th>
<th>1998/9</th>
<th>1999/00</th>
<th>2000/1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Overland walkers includes departures from Lake St Clair + adjustment for commercial walkers</td>
<td>7 800</td>
<td>7 900</td>
<td>8 500</td>
<td>8 000</td>
</tr>
<tr>
<td>Number of private Overland walkers registering at Cradle</td>
<td>4 300</td>
<td>4 400</td>
<td>4 500</td>
<td>4 400</td>
</tr>
<tr>
<td>Number of walkers registering for overnight trips (not Overland)</td>
<td>1 400</td>
<td>1 800</td>
<td>1 600</td>
<td>1 900</td>
</tr>
</tbody>
</table>

Current Users
The users of the track can be grouped as follows:

- Commercial hut users
- Commercial camping groups
- Free independent walkers undertaking the Overland Track from one end to the other
- Free independent walkers walking only sections of the Track from either end or from access points along the Track.

The latter group may consist of day walkers (primarily at either end of the Track) or overnight or multi day use walkers.

Commercial Hut Users
Generally older and/or less fit and/or less experienced people who have sought to have an experience where the load carried is lighter, the evening stay is comfortable, and there is security in terms of navigation and safety.

This group is generally well equipped and has a good knowledge of the trip they will undertake before departure. They have generally booked well in advance.

Primarily seeking the enjoyment of the scenic and natural values but gain a sense of achievement. Many have done or plan to do other hut based multi use tracks (eg New Zealand).

Commercial camping participants
Range of age groups of frequently single people, with minimal overnight walking experience seeking a social group experience with the security of a guide for navigation and safety as well as food preparation. Prefer camping experience to huts. Choice of commercial tour may be influenced by price.

The group is generally well equipped and has a good knowledge of the trip they will undertake before departure. They have generally booked in advance.

Primarily seeking the challenge of the walk and social experience but gain appreciation of the natural values.

Source: Internal Tasmania Parks and Wildlife Memorandum S. Rundle, (22/8/01)
Free independent walkers
This group can be divided into three sub groups:

1. Free independent walkers Overland Track route

- Includes a range of individuals, couples and groups from mixed nationalities walking the Track independently, carrying their own equipment and supplies and using huts and established camp sites. Social contact at overnight stops forms an important component of the walk.
- Management and anecdotal evidence and consultant observation suggests that a (small) proportion of this group may be carrying limited survival equipment such as inadequate wet weather clothing, tents and stove.
- Whilst the Australian walkers in this group have generally planned their trip well in advance, it appears many of the walkers from overseas have heard of the walk in their own country, or whilst travelling in Australia, or once they have arrived in Tasmania. The level of planning by these groups is more varied and may be very limited.

2. Free independent walkers using only part of the Track for overnight walk or to access other walks.

- Includes a range of more skilled bushwalkers that are familiar with the current use and experience provided on the Overland Track that are seeking more remote or less crowded experience or are seeking to undertake a specific walk including shorter walks or trips to specific peaks off the Overland Track. May access the Track from Cradle Valley, from Lake St Clair, or from side routes (Arm River being the most popular).
- A high proportion of Tasmanians within this group and generally people with considerable experience or walking with experienced people with a preference for tent camping who are self sufficient. May plan their trip in advance or at short notice.

3. Day walkers

- Day walkers at either end of the Track may undertake sections of the Overland Track (eg from Cradle Valley to Crater Lake, Cradle Mountain or Marion’s Lookout; from Lake Narcissus hut to Cynthia Bay or Pine Valley).
- Use of either end of the Overland Track by day walkers is likely to continue or increase due to the increased interest in nature-based tourism, the popularity of walking as a recreational activity and the demonstrated visitor interest in Cradle Mountain and Lake St Clair as visitor destinations.

Approximately 50% of parties and walkers on the Overland Track are from other States of Australia. Of those walkers approximately 70% are from Victoria and New South Wales.2

Since 1997/98 records show that the proportion of overseas walkers has been greater than the proportion of Tasmanians. Tasmanian Parks and Wildlife Service note that this does not mean that the proportion of Tasmanian parties is declining, but rather that the proportion of Tasmanians (and mainlanders) is declining in the face of an increase in the number of people from overseas.

Note: The material presented in this section is based on walker registration material collected by Tasmanian National Parks Service, unless otherwise referenced.
Table 2 Origin of private parties and walkers

<table>
<thead>
<tr>
<th>Origin</th>
<th>Number of parties 2000/01</th>
<th>Number of walkers 2000/01</th>
<th>Number of walkers 1999/00</th>
<th>Number of walkers in 1998/99</th>
<th>Number of walkers in 1997/98 (sep-jun)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tasmanian</td>
<td>292 (15%)</td>
<td>826 (19%)</td>
<td>876 (19%)</td>
<td>880 (20%)</td>
<td>725 (17%)</td>
</tr>
<tr>
<td>Mainland</td>
<td>888 (46%)</td>
<td>2,117 (50%)</td>
<td>2,329 (52%)</td>
<td>2,375 (54%)</td>
<td>2,427 (56%)</td>
</tr>
<tr>
<td>Overseas</td>
<td>673 (35%)</td>
<td>1,156 (27%)</td>
<td>1,091 (24%)</td>
<td>853 (19%)</td>
<td>828 (19%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>97 (5%)</td>
<td>191 (4%)</td>
<td>224 (5%)</td>
<td>311 (7%)</td>
<td>368 (8%)</td>
</tr>
<tr>
<td>Total</td>
<td>1,950</td>
<td>4,350</td>
<td>4,520</td>
<td>4,384</td>
<td>4,348</td>
</tr>
</tbody>
</table>

Overland Track Future Demand

Indicators point to a trend of increased activity in walking, some of which is likely to translate to overnight walking activity. The increase in supply alone of quality and diverse walking opportunities within Tasmania are likely to attract more overnight walkers.

Other indicators include:

- Tasmania is widely recognised as a haven for walking, with both national and international interest in undertaking walks, especially within the WHA and National Parks;
- A growing interest in nature based tourism and cultural based tourism opportunities within Australia;
- Bushwalking continues to rank highly as an outdoor recreational pursuit enjoyed by the Australian population, and particularly in the key market segments making up the visitor base to the State;
- Continued growth in overseas visitors to Tasmania from countries where walking is a popular activity and thus many associate holiday experiences with walking opportunities;
- There is a high participation rate in bushwalking within the Tasmanian community;
- The expectations by recreation analysts are for continued growth in walking and this will add to the demand for a range of walking opportunities that meet the varying needs of the community;
- There is likely to be continued growth in bushwalking as a result of a range of influencing social, economic and environmental factors affecting leisure generally, despite the slow population growth within Australia;
- The growth in bushwalking will continue to be individually organised but with potential for well designed commercial guiding/accommodation operations to deliver products that have appeal to the emerging market segments (especially those with tight time constraints, limited experience, not overly cost conscious and seeking educational/discovery experiences);
- Bushwalking will continue to attract participation across all age groups, with increased participation in older age groups as part of the ageing society and movement of the 'baby-boomers' into these age groups;
- The high level of satisfaction by walkers from interstate and overseas with the standard and quality of walking opportunities within the State; and
- The significant promotion and information generated by both public and private information sources about walking within the State.4

The recent announcement by the Government of the purchase of two mono-hull fast ferries to ply Bass Strait is predicted to lead to an additional 36,000 people in its first year of operation, and could rise to as much as 68,000 in future years. There is no doubt that some of these visitors will want to walk the "icon" Overland Track.

Motivation for visiting the Overland Track

3 Source: Internal Tasmania Parks and Wildlife Memorandum 22/8/01 S. Rundle)

4 Tourism Tasmania, 1998, Advancing the Attractions Sector
Discussions with stakeholders and walkers as well as consideration of survey information has indicated that the key motivations for visiting the Overland Track include:

- To experience the natural values of the area
- To experience wilderness
- To enjoy and be inspired by the landscape
- To enjoy challenge and adventure
- To experience a sense of back to basics and not being bound by modern civilisation

The experience people seek

A range of experiences is currently being sought and provided by the Overland Track. The range of experiences is best described by considering the different visitor groups on the Track.

The commercial hut walkers experience the natural values offered by the WHA, a physical challenge (within their own experience and physical limitations) and a limited wilderness experience. These are offered at a high level of safety, security and comfort provided by fully catered and stocked huts with twin rooms, mattresses and showers and accompanying guides.

The commercial camping walkers experience the natural values offered by the WHA, a limited wilderness experience and a physical challenge but their experience is a more “primitive” experience because their accommodation is much more basic being tent-based and subject to the elements of nature.

The experiences of the “free independent walker” can also be relatively safe, secure and comfortable because of the numbers of walkers on the Track, the quality of the Track itself and the standard of public huts and camping now provided.

The most “primitive” experience is available to those who choose not to camp at the hut sites and undertake the less popular side trips.

Significant factors affecting the experience people gain

Research has shown that the quality of the recreational experience is related to all stages of the trip including pre-, during and after the trip. Trip stages may be defined as follows:

Expectation and planning
Travel to the start point
The scenery and landscape
The walk on the Track
The hut or camp site
The challenge, adventure and safety
The education and interpretation

Departure from the Track
The recollection of the trip

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5 (Information from the Overland Track Walker Survey November 1999/ April 2000 University of Tasmania PhD Thesis in progress was not available at the time of preparing this draft. This information will be incorporated into a later draft.)
Information gathered from Overland and Wilderness walker surveys, Parks and Wildlife Service reports, stakeholder consultation and informal contact with walkers suggest that the following factors affect walkers’ experiences of the Overland Track:

- Adequacy of information in advance of the walk
- Perceptions of the experience they will have
- Overall packaging of the trip experience product
- Transport connections and experience
- Level of use and/or crowding at huts and camp sites
- Siting and design of infrastructure
- Standard of track surface
- Quality of interpretation of the world heritage values
- Quality of interpretation of the natural and cultural values
- Perception of wilderness
- Environmental standards
- Park management practices
- Customer orientation of the operation
- Standards for commercial operator education

Forming the expectations

There are a number of levels of preconceived perceptions of the Track. These can be described as:

- those that have planned their trip well in advance and have a good knowledge of what they can expect and what they should bring,
- those that have done it many years before and are pleasantly surprised at improvements, and
- those that hear it is a good walk and may have limited information about the Track in advance including limited knowledge of what they should take.

These groups have different approaches to their pre-trip research and have different expectations of the experience they are likely to have which may make it better or worse than that expected. The key elements of the experience that walkers indicate has varied from expectations include:

- Track condition (for some it is better than expected, for others worse)
- Numbers of people on the Track
- Numbers of people at camp and hut sites
- The weather
- The difficulty (for some it is easier and for some harder than expected)
- The level of facilities
- The lack of a permit or fee system
- The level of development and use of wilderness

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6 Quantitative data about factors that impact on quality of experience has been collected by the Overland Track Walker Survey November 1999/ April 2000 University of Tasmania PhD Thesis, (in progress), M.Poll. This data is currently being analysed and will, when available, be incorporated into planning.
The Overland Track within the context of a spectrum of recreational opportunities

The Overland Track is a significant walking experience for Tasmania, Australia and international visitors. It provides a range of opportunities to experience the outstanding natural values and the cultural heritage in the Tasmanian Wilderness World Heritage Area. It offers outstanding scenery, a safe and comfortable walking track, and a range of infrastructure to make long distance walking accessible for a range of walker types. It provides an opportunity to showcase Tasmania and Tasmania’s best practice national park management.

The Overland Track has received high levels of growth in visitation which are affecting the experience which is provided. Continued unmanaged visitation is not sustainable in terms of the environmental and social capacity of the area and is inconsistent with demonstrating a high quality wilderness experience to users. The Track is only one in a range of walking tracks that offer a range of levels of infrastructure, usage, challenge and remoteness.

Management of the Overland Track has occurred as necessary to ensure environmental impacts are managed for the increasing numbers of walkers. This has been consistent with management plans, but not in a strategic manner addressing issues common across the track length.

The Overland Track provides a range of experiences for walkers and a range of infrastructure and services provide different opportunities for walker experience. The recreational trip experience starts with planning the trip and concludes with the recollection when the visitor has returned home. There are ways in which the Overland Trip experience could be improved at all stages.

The proposal of the Tourism Council of Tasmania which is supported by the World Heritage Area Consultative Committee that the Overland Track be developed as the ‘best mountain walk in the world’ is achievable. The landscape quality and the natural and cultural values are there. It remains to ensure:

- that the product is sustainable through effective management;
- that best practice environmental and management standards are in place;
- that the experience of the Overland Track is recognised as more than simply the walk; and
- that marketing of the Overland Track is accurate and effective to ensure people’s expectations are met.
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Parks and Wildlife Service Tasmania Internal Memorandum- S. Rundle (August 2001) Final Overnight Walker Registration Data Summary for 2000/1, Cradle Mountain.


Celebrating Mountains – An International Year of Mountains Conference
Jindabyne, New South Wales, Australia

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Tourism Value Of The Australian Alps

Trevor Mules and Natalie Stoekl

This research was jointly funded by the Australian Alps Liaison Committee and the Cooperative Research Centre for Sustainable Tourism.

Trevor Mules is coordinator of the Cooperative Research Centre for Sustainable Tourism, Canberra node, at the University of Canberra.

Natalie Stoekl was a lecturer in economics at the University of Canberra when this research was conducted. She is now employed by CSIRO, Townsville.

Introduction

The Australian Alps attracts visitors from across the nation and from overseas. The research in this paper focuses upon both the value that such visitors place on the Alps for recreational use, and the economic impact of visitor expenditure on the State economies of Victoria, NSW, and the ACT.

Data for the study was collected via a 12 month sample survey of visitors from February 2000 to March 2001. Questionnaires for self-completion were distributed at visitor information centres, accommodation places, entry gates, ski chairlifts, retail outlets, and in situ on the mountains. A $500 lottery prize and post-paid return envelopes encouraged visitors to respond. There were 4791 useable responses, distributed as follows:

<table>
<thead>
<tr>
<th>Region</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victorian Alps</td>
<td>1,500</td>
</tr>
<tr>
<td>NSW Alps</td>
<td>3,096</td>
</tr>
<tr>
<td>ACT Alps</td>
<td>195</td>
</tr>
</tbody>
</table>

In this paper, the results of the survey that are pertinent are the origins of visitors, which were collected at postcode level, and their expenditure. The latter was collected according to the major items of trip expenditure such as accommodation, transport, ski lift tickets, food and drink, etc.

Visitor Use Values – The Travelcost Method

For many years economic theory has acknowledged the many non-financial benefits attributable to the environment and has attempted to develop means of measuring them. Although the exact classifications vary, at the broadest level economists tend to divide these benefits into the broad categories of ‘use’ and ‘non-use’ benefits. Use benefits are those which are derived from direct use of the environment. Examples of these include the benefits of Recreation and Tourism, the value of goods produced, the value of maintaining and/or improving environmental quality, the value of biodiversity, educational and research values. Non-use benefits are those benefits which are derived from the environment without actually using it. Examples of these include: the benefit of preserving the environment for future use (the option value); the satisfaction derived from being able to pass the area on to other generations (the bequest value); and the benefit of simply “knowing that the area is there”, even if there is no intention of ever using it (the existence value).
In this study, the travel cost method (TCM) is used to estimate the recreation use value of the Australian Alpine areas. The TCM focuses on just one part of the environmental value of a wilderness area – that which is attributable to recreation use. It does not measure other use values, option values, or existence values.

**The Concept of Consumer Surplus**

In theory, a product’s Demand Curve shows how much consumers are willing to pay for each extra amount of the product. Consider the problem of water, for example. Individuals do not often pay for it, yet if asked to do so, they might consent to do so. In most cases, consumers will not be willing to pay as much for their 2\textsuperscript{nd} and 3\textsuperscript{rd} glasses of water as they are for their first. As shown in Figure 2, this means that demand curves – typically – slope down.
If an individual is prepared to pay $10 for a glass of water, yet is only required to pay $1, they are deemed to have a ‘surplus’ of $9 (paying only $1 for something which brings $10 of benefit). This is the surplus attributable to the first glass of water. The second glass generates $8 worth of CS; the third generates $7; and so on, until the consumer is no longer willing to pay for another glass of water since its ‘value’ to the consumer (from the demand curve) falls below its price. In total, the consumer reaps $55 worth of CS; an amount equal to the area under the demand curve (Figure 3). Importantly, this demonstrates that the ‘value’ (to consumers) of some products far exceeds its price.
Consumer Surplus and The TCM

While there are many different versions of the TCM, the simplest (hereafter referred to as the zonal TCM) is theoretically capable of generating an estimate of the consumer surplus (CS) attributable to recreation at a particular area.

TCM treats the cost of travel as a proxy for price. The first stage of the TCM involves identifying the number and origin of visitors to a recreational site, and estimating their costs in travelling from that origin to the site and back again. This information is then used to estimate the functional relationship between visitation rates and travel costs. Stage two of the process makes the assumption that individuals react to changes in travel costs in the same way as they react to changes in price, and uses the function estimated in stage one to simulate visitation responses to hypothetical changes in price. A demand curve for the recreational area is thereby derived and used to estimate consumer surplus.

To illustrate, assume that travel costs, alone, influence visitation, that the current entry price (P) is zero. Assume also that the research observes the number of visits (V) from each of three different ‘zones of origin’, at a range of different travel costs (TC). These are shown in the first three columns of Table 1. Stage one of the implementation process involves regressing V against TC to estimate $\frac{\partial V}{\partial TC}$ (in this case, negative 1). From this, one can infer that within any zone, $\Delta V = -1 \times \Delta TC$. Stage two of the implementation process occurs when one uses that information to predict the number of visits (from each zone) which would obtain at higher travel costs ($= TC + P$):

---

Figure 3 - Consumer Surplus
Table 1 - Observed and Predicted visits at two different prices (entry fees)

<table>
<thead>
<tr>
<th>Zone</th>
<th>Observed</th>
<th>Simulated</th>
<th>Predicted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TC</td>
<td>V</td>
<td>TC1= TC + 10</td>
</tr>
<tr>
<td>A</td>
<td>10</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>B</td>
<td>20</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>C</td>
<td>30</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>Total Visits</td>
<td>30</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

Plotting price against the total visits (observed or predicted) gives the aggregate demand curve, the and its associated CS (Figure 4)

Figure 4: The aggregate demand curve for recreation

Recreation use value, is simply the value – into perpetuity – of a stream of consumer surpluses.

Empirical travel cost studies are considerably more complex than this; the functional relation between visits and travel costs, for example, is rarely linear and almost always includes other variables. Numerous problems are also encountered when attempting to collect relevant data, and measurement difficulties abound. Nevertheless, this stylised version helps to illustrate the process underlying the TCM.
Methodological overview

Despite the very large number of empirical applications of the TCM, several theoretical and practical problems have been identified. Interested readers are directed to Stoeckl (1999); Smith (1989) and Fletcher et al (1990), all of whom provide a detailed overview of many of those problems. Suffice to say here – final estimates are not as accurate as often portrayed. This study therefore provides a range of different estimates; that range reflecting some of the uncertainties associated with the methodology.

More specifically, this study uses the zonal TCM to generate a range of estimates of the recreation use value of each of seven different regions within the Australian Alps. Rather than attempting to determine travel costs from each zone, we use the ‘great circle’ distance between each zone of origin and the location from which the survey was collected as a measure of travel costs (assuming a price of distance = $ 0.50 per km since distance is one-way). Distance, the population of each zone, and other socioeconomic measures (taken from the ABS’s 1996 census) are used as regressors within the visitation equation and the dependent variable is defined as the number of sampled visitors from each zone. We allow for multiple-site visitors problem by using dummy variables to identify multiple-site visitors, and estimate five different visitation equations (using five different functional forms) for each region.

The results

A total of 4,614 questionnaires were completed by Australian residents. This allowed us to allocate 16528 Australian residents into 2293 different postal ‘zones’. We then divided that data into seven different sub-sets; according to which region (within the Australian Alps) the individuals were visiting when they completed the questionnaire.

For each region, visitation equations were estimated using 5 different functional forms. The double-log version was chosen as the “correct” functional form on both practical and theoretical grounds (see Stoeckl, 1999). From this point onwards, we therefore focus on estimates associated with the double-log model.

Coefficients from the double-log visitation equation were used to generate the following estimates of CS attributable to our sample of visitors (assuming a travel costs = 50 cents per km). These estimates were scaled downwards for a range of ‘plausible’ travel costs (10 and 30 cents per km), producing a range of ‘plausible’ consumer surplus estimates attributable to our sample of visitors (Table 2).

<table>
<thead>
<tr>
<th>Region</th>
<th>CS a ten cents per km</th>
<th>CS at thirty cents per km</th>
<th>Per Person CS at ten cents per km</th>
<th>Per Person CS at thirty cents per km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yarrangobilly</td>
<td>$259,124</td>
<td>$777,372</td>
<td>$258</td>
<td>$773</td>
</tr>
<tr>
<td>Jindabyne</td>
<td>$1,049,092</td>
<td>$3,147,276</td>
<td>$113</td>
<td>$338</td>
</tr>
<tr>
<td>Tharwa</td>
<td>$356,694</td>
<td>$1,070,082</td>
<td>$537</td>
<td>$1,612</td>
</tr>
<tr>
<td>Mt Buffalo</td>
<td>$582,034</td>
<td>$1,746,102</td>
<td>$217</td>
<td>$652</td>
</tr>
<tr>
<td>Falls Creek</td>
<td>$551,102</td>
<td>$1,653,306</td>
<td>$446</td>
<td>$1,338</td>
</tr>
<tr>
<td>Bright</td>
<td>$518,780</td>
<td>$1,556,340</td>
<td>$402</td>
<td>$1,206</td>
</tr>
<tr>
<td></td>
<td>$3,428,310.00</td>
<td>$10,284,929.00</td>
<td>$286.38</td>
<td>$859.00</td>
</tr>
</tbody>
</table>

Table 2: “Plausible” Consumer Surplus Estimates from the sample of visitors

(Using the double-log visitation equation)
To calculate the minimum ‘plausible’ CS estimate attributable to all visitors, we calculated the average per-person consumer surplus attributable in each state. Our averages, are weighted by the number of sampled visitors from each sub-region within each State. We then multiplied the 10 cent per km per-person consumer surplus estimates by the total number of visitors to the each region, and multiplied that figure by 0.8 to generate an exaggerated lower-bound estimate. For the upper-bound estimates, we multiplied the 30 cent per km per-person consumer surplus estimates by the total number of visitors to each region, and then scaled those numbers upwards by a factor of 1.2 (so as to over-exaggerate the range). We also supply a “middle of the road” estimate, calculated using an implied price of distance equal to 20 cents, and using total visitor numbers (without scaling). These ranges are presented in Table 3.

Table 3: “Plausible” Range of Consumer Surplus Estimates for all visitors

<table>
<thead>
<tr>
<th>State</th>
<th>Region</th>
<th>Visitors</th>
<th>“Plausible” minimum CS if P = 10 cents</th>
<th>“Plausible” minimum CS if P = 20 cents</th>
<th>“Plausible” maximum CS if P = 30 cents</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW</td>
<td>1 and 2</td>
<td>1,001,500</td>
<td>$101,752,400</td>
<td>$279,819,100</td>
<td>$457,885,800</td>
</tr>
<tr>
<td>Namadgi</td>
<td>3</td>
<td>200,500</td>
<td>$86,134,800</td>
<td>$236,991,000</td>
<td>$387,847,200</td>
</tr>
<tr>
<td>VIC</td>
<td>5, 6 and 7</td>
<td>2,506,000</td>
<td>$635,521,600</td>
<td>$1,749,188,000</td>
<td>$2,862,854,400</td>
</tr>
<tr>
<td>TOTALS</td>
<td></td>
<td>3,708,000</td>
<td>$823,408,810.00</td>
<td>$2,265,998,120.00</td>
<td>$3,708,587,430.00</td>
</tr>
</tbody>
</table>

If one wishes to obtain an estimate of the recreation use value of an environmental area, consumer surplus estimates must be extrapolated into the future and discounted back to present values. Generally, it is assumed that current annual values of consumer surplus will continue in perpetuity, meaning that the recreation use value (RUV) of an area is given by the present value of future annual values discounted at the social discount rate.

Minimum estimates of RUV were calculated using the minimum CS estimate (from Table 3) and a discount rate of 10%, the ‘middle’ estimate was calculated from the ‘middle’ CS estimate (with a discount rate of 6%) and the maximum used the highest CS estimate with a 2% discount rate.

Table 4 - A ‘plausible’ range of estimates of RUV.

<table>
<thead>
<tr>
<th>State</th>
<th>Region</th>
<th>“Plausible” minimum RUV if P = 10 cents and $\delta = 10%$</th>
<th>“Plausible” maximum RUV if P = 20 cents and $\delta = 6%$</th>
<th>“Plausible” maximum RUV if P = 30 cents and $\delta = 2%$</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW</td>
<td>1 and 2</td>
<td>$1,119,276,400</td>
<td>$4,943,470,766</td>
<td>$23,352,175,800</td>
</tr>
<tr>
<td>Namadgi</td>
<td>3</td>
<td>$947,482,800</td>
<td>$4,186,841,000</td>
<td>$19,780,207,200</td>
</tr>
<tr>
<td>VIC</td>
<td>5, 6 and 7</td>
<td>$6,990,737,600</td>
<td>$30,902,321,333</td>
<td>$146,005,574,400</td>
</tr>
<tr>
<td>TOTALS</td>
<td></td>
<td>$9,057,496,810.10</td>
<td>$40,032,633,119.06</td>
<td>$189,137,957,430.02</td>
</tr>
</tbody>
</table>

In words, this analysis allows us to say that the recreation use value of the Australian Alps lies somewhere between $9 billion and $190 billion; most likely somewhere close to $40 billion. Admittedly, that range is large - but a broad range of estimates is frequently better than no estimate at all.

---

1 Eg. the average per-person CS for NSW using ten cents per km as the price of distance was calculated as \( \frac{(258 \times 1006 + 113 \times 9303)}{(1006 + 9303)} \)
**Economic Impact Of Visitor Spending**

While alpine Parks have economic value to recreational users, they also have value to their host economies via the generation of jobs and income which would not occur in the absence of the Parks. This value is termed the economic impact, and is driven by the visitor expenditure which is incurred in the host economies.

In this study the State is viewed as the host economy, because of the high level of State Government involvement in the visitor use of the alps. This approach has led us to treat only the expenditure by visitors to the State as having an economic impact on the State economy. For the present study, input output models were developed for each of the ACT, NSW, and Victorian State economies by the Centre for Tourism Research at the University of Canberra. The models provide detailed sector multipliers for Gross State Product (GSP), which is the state equivalent of Gross Domestic Product (GDP), and for employment measured in full time equivalents (FTEs).

The economic impacts on each State/Territory are summarised in Table 5. The size of the impacts on GSP is a function of how many interstate visitors go to each of the alps destinations, and since 2001 was a low snow year, these numbers may have been lower than they otherwise might have been. The economic numbers should therefore be regarded as being towards the lower bound of annual impacts.

**Table 5 - Economic Impact of Visitors to the Australian Alps, 2001**

<table>
<thead>
<tr>
<th></th>
<th>GSP $m.</th>
<th>Employment FTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Namadgi winter</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Namadgi summer</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Namadgi Total</td>
<td>29.64</td>
<td>456</td>
</tr>
<tr>
<td>NSW winter</td>
<td>95.98</td>
<td>1540</td>
</tr>
<tr>
<td>NSW summer</td>
<td>51.67</td>
<td>840</td>
</tr>
<tr>
<td>NSW Total</td>
<td>147.65</td>
<td>2370</td>
</tr>
<tr>
<td>Victoria winter</td>
<td>102.97</td>
<td>1654</td>
</tr>
<tr>
<td>Victoria summer</td>
<td>42.06</td>
<td>675</td>
</tr>
<tr>
<td>Victoria Total</td>
<td>145.02</td>
<td>2329</td>
</tr>
</tbody>
</table>

For Namadgi National Park there was insufficient data for a winter/summer breakdown and so annual results are presented. The ACT economy receives an annual boost to GSP of $29.64 million, of which $2 million represents increased tax revenue going to the ACT Treasury. For NSW the GSP boost is $147.65 million per year, of which $10.3 million is increased tax revenue to NSW Treasury on account of expenditure by visitors to the NSW alps. For Victoria, the boost to GSP is $145.02 million annually, of which $10 million is extra State tax revenue.

The seasonality of economic impacts on NSW and Victoria has changed over the past decade, in line with the growth in summer tourism in each State’s alpine areas. Studies in the early 1990s put the winter effect at 89 per cent of the total in NSW, and 83 per cent in Victoria. This study estimates the 2001 winter percentages at 65 per cent and 71 per cent respectively.

**Conclusions**

This has been an empirical study of the economic values and impacts of tourism in the Australian Alps. It has estimated the capital value of the alps for recreation using the travel cost method to be likely of the order of $40 billion, and the annual economic impact at a combined $322.31 million.
References


Knapman, B. and Stanley, O., (1993), "A travel cost analysis of Kakadu National Park” in *Building a research base in tourism* Proceedings of the National Conference on Tourism Research, Bureau of Tourism Research, Canberra


Can The Mountains Survive Without Tourism?

Greg Roberts

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Tourism Snowy Mountains, New South Wales

Abstract

The Snowy Mountains is a region of south east NSW that includes the prairie like grasslands of the Monaro, a large portion of Australia’s alpine environments, and eco-systems like Australia’s only Fjeldmark that are highly limited. The region includes the highest Mountain on the mainland, has developed strong cultural history, and evokes enormous scientific interest. Within this context, tourism is the major industry of the region generating $604 million. It creates about 5000 jobs and has allowed the permanent development of communities and service industries in the surrounding towns and villages. Tourism has more benefits than negative influences. Beside jobs, sustainable tourism has ensured the maintenance of the history and culture of the post 1788 migration and has strong links to Australia’s multicultural development since 1945. Using the economic principle of yield management, the future of a sustainable tourism industry will ensure the protection of mountain communities, and the natural environments, eco-systems and species that are conserved inside and outside the boundaries of national parks and reserves. Tourism is the means to survival of mountain environments and communities.

The Snowy Mountains - NSW

Physically, this region ranges in altitude from 800 to 2228m above sea level. It takes in a variety of geophysical, geological and ecological communities. The plant communities for example, vary as widely as the vast Monaro grasslands, those prairies to the east of the mountains that are largely treeless, due as much to the effects of cold air drainage and firestick farming, as the rain shadow created by the mountains of the Kosciuszko uplift to the west. The vastness of these plains can be contrasted by the tiny plant community of the rock strewn Fjeldmark above Lake Albina, a tiny plant community, protected within Kosciuszko National Park.

The geology varies as much as the plants, but is dominated by the vast sea of granite boulders and its soils, the best examples of which can be seen around Berridale on the plains, and above Thredbo in the mountains. These eerie boulders are a constant source of interest to visitors and are a great example of the forces of nature that have moulded the regions landscape.

I have refrained from using the word unique in this description. However, the natural environment truly comes to life when it is seen within the context of the human communities that have grown around it. While the migration and aestivalion of the Bogong moth is scientifically interesting, it is the association with the Aboriginal people of the Monaro, the South Coast and the people to the west that begins the story of the cultural fabric of the mountains.
The stories of the exploitation of the grasslands and high country for summer grazing, and the dependence on the horse created a cultural icon in this region that no Australian, and certainly from our experience, no international visitor has not heard of. The opening sequence of the opening ceremony of the Sydney Olympics described the deeply held relationship in the Australian community, between the high country and the Australian horse rider. Horse treks, day rides and riding tuition have, as a result, been part of the high country summer tour industry for a longer period than just about all others, save for bushwalking and bicycle touring. Mountain biking and white water rafting are young upstarts by comparison.

**Touring, tourists and tourism**

So when did tourism commence, and what impact does it have on mountains? I am not qualified nor would I indulge myself in believing I could comment on the 12-15000 year presence in the mountains of Aboriginal communities. However, I do believe that their presence in the high country for their own economic and cultural reasons does give the first insight to the need for humanity to travel, and set the scene for what was to come.

Depending on your preference, European presence was first recorded during 1823, when Ovens and Currie travelled south of “Yarralumla” into the Monaro grasslands. Edmund Strzelecki is the most recalled “explorer”, the one who climbed and named Mt Kosciuszko. Now I doubt whether even Strzelecki had that much arrogance. As an aristocratic European traveller, he was on his own journey of discovery, and it was not beneath him to employ two local Aboriginal guides to guide him to the highest peak on mainland Australia. Their names are not recorded, however they guided him along the Murray, and up what we now call Hannels Spur. Strzelecki recorded that the campfires of the local people were obvious, and he, in true aristocratic style, requested that the guides remain, like 19th century Sherpas, at the advanced camp at Moiras Flat, while he continued to the summit. Here, it seems, he decided to rename the place Mt Kosciuszko. His cultural sensitivities not as heightened as they would be today, or he would have taken the fact that it already had a perfectly legitimate, and culturally appropriate name – Targangil.

That aside, Strzelecki is among the first of the European visitors. A person on a great tour of life and discovery, following what is enshrined in many cultures as a means to discover yourself, by exploring new worlds. By any standard, Strzelecki was a tourist.

Let’s look at what he did. He booked and paid passage for an international journey. He paid for land transport once in Australia, and without a “Lonely Planet” guide, investigated, contacted local community people, and hired local guides. The economic impact of his journey even then, would be significant. In today’s economy, the same tour would have invested perhaps $20 000 to the Australian economy.

Of course it is history now that the region was then exploited for grazing. It was another group of visitors, the Mountain Trails Club of which Myles Dunphy was a member, that made the first noises about the alpine area, and the need for the mountains to be protected. Following the suggestion of the Snowy Mountains Scheme, the problems of soil erosion from grazing were recognised, and the alpine region was finally protected.

A number of studies have shown that the Snowy Mountains Hydro-electric Scheme, and the natural environment and history of the mountains are two major drawcards for visitors to the mountains. So, chicken or egg? Was the Snowy Mountains Scheme good for the mountains, or did it change the mountains? The enormous influx of workers brought with it the desire to explore the mountains, seek adventure, and was to develop the snow sports industry that is the backbone of the regional tourism today. It built the infrastructure, the roads, the trails and tracks, the dams and tunnels and the Alpine Way.

All these things make the journey easier and have a cultural story of their own. When they were constructed, Australia had a different mentality to the outback than today. One such story is that of Major Clews. A post war Snowy Scheme worker whose skills with surveying have been recognised internationally along with his teaching prowess. He taught English and surveying to snowy workers and war refugees. The man’s selfless nature is an example of the cultural story of the mountains. The simple mountain pise hut where he lived can be visited off the “Alpine Way” today.
The tourism business

A study in 2000, identified a worrying trend in the Australian workforce. That trend was for the workers to take less holidays, of shorter duration, largely because the pace of the work environment, and the potential for business to change even overnight. Many workers were not taking holidays longer than 3 days, and many had not taken a break for periods of up to two years. Compounded by the competition of consumer goods for discretionary spending, this is a problem for the health of the workforce. They needed to take a break. The result was the “see Australia” campaign. One value of this is to spread economic activity into regional Australia.

In the Snowy Mountains, the Australian Bureau of Statistics puts tourism as the major economic activity, with $604 million created. In context this is ten times greater than agriculture at $64 million. Put more simply, tourism is the regional industry.

The villages and centres of the mountains benefit. While many Australian regional towns are experiencing hardship, Cooma, for example, the economic centre of the Snowy Mountains is a hive of activity. Few country towns of less than 10,000 population can boast five banks, seven schools and preschools, one tertiary institute, two doctors surgeries and a busy health services centre and hospital. There is also an entire industry servicing the tourism industry. These include, food, equipment suppliers, vehicle repairers, electrical and electronic goods suppliers, government agencies, police and of course the myriad of building suppliers and tradesmen that support the industry.

Studies have shown that the average per person per night spent in the region is $220. With churn the economic value to the community compounds to $660. As research from the Department of Industry, Tourism and Resources point out, tourism, adding about 6.5% to GDP, is a very significant producer.

In the national context it is an industry that is a net exporter too, with approx 2 million traveller arrivals last year, and dispersal right throughout the country.

Economic, political, environment conditions

On the downside, this is an industry that is heavily influenced by factors beyond its control. In the financial year 2001–2002, this region had looked forward to domestic growth following a tough year, mainly due to the effect of the Sydney Olympics, and the introduction of the GST. Evidence of this was the regional fishing competition that saw a decrease in numbers as it coincided with the first reporting statements. For international readers……just think of a new tax! Last summer, the Australian domestic market had been affected by the Ansett collapse, creating uncertainty in the travel industry. After September 11, the international market reacted strongly, and with gale force winds in the mountains and bushfires reported by mainstream media as “NSW burns”, the industry was knocked. But there was some optimism, and growth in visitor numbers steadily increased. 2002, a good year for visitors, has so far been stymied by a lack of commercial operators, as the fallout from the HIH insurance collapse is felt. Small family operated horse trekking businesses for example, employing several people, are now confronted with insurance bills of $AU20 000, if they could get cover at all.

The point being that tourism is not so much a sector industry, but one that is impacted by many factors, especially government, and its bureaucracies.

Before I go onto that, I recognise that there are a number of people from the scientific community, to which a discussion without mathematics, is irrelevant. Tourism NSW have researched some interesting data.

- Australia is the 6th largest country in area
- Australia has the lowest population density in world
- Australia is the 33rd largest country in “inbound” tourism
- International tourism accounts for 20% of visitors and 40% of revenue
- A growth of 2% to 15% of bookings via internet
- Rapid growth in international tourism has given greater employment in service sector
Australians:
- are living longer – by 2051 the median age will be 44 (now 35.5);
- one fifth of them will be born overseas;
- increasingly live in cities;
- ethic is moving towards ecological sensitivity;
- use the internet for information;
- are taking shorter holidays, and are shifting from active holidays to holidays as an experience eg., learning new things, authentic emotions, personal development;
- prefer personal choices eg., food and wine, interact with hosts;
- as consumers, are better informed, demanding choice and freedom.

**Snowy Mountains – 2001 snapshot**

- 554,000 visitor nights
- 96% are domestic visitors
- 23,000 are international
- 210,000 are day trips into the region
- 16% are Visiting Friends and Relatives
- 77% of trips are for holiday (state average 44%)
- Average stay is 3.3 nights
- 54% of Visitors from Sydney
- Internationally, visitors arrive from Europe, (especially Netherlands, Scandinavia) UK, Germany and US
- Transport primarily car 44%
- $604 million
- Every $1 million creates 7.7 jobs
- 5,500 jobs created
- Community benefits with infrastructure eg restaurants, cafes, attractions.

**Recognition of positives**

Of major importance, is the fact that tourism gives added impetus for the preservation of local cultural and natural heritage.

**Consumers**

So what do consumers know of the Snowy Mountains as a summer destination:

- Quiet, peaceful holiday spent in a natural environment, pursuing relaxing activities
- An escape from summer heat
- Snow capped peaks create an image of grandeur, silence, isolation and escape
- Beautiful flora and fauna
- Activities, especially hiking to the top of Mt Kosciuszko

Those were the good things. On the down side some respondents said:

- Boring destination, not enough to do
- Not enough to keep kids occupied
- No night life for DINKS
- Poor accommodation choices
- Poor quality and high price for food
- Resentment of National Park fees

(Source TNSW BTR)

Enough figures, now to the emotive stuff.

**Culture, learning and a great holiday**

There are three propositions that I wish to put to you:

The view of science, and its particular skew

Tourism and sustainability

The value of commercial tourism to preservation

**Managing tourists**

It’s a problem for me, that science so often gets it wrong. Students of ecology, natural sciences, geology or geography use the mountains for their research projects, often for exactly the same reason that visitors do. Mountains are inspiring. They pose so many questions for the science student to exploit. Unfortunately conclusions are always directed at protection: protecting a species, an environment, an ecosystem. Recommendations always seem to suggest ways of managing the major problem causer…the visitor. The implication is that, like so many of the parks manageable problems, visitors are also something that needs managing. An alternative is to encourage visitation and to engage the visitor. By inviting visitors you can achieve the same result ecologically, with huge benefits politically. By providing opportunities to experience the natural environment or local culture, you can create a committed people, champions for your cause. Treating people like another introduced species is counter productive to the very purpose of the management in the first place … I’ll explain why.

**Sustainable tourism and yield**

While sustainability has become the buzz word of the 00’s, it’s a practice that many businesses in the tourism sector have begun implementing over the last 10 or even 15 years. Sustainability is possible when the practice of yield management is adopted to ride the highs and lows of business. An industry that is so affected by politics, economics and environmental factors has to have methods to even-out cash flow over a longer term than the usual fiscal year.

**Yield v numbers**

Promoting the mountains does not mean increasing numbers, what it means is increasing the return from the visitors you get. This has a number of benefits. Getting more from the same number of visitors means that costs can be reduced. One major way of achieving this is to increase the visitor length of stay. Financially, operators can reduce costs, as room changes, cleaning, check in/outs and transport costs are all reduced. On the other hand, opportunities to market commercial and non-commercial activities/attractions are increased. There are also increased opportunities for secondary businesses, restaurants, guides, tours etc to benefit. Even better, is the heightened opportunity for learning and experiencing the mountain environment and culture. All this is a benefit to both the community and the environment. Additionally, a better educated and experienced traveller is more likely to be influenced enough to seek support for conservation, education, research and protection of the environments and species they see. Think of the battles for Pedder, South East Forests and Kakadu that have been won by the impact of visitors. In this way, the true definition of sustainability, to preserve ecological processes and to protect human heritage and biodiversity, can be achieved.
**Commercial guiding operations**

Now legislation affecting National Parks, and I am referring mainly to wilderness areas, has adopted as conventional wisdom, the proposition that there is to be no commercial operations. This had the intention of preventing large scale operations in an area where self reliant travel is considered “savoir fare” but it has created great difficulties for sensitive eco-tour operators and their customers. Certainly it is my experience that minimal impact techniques had been introduced by commercial operators well before it became management policy in parks. It is a ludicrous situation that operators can bring through sensitive areas, large groups of people, masquerading under the guise of education or “not for profit”. Experience tells that it is often these groups, with little control, who have the greatest impact on the environment. On the other hand, small group commercial tours, lead by experienced guides are able to learn about the ecosystems, elements of the natural environment such as the animals and plants, taught by people who have developed interest, knowledge and a love of the mountains. They are also able to teach navigation, weather and survival skills within the environment where it will be used at future times by the participants.

I have also noted that, just as the consumer research tells us, many potentially independent travellers use commercial operators for reasons such as limited personal time for planning, use of transport, and equipment hire among others. I know of examples of customers who use commercial operators just so they get to have a break and not be called back to the office from a “paid” holiday. But even better still, can you picture yourself under the mantle of a crystal clear mountain night sky, “up by Kosciuszko, where the white stars fairly blaze” with a member of a local family, telling their family stories, explaining the culture of the mountains, the origin of the noises of the night, the reasons the Corroboree Frog is now endangered……and on and on….this certainly far outweighs the oft seen summer walker, in thongs and singlet, with little protection from the sun and mountain weather, sailing past 10,000 year old glacial tarns, oblivious to the ancient geology, the Aboriginal and European culture and history, leaving the area with the opinion, that it’s a pity you can’t drive to the summit……what a different visitor experience we should all aspire to.

**Conclusion**

So how do you value the visitor and their economic impact? Are they a consumable to be exploited, or a problem to be managed? Is the promotion of their visits ecologically sustainable?

I believe that the potential of sustainable tourism is a means to develop a commercially viable industry, one which creates meaningful permanent jobs. It’s a way of winning the minds of the public, the legislators, and especially in protecting and preserving the ecosystems and culture of the region. It may even be a means to see the emergence of a viable and meaningful aboriginal cultural product, that we know is so eagerly sought by international visitors, and is ruthless exploited in the northern territory. In summary, managers, scientists and the local community should embrace tourism as a positive influence on mountains, and not a problem that requires managing! And, you will find that good commercial operators will defend the resource that feeds them and their families.
Day Two – Mountains Of Meaning
Land Affinities Of The Mountain Aborigines Of North-Eastern Victoria

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Abstract

Along with other Aboriginal people in Australia, the Aborigines of the mountain country of north-eastern Victoria held a strong affinity with their land. This was expressed in their knowledge of food resources and manufacturing technology, their group and individual identification with specific places, and their application of the Dreaming and Law. Land affinities specific to the Yaitmathang of the Omeo area are detailed in this paper, and several Yaitmathang individuals responsible for maintaining that culture are identified. The interaction between the Yaitmathang and the explorers, settlers and gold miners are explored, and reasons for the demise of Aboriginal land affinities with the Omeo region are suggested.

Introduction

Of the Aborigines who once occupied mountainous Victoria, former Museum of Victoria anthropologist, Aldo Massola, wrote: “so little is known about them, so few are the relics that they left behind, and so difficult is the country they inhabited that they must remain as the least known of the Aborigines of Victoria” (Massola, 1969: 152). Likewise, geographer Sue Wesson considered the north-eastern Victorian Aborigines to be particularly enigmatic. Compared to other parts of south-eastern Australia, there is a paucity of information on the lifestyle, customs and habits of the Aborigines who once occupied mountainous Victoria, and their interaction with the environment.

However, recent documentation has become available that allows for the extension of previous knowledge. Several manuscripts containing key insights and observations on the mountain Aborigines dating to as early as the 1840s have recently been published. For example, the diary of the journey of the Chief Protector of Aborigines, George Augustus Robinson, through mountainous Victoria was published by geographer Ian Clark in 1998. Combined with published and unpublished documentation of eighteenth century historians, anthropologists and government departments (notably the ‘Central Board appointed to watch over the interests of the Aborigines in the Colony of Victoria’), there is now sufficient information available to warrant a closer examination the Victorian mountain Aborigines.

The purpose of this paper is to briefly outline the manner in which the mountain Aborigines of north-eastern Victoria interacted with the environment. Traditional land affinities will be overviewed and the keepers and perpetrators of that knowledge will be identified. Land affinities evidenced by Aborigines during the period of European settlement of the mountains will be outlined. In addition, the question as to why no Aborigines live in the mountains today will be addressed. More details on all these aspects of Victorian mountain Aboriginal history can be found in Lawrence (in press (a) and (b)).
Who were the Victorian mountain Aborigines?

A summary of the names given to the Aborigines of the north-eastern Victorian mountains by various nineteenth century explorers, settlers, government officials and anthropologists is given in Table 1. There are essentially three names used:

- the Kunora / Gundanora / Kandangora-mittung,
- the Thed-dora / Theddora-mittung, and
- the Yaymirttong / Ya-itma-thang / Jaitmathang / Yatte mittong.

Subsequent authors such as Tindale (1940, 1974), Massola (1962, 1969), Barwick (1984), Horton (1994), Clark (1996) and Wesson (2000) all use one or several of those names. The most detailed description of the naming of the Victorian mountain Aborigines is provided by Howitt (1904). Howitt contended that the Yaitmathang Aborigines occupied the northern slopes of the Australian Alps, as depicted in his map (Figure 1), and that the Yaitmathang people were a composite of the Theddora-mittung and the Kandangora-mittung. His assessment of the spatial distribution of Victorian mountain Aborigines, as well as his spelling, has been used in this paper.

TABLE 1  Names of mountain Aborigines of north-eastern Victorian as identified by various authors

<table>
<thead>
<tr>
<th>Year</th>
<th>Name given</th>
<th>Location given</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1834</td>
<td>Kunora alias</td>
<td>“Over the Snowy river [looking from the Monaro], and in the Alps”</td>
<td>Lhotsky (in Andrews 1979)</td>
</tr>
<tr>
<td></td>
<td>Gundanora</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1844</td>
<td>Yaymirttong</td>
<td>“The Blacks of Omeo are called the Yaymirttong”</td>
<td>Robinson (in Clark 1998: 109)</td>
</tr>
<tr>
<td>1850s</td>
<td>Thed-dora</td>
<td>“The Thed-dora … inhabited the country up the Livingstone Creek... the Omeo tribe lived about the Plains, the Mitta Mitta and over eastward where they joined on to the Maneror tribes”</td>
<td>Buntine (n.d.)</td>
</tr>
<tr>
<td>1859</td>
<td>Gundanora</td>
<td>“Name of the tribe... on the elevated plain of Omeo” was the ‘Gundanora’</td>
<td>Wills (in Victoria, Legislative Council 1859: 26)</td>
</tr>
<tr>
<td>1878</td>
<td>Gundanora</td>
<td>Omeo Plains area</td>
<td>Brough Smyth (1878) map</td>
</tr>
<tr>
<td>1880s</td>
<td>Ya-it-ma-thang</td>
<td>Omeo tribe “called itself Ya-it-ma-thang”</td>
<td>Bulmer (in Howitt m’scripts)</td>
</tr>
<tr>
<td>1904</td>
<td>Ya-itma-thang</td>
<td>“The Ya-itma-thang, commonly called the Omeo tribe, was divided into... (a) the Theddora-mittung... [and] (b) the Kandangora-mittung...”</td>
<td>Howitt (1904)</td>
</tr>
<tr>
<td>1904</td>
<td>Theddora-mittung</td>
<td>“Sources of the Mitta-Mitta River and its tributaries down to about the Gibbo Mountain, the Upper Kiewa River and the Ovens River to the Buffalo Mountain”</td>
<td>Howitt (1904)</td>
</tr>
<tr>
<td>1904</td>
<td>Kandangora-mittung</td>
<td>“Lived on the Omeo plains, the Limestone River down to its junction with the Indi River, and the Tambo River to Tongiomungie”</td>
<td>Howitt (1904)</td>
</tr>
</tbody>
</table>
The Yaitmathang occupied one of the richest and diverse areas of Victoria. Four physiographic units are contained within their region:

- river valleys and associated floodplains of the upper Mitta Mitta and Kiewa valleys;
- gently sloping plains areas of alluvial deposits, such as the Omeo Plains;
- foothills abutting the plains and river valleys; and
- elevated alpine plateaux areas generally bounded by steep-sided valleys.

The spatial distribution of these landforms between the Omeo Plains and the upper Kiewa Valley are shown in Figure 2. The physiographical variation gives rise to a diverse climate. Annual rainfall varies from about 450 mm to in excess of 2500 mm in the alpine plateaux areas, where snow is a common form of precipitation (Figure 2). Temperatures vary spatially, diurnally and seasonally. On a dry, summer day there is often a 12°C difference in the temperature between river valley environments at 500 m and the highest peaks above 1750 m. Rivers in the region are permanent, and the water is of good quality. Flooding often occurs in the river valleys during the spring months, when high rates of precipitation combine with melt from the snowfields.
The variety of landscape features support a wide range of vegetation communities (Figure 2):

- the lower river valleys carry extensive stands of red gum;
- the lower elevated hills areas are covered by open forests;
- almost pure stands of alpine ash occur between about 800 and 1400 metres elevation;
- snow gum woodlands occupy areas above 1400 metres and below the tree line; and
- the vegetation on the Bogong High Plains is typified by a mosaic of mosslands, grasslands, heathlands and snow gum woodland islands.

The diversity of vegetation communities supports a native fauna consisting of more than 250 bird species, at least 30 native mammals, about 50 species of reptiles, more that 25 different species of native fish, at least 20 amphibians, and a plethora of invertebrates. Fish native to the area include cod, perch, gudgeon, galaxias and blackfish. The fauna noted by Europeans to have been utilised by the Yaitmathang are shown in Figure 2.

It is evident that the Yaitmathang occupied a region containing a range of environments. This allowed for optimal living conditions as the Yaitmathang could migrate to favourable sites within their territory at any time of the year. One such favourable site was the Omeo Plains, as explorer George MacKillop (1836: 166) recorded:

> According to the account of the native who was with me, the climate [at Omeo] is bland all the year round. When he was asked if the cold be ever great in Omio [sic.] ... he replied, ‘When all hills in Monero got on white night-cap (ie. snow), in Omio, black fellow not want it blanket’.

Likewise, policeman Alfred Wills (in Victoria, Legislative Council, 1859) recorded that “in May 1835, there were about 500 or 600 men women and children, resident during a few months in each year, at their headquarters on the elevated plain of Omeo”. The rain-shadow area of gently sloping alluvial plains provided abundant supplies of resources to meet the needs of the Yaitmathang for many months of the year.
Traditional Yaitmathang land affinities

In traditional Aboriginal times, there were a number of ways in which the Yaitmathang developed specific land affinities, and included:

- the acquisition of food resources;
- manufacturing technology;
- an individual’s identification with place;
- initiation ceremonies; and
- individual totems.

A brief elaboration of those follow.

Early settler Richard Helms (1895: 394) recorded that the food of the Yaitmathang “consisted of all kinds of game, birds and birds’ eggs, reptiles, fishes, and insects”. The Yaitmathang developed such an intimate knowledge of their resource-rich territory “that by half a day’s hunting, a native could support himself for four days together” (Wills in Victoria, Legislative Council 1859: 37). The Yaitmathang developed a specific land affinity when they trekked to the alpine area to collect and feast on the Bogong moth (*Agrotis infusa*) each summer. Early settler Angus McMillan (in Clark 1998: 58) recorded:

> The Alps are called the Boogon mountains but is one mountain at Omeo where the fly [Bogong moth] is so abundant. Large numbers of blacks go thither: they are in general very thin but return stout; it is fine feasting for them... the natives... put them in a bag and shake them to break their wings and legs; then tie them up in a piece of bark and roast them: are very good.

Anthropologist Josephine Flood (1980: 61 ff.) has documented the ceremonial procedures associated with hunting the Bogong Moth. She suggested that this practice occurred for about 4000 years, indicating an acquired knowledge of food sources that transcended many generations.

The manufacture of Yaitmathang technology required knowledge of the land and its resources. Yaitmathang tool usage included yam sticks, stone axes, water containers, fibre nets, carry bags, boomerangs, spears, clubs, shields and canoes. Specific geological and ecological knowledge was required for the manufacture of tools. For example, spears were made for different purposes, as the Yaitmathang manufactured “three or four kinds of spears, which were made of reeds, seedstalks of the grassstree, boxtree, or if procurable, ironbark” (Helms 1895: 400). Likewise, collection nets made by female Yaitmathang members for the collection of Bogong Moths utilised particular wetland plant species, as Richard Helms (1895: 396) also described:

> The fine nets made of kurrajong fibre... seem to have been especially designed for the purpose of collecting the 'Bugong'. They had very fine meshes and were manufactured with great care... A shrub (Pimelia sp.) growing abundantly in places by the river sides to a height of three or four feet, furnished the fibre... The Omeo blacks called the bush as well as the fibre kurrajong.

The Yaitmathang Aborigines identified with the Omeo region through the use of body scarring (cicatrices), and spatial associations in child naming. Both male and female members of the Yaitmathang used cicatrices to identify their family descent and tribal association. George Robinson’s sketch of the cicatrices of ‘Omeo Black Billy Blue the Traveller’ indicated five rows of vertical marks across the back, three rows across the chest and several rows down the arm (Robinson in Clark, 1998: 125). In his role as inter-tribal messenger, it would have been important that his tribal association be clearly identifiable. In relation to the names given to Yaitmathang Aboriginal children, Richard Helms (1895: 398) recorded that “children generally received a name after something remarkable that happened at the time of their birth or after something in connection with the locality of it”. This is illustrated in the names of several Yaitmathang individuals given in Table 2.
TABLE 2  Spatial association of names of Yaitmathang individuals. Source: author’s research

<table>
<thead>
<tr>
<th>Name</th>
<th>Spatial association</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nukong and son Charlie Nukong</td>
<td>Mt Nugong and subsequent adjacent mining town of Nugong</td>
</tr>
<tr>
<td>King Billy of Kabungara</td>
<td>Cobungra area</td>
</tr>
<tr>
<td>Hingubiri or Jargair alias Cobbon</td>
<td>Mountain, creek and subsequent homestead in the Snowy River</td>
</tr>
<tr>
<td>Johnny</td>
<td>valley called Ingebyra</td>
</tr>
<tr>
<td>Nadjup alias Nabbimunjie</td>
<td>Numblamunjie area in the vicinity of the settlement of Ensay</td>
</tr>
</tbody>
</table>

Richard Helms and Alfred Howitt have recorded aspects of Yaitmathang law. There were two distinct ceremonies for the transition of male children to manhood: the first was to remove the child from his mother’s care, and the second was to convey to the initiate the districts of friendly people and those where hereditary feuds were to be upheld. Spatial affiliations were particularly important in the second ceremony, because it was then that locational information about friends and enemies was related to the initiate (Helms 1895: 393):

At the age of 18 or 20… he was made ‘Wahu’… The men would run some distance away and returning swing the boughs with a swishing sound in a certain direction, mentioning at the same time the name of the district towards which they were pointing… Each name mentioned was preceded by the emphasised exclamation of ‘Wau-Wau!’ For instance, ‘Wau-Wau! Tumut;’ ‘Wau-Wau! Queanbeyan’… This indicated that the Wahu may go to these districts as a friend and may have luck, or on the other hand that in some of these directions lived the tribes whom he would have to carry on the hereditary feuds, for from henceforth he was to be considered as being raised to the position of a warrior in his own tribe.

The use of totems in Yaitmathang society was two tiered. Firstly, every individual within the Yaitmathang population belonged to one of two ‘classes’. Alfred Howitt (1904: 101) recorded that the tribal totems (classes) of the Yaitmathang were “Tchuteba the rabbit-rat, and Najatejan, the bat”. Howitt also noted that whenever there was occasion for the Yaitmathang to apportion themselves into two groups, they naturally divided themselves up by ‘class’. Secondly, Yaitmathang individuals held their own totemic symbol, which may have been a bird, mammal, reptile, fish, etc. Individual totems were foundational to the social organisation of the Yaitmathang people and formed the basis for laws of marriage. Alfred Howitt provided an example of the Yaitmathang marriage rules when he compiled Table 3. In his manuscripts, Howitt recorded “the eagle, bat, pheasant and the wattlebird can not marry in themselves but they can do so with the others from tribes belonging to several hawks”. This illustrates that the two tiers of totemic usage used in marriage rules were grounded in nature.

TABLE 3  Yaitmathang class and individual totemic organisation. Source: Howitt manuscripts, MS 9356, Box 1054/2 (a), La Trobe Library, Melbourne.

<table>
<thead>
<tr>
<th>Class</th>
<th>Individual</th>
<th>Totem</th>
<th>Yaitmathang name</th>
</tr>
</thead>
<tbody>
<tr>
<td>No 1</td>
<td>No 1</td>
<td>Eagle hawk</td>
<td>Musorong</td>
</tr>
<tr>
<td>No 2</td>
<td>No 2</td>
<td>Bat</td>
<td>Nadghan-en-jong</td>
</tr>
<tr>
<td>No 3</td>
<td>No 3</td>
<td>Pheasant</td>
<td>Bullinger</td>
</tr>
<tr>
<td>No 4</td>
<td>No 4</td>
<td>Wattlebird</td>
<td>Gub-it-bearhook</td>
</tr>
<tr>
<td>No 2</td>
<td>No 1</td>
<td>The small grey hawk</td>
<td>Baay-gurgur</td>
</tr>
<tr>
<td>No 2</td>
<td>No 2</td>
<td>Kangaroo</td>
<td>Burro</td>
</tr>
<tr>
<td>No 3</td>
<td>No 3</td>
<td>Bush Rat</td>
<td>Judabah</td>
</tr>
<tr>
<td>No 4</td>
<td>No 4</td>
<td>Crow</td>
<td>Yowcombrake</td>
</tr>
</tbody>
</table>
Keepers of Yaitmathang traditions

The personnel with knowledge of traditional Yaitmathang land affinities were the elders of the group. There seems to have been five roles filled by Yaitmathang elders, and ten individuals who fulfilled those roles between the mid 1840s and 1880s (Table 4). The chief, who was known as ‘Turki’ (Howitt 1904: 301), was usually the eldest man of the group, whose advice was sought on matters to do with territorial rights, warfare and revenge (Helms 1895: 388). The medicine men (Yaitmathang term unknown) were usually noted for their abilities in healing and magic; the principle fighter was deferred to in warfare and some leadership roles; the messenger was multi-lingual and formed the main source of communication between surrounding tribes; and the song-writer displayed skills in conveying traditions through song and dance. The multiplicity of leadership roles suggested a well-organised community committed to maintaining their society in perpetuity.

TABLE 4  Yaitmathang elders. Source: adapted from Wesson (2000).

Note: nomenclature from Helms (1898) and Howitt (1904).

<table>
<thead>
<tr>
<th>Elder’s role</th>
<th>Name</th>
<th>Years of record</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief</td>
<td>Wobiner</td>
<td>1844</td>
</tr>
<tr>
<td></td>
<td>Taragerer alias Motogo</td>
<td>1844 - 1855</td>
</tr>
<tr>
<td></td>
<td>Nukong</td>
<td>1844 - 1856</td>
</tr>
<tr>
<td></td>
<td>King Billy</td>
<td>1850s</td>
</tr>
<tr>
<td></td>
<td>Charlie</td>
<td>1844 - 1880s</td>
</tr>
<tr>
<td>Medicine-men</td>
<td>Taragerer alias Motogo</td>
<td>1844 - 1855</td>
</tr>
<tr>
<td></td>
<td>Corvomung alias Slarney/Larnie</td>
<td>1844 - 1851</td>
</tr>
<tr>
<td></td>
<td>Munngijowun alias Cocky</td>
<td>1844 - 1850s</td>
</tr>
<tr>
<td>Principle fighter</td>
<td>Jargair alias Johnny (Ingubiri)</td>
<td>1844 - 1846</td>
</tr>
<tr>
<td>Messenger</td>
<td>Bittocort alias Billy Blue</td>
<td>1844 - 1856</td>
</tr>
<tr>
<td>Song-writer</td>
<td>Almilgong</td>
<td>1844</td>
</tr>
</tbody>
</table>

The Yaitmathang and the explorers, settlers and gold miners

The arrival of the Europeans was to result in major disruptions to the continuance of Yaitmathang traditions, but not before the Yaitmathang had assisted in the ‘discovery’ and ‘settlement’ of the Omeo region. Table 5 outlines the role played by Aborigines in the European discovery of the north-eastern Victorian mountain country. Both Ngarigo (Monaro) and Yaitmathang Aborigines played a necessary, although usually forgotten, part in Europeans claiming the honour of being ‘the first’ into a certain area. The Aborigine’s knowledge of their own and adjacent territories was admirably displayed in the transmission of that knowledge to the European explorers.

TABLE 5  Aboriginal guides to European explorers

<table>
<thead>
<tr>
<th>Date</th>
<th>Explorer</th>
<th>Area explored</th>
<th>Guide’s name</th>
<th>Guide’s origin</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1834</td>
<td>Johann Lhotsky</td>
<td>Monaro to Omeo (?)</td>
<td>Unnamed</td>
<td>Ngarigo</td>
<td>1</td>
</tr>
<tr>
<td>1835</td>
<td>George MacKillop</td>
<td>Monaro to Omeo</td>
<td>Unnamed</td>
<td>Ngarigo</td>
<td>2</td>
</tr>
<tr>
<td>1839</td>
<td>Angus McMillan</td>
<td>Monaro to Buchan</td>
<td>Jimmy Gibber</td>
<td>Ngarigo</td>
<td>3</td>
</tr>
<tr>
<td>1840</td>
<td>Angus McMillan</td>
<td>Omeo to Gippsland Lakes</td>
<td>Cobbon Johnny</td>
<td>Yaitmathang</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>and Boy Friday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1840</td>
<td>Paul Strzelecki</td>
<td>Monaro to Port Phillip area</td>
<td>Charley Tarra</td>
<td>Sydney area</td>
<td>5</td>
</tr>
<tr>
<td>1851</td>
<td>Brown and Wells</td>
<td>Cobungra to Bogong H. Plains</td>
<td>Larnie</td>
<td>Yaitmathang</td>
<td>6</td>
</tr>
</tbody>
</table>

Following the establishment of routes to and through Omeo with the help of the Aborigines, European squatter settlers followed. The sequence of establishment of squatting runs in the Omeo region is outlined in Table 6. It is noteworthy that, without exception, the squatters named their runs using Aboriginal terms. Also of note in Table 6 is that the nomenclature used by the Yaitmathang and settlers had a strong association with place. For example, the frequency with which the suffix ‘mungie’ was used in place names was a reference to the presence of fish or codfish in the streams (Robinson in Clark 1998: 109; Neumayer 1869: 102). It is apparent that the initial European settlers learnt the names and features of specific locations, and used these geographical indicators of the landscape features in the naming of their runs. This indicates a certain liaison between the Aborigines and the Europeans during the early years of settlement and that some of the first exchange of language related to geographical features. Several Yaitmathang Aborigines were employed by the early settlers as stockmen and bullock drivers (Tyres in The Gippsland Mercury 1875).

Gold was officially discovered in Omeo in November 1851, and produced the following changes:

- an increase in the European population from 22 in 1850 to 777 in 1861 (Australian Bureau of Statistics data);
- disruption to the forest and aquatic environments through mining disturbances, with an associated decrease in traditional Aboriginal food supplies; and
- an increase in the incidence of bushrangers and outlaws.

One incident of note occurred in January 1859, when bushrangers Chamberlain and Armstrong held up a gold escort south of Omeo, and were only apprehended when a Yaitmathang Aboriginal named Omeo Tommy successfully tracked them down in rough terrain (The Constitution and Ovens Mining Intelligencer 1859). The settlers and police obviously recognised the skill of the Aboriginal trackers from Omeo and were happy to utilise those skills in the pursuit of justice.

### TABLE 6  The sequence of grazing runs taken up in the Omeo region, depicting the use of names of Yaitmathang origin.

Source: run names and dates from Spreadborough and Anderson (1983); Aboriginal associations from sources as indicated.

<table>
<thead>
<tr>
<th>Squatting Run</th>
<th>First year</th>
<th>Aboriginal Name</th>
<th>Aboriginal meaning</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omeo A</td>
<td>1835</td>
<td>Omeo / Karengo</td>
<td>Very extensive plains / unknown</td>
<td>1 and 2</td>
</tr>
<tr>
<td>Omeo B</td>
<td>1835</td>
<td>Omeo/ Nabbimunjie</td>
<td>Very extensive plains / unknown</td>
<td>1 and 2</td>
</tr>
<tr>
<td>Benambra</td>
<td>1839</td>
<td>Benambra</td>
<td>Not known</td>
<td></td>
</tr>
<tr>
<td>Tungie Mungee</td>
<td>1839</td>
<td>Tongiomungie</td>
<td>Place where fish are found in streams</td>
<td>3 and 2</td>
</tr>
<tr>
<td>Numblamungie</td>
<td>1839</td>
<td>Numblamungie</td>
<td>Place where fish are found in streams</td>
<td>3 and 2</td>
</tr>
<tr>
<td>Hinnomunjie</td>
<td>1841</td>
<td>Einciomungie</td>
<td>Place where fish are found in streams</td>
<td>3</td>
</tr>
<tr>
<td>Bindi</td>
<td>1845</td>
<td>Bendi</td>
<td>Home of Bindi-mittung (mittung=many)</td>
<td>3 and 4</td>
</tr>
<tr>
<td>Cobungra</td>
<td>1851</td>
<td>Karbungerer</td>
<td>Named for a chief living in the area</td>
<td>2</td>
</tr>
<tr>
<td>Bundaramunjee</td>
<td>1857</td>
<td>Bundaramunjee</td>
<td>No fish in river</td>
<td>5</td>
</tr>
<tr>
<td>Bynomunjie</td>
<td>1860</td>
<td>Binnomunjie</td>
<td>Place where fish are found in streams</td>
<td>3 and 2</td>
</tr>
<tr>
<td>Darbarlary</td>
<td>1861</td>
<td>Darbarlary</td>
<td>Not known</td>
<td></td>
</tr>
</tbody>
</table>

Why are there no Yaitmathang today?

A strong association of the Yaitmathang with the Omeo region in both traditional times and the early years of European settlement has been demonstrated. Why then, are there no remnant Yaitmathang in the Omeo region today? Table 7 outlines the many incidents that have led to the demise of the Yaitmathang. Indeed, Alfred Wills (in Victoria, Legislative Council, 1859) recorded:

Numbers - in May 1835, there were about 500 or 600 men women and children, resident during a few months in each year, at their headquarters on the elevated plain of Omeo. In 1842 they frequently assembled there in large numbers, and often killed many cattle belonging to squatters, whose stockmen, it is said, retaliated by firing on them... In 1843 a great diminution in their numbers was first observed.

Figure 3 depicts the temporal changes in population numbers of the Yaitmathang and European residents of Omeo. It is evident that there were incremental changes in Yaitmathang numbers during the first decade of European settlement at Omeo, but that the most significant change occurred in a single event. The 1842 massacre was recorded by both Wills (in the above quote) and George Robinson (in Clark 1998: 95) who wrote in 1844 that “it was two years ago when two bush rangers shot the Omeo blacks and scattered them”. This massacre depleted Yaitmathang people to about one-quarter of their pre-settlement numbers. Further declines in Yaitmathang numbers occurred between 1843 and 1865 (Table 7), so that by 1895, there were no Aborigines living at Omeo (Helms 1895: 388).

Those Yaitmathang who survived the atrocities outlined in Table 7 did so without the guidance of their elders. Of the ten elders listed in Table 4, it is noteworthy that records relating to nine do not persist after the mid to late 1850s. It seems that all except one Yaitmathang elder did not survive the first decade of gold mining activity in the region. After the elders had died, the once-strong affinities of the Yaitmathang with the Omeo region began to dissipate. The remnant Yaitmathang moved to the Monaro, Murray valley and Gippsland areas (Bulmer 1863; Haughton in Victoria, Legislative Assembly 1861; Hagenuer in Victoria, Legislative Assembly 1861).

However, there is a twist to this story. Several residents of the Omeo district have mentioned to this author that at least one of the early settlers had children to an Aboriginal wife, but that aspect of history is not acknowledged openly today. This is to be regretted as that family can not only claim land affinities dating to the 1830s, but rather for many centuries prior to that.

TABLE 7 Incidents relating to the demise of the Yaitmathang Aborigines

<table>
<thead>
<tr>
<th>Year</th>
<th>Incident</th>
<th>Result</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late 1830s /</td>
<td>Stockmen retaliation</td>
<td>Several Yaitmathang killed and buried in a swamp near The Brothers</td>
<td>1 2 3</td>
</tr>
<tr>
<td>early 1840s</td>
<td></td>
<td>Many Yaitmathang killed when performing a corroboree in the Innisfail area</td>
<td>1 4 5</td>
</tr>
<tr>
<td>1842</td>
<td>Bushranger massacre</td>
<td>Several Yaitmathang inflicted and presumed to have died from syphilis and gonorrhea</td>
<td>5</td>
</tr>
<tr>
<td>1840s and '50s</td>
<td>Venereal disease</td>
<td>“Quite a few of them died” from eating uncooked rice</td>
<td>4</td>
</tr>
<tr>
<td>???</td>
<td>Eating unfamiliar food</td>
<td>“Natives... given flour laced with arsenic in the Benambra area”</td>
<td>4</td>
</tr>
<tr>
<td>???</td>
<td>Deliberate poisoning</td>
<td>About 150 Yaitmathang and Kurnai killed in seven separate incidents</td>
<td>5 6 7 8 9 10 11</td>
</tr>
</tbody>
</table>

Population numbers

Sporadic deaths by stockmen, disease & poisoning
Massacre by bushrangers (at Innisfail?)
Sporadic deaths by various
Migration of Omeo Aborigines to Monaro, Murray valley & Gippsland
Artificial drop in population due to Mining District

ABORIGINA L NUMBERS
EUROPEAN NUMBERS

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FIGURE 3 Trends in population numbers in the Omeo region. Source: Aboriginal numbers from author’s research; European numbers from Australian Bureau of Statistics.

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Victoria, Legislative Council. 1859.  Report of the Select Committee of the Legislative Council on the Aborigines; together with the proceedings of committee, minutes of evidence, and appendices.  Parliamentary Paper D19, John Ferres, Melbourne

I have recently had the pleasure of undertaking the Australian Alps Mining Heritage Conservation and Presentation Strategy, funded by the AALC. This project looked at the European quest for metals, from the 1850’s. It was noted, of course, that Aboriginal people were the first miners in the Alps, extracting stone for tools, and ochre for ceremonial purposes.

Gold has been overwhelmingly the most important metal mined in the Australian Alps. Gold mining is an activity that is not constrained by topography, altitude or environment, nor is it influenced by regional or even national demand. Gold was, and is, a global commodity. There would not be a creek or river within the entire Alps that has not felt the blow of a prospector’s pick and the rattle of a gold pan some time in the last 150 years, nor a mountain range that has not echoed to the hoof beats of a prospector’s pack-horse. Nearly a billion dollars worth of metals, principally gold, has been wrought from the Australian Alps National Parks and attached Historic Areas, but this is only the tip of the iceberg. Metals production itself is limited by the existence of actual resources, but perversely, mining activity is not. An important cultural dimension operated - the lure of gold and other precious metals, and the promise of instant wealth, drove the level of activity in the early years. Mining in these early years had astonishing productivity for its relatively short life, compared to other economic pursuits of the period. It was very labour intensive, and acquired a complex support infrastructure, not the least of which was a strong governmental regulatory presence.

Grazing and sawmilling have also affected large areas. Both were constrained by environmental factors – suitable high-altitude grasslands or wide lowland valleys for the former, and suitable lumber species and growth characteristics for the latter. Cattle grazing, in particular, was not labour intensive, and while the environmental influence may prove to be long-lasting, the cultural heritage is largely tied up in the legends of the relatively-few cattlemen, and the huts, rather than deeply imprinted in the landscape. Sawmilling was a service industry that, in historical times, was greatly influenced by local and regional demand. The later hydroelectric schemes and the skifields are geographically constrained, relating to developments in particular topographies and altitudes within the Alps. Their local impact may have been enormous, but they do not touch the greater portion of the Australian Alps.

While the study of such a wide-ranging and important European cultural influence as mining is necessarily complex, the results of the study were relatively simple. Historic mining sites are widespread through the Alps, and are principally archaeological in nature. By the very nature of mining, the fabric of these places is generally robust, and usually deeply imprinted in the landscape. The regrowing vegetation is an integral part of the significance and experience of these places, offering a sense of discovery, and mute evidence of the passing of a way of life. Therefore the natural and cultural environments are particularly compatible at historic mining places. Management intervention may be limited to places targeted for interpretation, places requiring risk works because of their locations, and some of the more significant and fragile machinery sites. While historic mining sites are abundant, discernible mining landscapes are not, tending to be masked by the regrowing vegetation. There are spectacular exceptions, of course, such as Kiandra.
Little is presently available in interpretation of historic mining areas throughout the Australian Alps National Parks, and the strategy recommended cultural heritage presentation works at three places in Victoria and three in NSW. In NSW, recommendations were made to extend interpretations at Kiandra, attend to minor conservation and presentation works at the battery on Three-Mile Creek near Kiandra, and to install basic cultural heritage information on a board at Thredbo Diggings. In Victoria, basic interpretations for the Brandy Creek Mine and Jokers Flat diggings were recommended, as well as conservation and presentation works at the Monarch Mine. These places are strategically located, and present the principal characteristics of mining in the Australian Alps. They have good visual qualities and show a wide range of instructive features, from gold-rush landscapes and diggings, to quartz mines with abundant artefacts of former operations. They occur in a spectacular array of natural settings, from Alpine grasslands and woodlands, to rugged mountain bushland, to scenic mountain river valleys.

Two things troubled me at the beginning of the project. The first of these was a comment by a cultural liaison person in an area of the Victorian Alps with a massive mining influence. He simply told me that the cultural heritage of the area lay with the cattlemen of the High Country, and that mining was essentially trivial. Totally ignoring thousands of years of Aboriginal occupation and use, this naturally made me wonder about the ability of this particular local area to come to grips with cultural heritage. It also made me revisit the early years of European incursion into the high Victorian Alps.

The story of John Mitchell’s journey to the Bogong High Plains in 1843 has been discredited, so we are left with an 1850’s, grazier-led European exploration of the Victorian Alps. The story is repeated in all histories relating to the region in the last 40-odd years. Brown and Wells, from Cobungra Station, blazed the first trail over Mt Hotham in 1852-3, guided by Larnie, a local Aboriginal. They were the first onto the Bogong High Plains, named most of the geographical features, pioneered high country grazing, etc. Maps have been drawn, detailing the various routes of their Alpine explorations. Strange as it may sound, none of this seemed to be part of any earlier written histories that I came across during the study. In fact, it is at odds with some of the scraps of contemporary documentation that happened to surface.

A Lands Commissioner from Benalla trying to find a route from the Ovens Valley to Omeo in January 1852 in response to gold discoveries, but turned back by unseasonal snow. A party of miners leaving Wangeratta early in 1852 to push into the ‘Buffalo and Snowy Mountains’, with hints that they had been there before. Pardoe and party ascending the Ovens River to the Buckland Gap near Mt Smythe in 1853, before descending into the Buckland valley. Von Meueller claiming to be the first (European!) person in the highest part of the Alps in 1854. A Goldfields Commissioner attempting to blaze a route over Hotham in 1854, and reporting that miners were regularly and haphazardly crossing the Alps. A newspaper report of 1866 crediting miners with systematically pushing back the frontiers in the Alps.

High country summer grazing does not even rate a mention in local histories of the late 1800’s and early 1900’s. We know it happened, but when? Alfred Howitt observed summer grazing in 1866, and the original Bogong High Plains grazing lease dates from the same year. Note that gold miners were working adjacent to the Bogong High Plains on the Mt Fainter goldfield in 1861, some five years earlier. The grazing lease was broken up into smaller leases in 1887. Around 1920, it is reported that the High Plains were rarely grazed, only intermittently for drought relief by properties to the west (ie the Kiewa valley side). This is a far cry from the annual musters of more recent times.

So what about Brown and Wells? We know that Larnie existed, provided that he is the same Slarnie or Corvomung described by Robertson in 1844. But Brown and Wells’ exploits derive solely from an interview with the McNamara brothers, revealed by Stella Carr in 1962. It is oral tradition, over one hundred years removed from the events, and confirmation was by way of corroborative tales from other local cattlemen. That is, no corroboration. This is not to say that the events described did not happen or could not have happened.

Some logic can be applied. What interest would the early graziers have had in the Alpine country of Victoria, a mere postage-stamp compared to the vast high-altitude grasslands of the NSW Alps? Before gold, grazing around the Victorian Alps was on unimproved pasture with very low stocking rates. The graziers were not the ‘squattocracy’ – these people were pushing the frontiers into what was then very marginal land. State and regional populations developed massively during the gold rushes, providing impetus to pasture improvement, higher stocking rates and the development of intensive agriculture. It
would seem likely that high country grazing was a response to post-gold pressures on stocking rates, and subsequent sensitivity to drought and fire. If Brown and Wells did explore the Victorian Alpine areas prior to the gold rushes, it is likely to have been through a spirit of adventure, rather than an economic imperative. Undoubtedly a short cut to Wangaratta would have been beneficial to them, but would a simple blazed trail over Mt Hotham have been suitable for the graziers’ needs, given the rugged and steep topography of the Ovens Valley fall? For Brown and Wells, and their employer Gray, the Hotham route was definitely not the best short-cut across the Alps. In any case, government officials were clearly still trying to blaze this trail for gold miners in 1854.

So what is the real post-contact history of the Victorian Alps? Were gold miners in fact the first Europeans into the highest parts of these Alps? I don’t know, but perhaps a little more research and rigour could be applied to the issue. The Cattlemen of the High Country are seen as important in the European cultural heritage of the Victorian Alps, and therefore they are, quite validly. But their significance in Victorian Alpine exploration is based in tradition, and unsupported. And their incorporation as key icons into the cultural heritage and history of the Victorian Alps seems to have begun in the mid 1900’s, as Melbourne-based academics began to venture into the Alps in bush-walking clubs, skiing clubs, and for research, and were exposed to the camp-fire yarns of the cattlemen.

Throughout the Australian Alps, there is massive documentation of the oral histories of the relatively-few graziers and cattlemen, but little of the tens of thousands of miners who ventured into the Alps, establishing townships, living, working and sometimes dying in the High Country. Why? Simply because they were gone. And there has been a generational loss of their stories. In the NSW Alps, the tales of mining that are recorded are largely the testimonies of the grazer-miners, and this colours our better understanding of the mining sites and landscapes.

Have myths become facts through the retelling? There may well be many early histories throughout the Alps that need revisiting, or at least caution applied in their telling.

The second thing that troubled me was an abundance of published histories that neatly divided the history of the Alps into blocks, or phases. That is, we had the long, pre-European, aboriginal phase, followed by the European explorers and pioneer graziers. Then the miners came and left. Then came the later graziers and agriculturalists, after that the development of the skifields, National Park and tourism development, the hydro schemes etc. Well and good, perhaps, as a very rough chronology, but in the era of European exploration and use, it does a great disservice to the dynamics of regional development.

Before gold, the European presence in and adjacent to the Australian Alps was sparse at best. Gold discoveries adjacent to the Alps, at places like Adelong, Tumbarumba, Beechworth, Bright, Omeo etc, drew relatively large numbers of people into the region. Subsequent gold discoveries within the Alps further drew considerable populations into the Alps. Prospecting was widespread throughout the Alps, and townships developed in the major mining areas. In the NSW Alps, the gold was principally buried lead and alluvial, and the early camps and settlements rapidly disappeared as the surface gold deposits were worked out. In the Victorian Alps, quartz mining developed as the surface gold deposits were worked out, and the townships assumed a more settled appearance. However, even these resources were eventually depleted, and within the area of the Alps National Parks, the miners left, the townships died, and the bush slowly reclaimed the land. So was that it? Well, in examining the influence of gold mining in the Alps, it is necessary to look further. How different would the Alps, and our view of the Alps, be today without historic mining?

I certainly don’t have the answers, but I do have lots of questions. Let’s consider the Victorian Alps. Without the entrepreneurial efforts from the adjacent mining towns of Bright and Omeo, and the mining tracks and shanties across the mountains, would the Mt Hotham Ski Resort have developed? Without the local lobbying from Bright and the railway connection, what would Mt Buffalo be like today? Could it have ever been developed from what would essentially have been a dead-end valley with a small grazing presence? When would the timber industry have developed in the Alps, and how different would its incursion have been without the local demand stimulated by mining and mining populations, the developed settlements from which to base operations and draw labour, and the established roads on which to transport its products? How and from where would we access the Alps nowadays? How different
would our fundamental view and understanding of the Alps be, and how different would our conservation needs and efforts have been?

Similar questions abound for the NSW Alps. While high country grazing had been established before the Kiandra rush, how different would our concept of the Alps be today without the influence of Kiandra and the large adjacent mining populations at Tumut/Adelong, Tumbarumba and Cooma? Without mining-associated settlements on the roads to the diggings at Jindabyne, Adaminaby, etc?

Without the thousands of miners and prospectors turning the unknown into the familiar, and the daily newspapers of the era bringing the mountains to the masses for the very first time, with every new gold find?

From a time of very sparse European presence, mining was the engine-room that drove regional development, and in just a few decades laid down the demographics and infrastructure that pre-determined much of what is familiar today in the Alps.

The influence of mining can be very personal. In Bright, from my kitchen window, I look up the valley to the snow-covered peak of Mt Bogong in winter, and from my loungeroom window I can glimpse the snowy top of Mt Buffalo peeping above the foothills. Without gold mining, I would indisputably be trespassing on somebody’s farm! Many of the roads we follow into the Alps only became roads because of gold mining, even where some may have existed as trails before. Some of our lasting visual impressions of the Alps may have thus been modified by mining. Did we really get over it? I don’t think so.

But for a cultural influence that is so pervasive in the Alps, and occasionally so personally relevant, we often have difficulty in effectively interpreting the historic mining sites and landscapes. It is very easy to take the soft option, that of treating them as technological places. While evolving technologies do relate to the development of our culture, the real cultural interest is obviously in people. We need to develop innovative ways to put the missing people and stories back into our mining sites and landscapes. In a very real sense, these sites and landscapes were not created by miners, as we understand the appellation today. The gold-rushes - the great treasure hunts of the nineteenth century - cut across the whole spectrum of society. More than in any other occupation or pursuit, the digger was ‘everyman’, or put another way, these people were very much just you and I in another age.
A Chinese Presence

Barry McGowan

The main wave of Chinese immigration into New South Wales took place in 1858, and within a few years they were firmly established on almost every major goldfield in the colony.1 By 1860 they had settled on the Kiandra goldfields in the Snowy Mountains. My paper explores briefly the history of the Chinese in southern NSW, particularly Kiandra, with some reference to the Chinese at Omeo in north east Victoria, and discusses the archaeology of Chinese mining, settlement and burial sites. The Kiandra Chinese camp has been examined in detail by Lindsay Smith, and is possibly one of the most important such sites in Australia.2

In the early gold rush years there was a constant movement of miners across the landscape. For instance, the Chinese travelled regularly between the Braidwood goldfields, particularly Jembaicumbene, Lambing Flat and Kiandra. One consequence of this was the discovery of other gold deposits on the fringe of the mountains, and the establishment of a number of other goldfields, some of which were settled predominantly or exclusively by Chinese. Such fields existed at Craigie, the Numeralla and Big Badja Rivers, Colyers Creek and Humula.3 There was a similar migration between Omeo and Kiandra.4 A locational map is at Fig.1.

Chinese gold miners were generally well organised, worked in large cooperative groups, were well equipped and often regarded as more diligent than European miners. Contemporary accounts indicate that most Chinese were subject to the contract system of employment, which was well organised and very successful.5 This mode of working has important implications for the archaeological remains of their diggings, which, it will be argued, form a distinctive signature mark on the landscape.

Kiandra goldfields

At Kiandra the Chinese population increased from 80 first arrivals to a peak of around 700, or about 20 per cent of the population during July and August 1860. At the end of June 1860 the Kiandra correspondent of the Sydney Morning Herald noted that

The Chinese Camp is a little to the east of the township, pretty comfortably sheltered under the brow of a small rising piece of ground. The Commissioner has requested them to remove under the shelter of another hill-side, a small distance to the right, which a number of them have done, and thereby opened another settlement apart from all Europeans. There are supposed to be some three or four hundred Chinamen here.6

Lindsay Smith has commented that, although there was very little mining done by anyone in the harsh winter conditions at Kiandra, some Chinese found other steady employment. This alternative employment proved to be of great benefit, not only to the Chinese but also to most of the European residents. The machinery for Thomas Garrett’s newspaper, The Alpine Pioneer and Kiandra Advertiser,

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1 Braidwood Observer and Miners’ Advocate, 1 August 1860, 14 December 1861; Sydney Empire, 6 July, 9 September 1861.
could not be brought into the town because of the snow, and Chinese labour was used for this purpose, and for the carriage of other goods equipment and produce. Although there were still reports of large numbers of ‘Celestials’ passing through Braidwood en route to Kiandra towards the end of August, by the end of that month Kiandra was starting to fade, and they began to disperse. By the end of the year, most of the Europeans and Chinese had left Kiandra.\(^7\)

There are few other accounts of the Chinese at Kiandra until 1872. A special correspondent for the *Town and Country Journal* reported that the Chinese were a significant presence at Kiandra at that time. About 80 Europeans and 150 Chinese lived in the township proper, and were engaged actively in preparations for the Chinese New Year. Large supplies of groceries were brought in, and the bakers and butchers were busy, as were the Chinese tailors, who were making flags for the temples.\(^8\)

In the latter part of the nineteenth century many of the remaining Chinese moved into buildings located on the southern outskirts of the town. From there they assumed a more prominent role in the Kiandra community. By this time the town had about 200 to 300 people, of whom the Chinese comprised possibly a third. At the end of the 1880s the Chinese began to abandon their camp. By the early 1890s it contained only a handful of men.\(^9\) It appears that by the turn of the century the Chinese camp at Kiandra had been completely abandoned. A Chinese presence continued well into the 1920s, Tom Yan, one of the original Chinese miners and later a storekeeper, passing away at Kiandra in 1925. At Omeo there was a similar pattern of separateness, gradual abandonment and assimilation.\(^10\)

**The Archaeology of the Chinese**

Archaeologically there are three main questions concerning the Chinese on the goldfields, whether it is Kiandra or elsewhere; that is, where they worked, where they lived, and where they were buried? Each of these question is addressed in turn, using examples from Kiandra, Omeo and the Braidwood goldfields. The latter goldfields are important as the discourse on the archaeology of the Chinese mining sites had it origins in this area.

Firstly the mining. One difficulty in identifying distinctly Chinese workings is that the mode of working and technology were similar to those used by Europeans. Implements such as the pan and cradle, short sluice or tom, water wheel or Californian pump, and constructions such as water races and puddlers, were almost identical. One exception was the treadmill, which appears to have been used only by the Chinese.\(^11\)

Another exception concerns the tailing mounds. These are elongated mounds of water worn stone piled up while working the face and floor of the diggings. The mounds were often arranged as tail races, which would in turn hold rock sluices or sluice boxes. In my earlier work I distinguished two principal types of tailing mounds; unstructured mounds, referred to as Type D1, and neatly packed vertical mounds, referred to as Type D2. It is this latter type which I have regarded as characteristic of Chinese mining sites. The ethnically determined characteristics of these mounds have been confirmed time and time again by field and archival work.\(^12\)

It is worth recounting the first site of this nature that came to my attention, as it says something about the range of evidence available to the archaeologist. It is located at Mongarlowe on the Braidwood goldfields. The workings were qualitatively different to anything I had seen before. They were relatively small scale, and included vertically packed stone walls, some of which were about 12 metres long, but less than one metre high. The floor of the workings was completely clear of tailings, and the whole area looked as if it had been intensively and meticulously worked by pan and cradle.

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On a subsequent visit to the site I was accompanied by a local resident, Ted Richardson, who was then in his late 70s. He had been a miner on the Mongarlowe field in the 1930s. On seeing the site he immediately commented that it had been worked by Ah Hack, who when he saw him in the 1920s, was then a very old man. He remembered that he had a vegetable patch near his hut site and that he had been befriended by the Nomchongs of Braidwood, who took him into their home.

Subsequently, a lease map confirmed the ethnicity of this site (Fig.2). The water race on the map is referred to as the ‘Chinamans water race’ and the area south of the race as ‘occupied by Chinamen’, this area incorporating Ah Hack’s claim and a large area of paddocking. This latter site included several closely grouped hut sites, a good artefact scatter, drift tunnels and a neatly carved round hole, or well, into which part of a nearby water race was directed. Further Type D2 mounds were located at the terminus of the race.

Further field work on the several other goldfields in the Braidwood district, for instance, Araluen, Majors Creek and along the Shoalhaven River near Bombay Crossing, and at Kiandra, has revealed similar sites. At Kiandra the diggings include a large number of Type D2 tailing mounds. Of particular interest is the presence of a number of stone walled enclosures, 0.5 to one metre high, downslope and adjacent to the tailing mounds. Lindsay Smith has identified these structures as puddlers, which were used for breaking down the wash dirt. Whether this type of puddler is peculiar to Kiandra or has wider applicability is not clear, but if the latter is the case then it should also be added to the typology.

The mining typology at Omeo is also similar. Near the Chinese encampment is an extensive area of Type D2 tailing mounds with the usual complex of stone packed tail races and dams. Of particular interest is an area about two kilometres distant, which was worked by hydraulic sluicing in the 1870s by a European company known as the Oriental Sluicing Company. Some 50 to 100 metres from the face of the workings is an extensive area of Type D2 tailing mounds, which suggests that the first to have worked this site were the Chinese. There were a number of other hydraulic sluicing claims in the area, which have been identified from lease records as Chinese. However, there appears to be little in the way of mining typology to distinguish these sites from European ones.

Some mention should also be made of the alleged practice of the Chinese in digging ‘round holes’. According to popular folklore these holes warded off evil spirits or prevented the build up of noxious gases, or were dug that way for safety reasons. In my earlier work I referred to the narrow trench like shafts characteristic of high level auriferous drifts as drift shafts, or Type E workings. They were dug not only at the claims to test the extent of the wash dirt, but also along the line of race to test the drift in these areas as well. The shafts were narrower and as a rule shallower than those associated with reef mining, and did not have large mullock heaps.

In the absence of a totally convincing argument as to why round holes were Chinese I had been inclined to ignore them. However, a series of fortuitous events several years ago caused me to change my mind, for I was introduced to, or otherwise stumbled upon, three areas of symmetrically rounded shafts, all with footholds dug into their sides. These sites are at Bendigo, Little Bog Creek (south of Bombala in NSW), and Ararat in Victoria’s Western Districts. In the first two instances local residents were adamant that the ground had been worked by the Chinese. With the exception of Ararat, where there was an artefact scatter that was unmistakably Chinese, no other ethnically determined indications by way of tailing mounds, hut sites and the like existed. To add to the confusion, at Bendigo and Little Bog Creek, round and rectangular shafts were located in very close proximity.

The most convincing and plausible argument to date is that proffered in private discussion by Peter Bell, who postulated that the round shafts were dug by Chinese miners who were also well diggers. The Chinese were highly sought after as well diggers in Australia, and obviously their considerable expertise in this area was highly regarded. This would account for the relative rarity of the round holes and the incredible degree of perfection with which they were dug. It would also explain why rectangular and round shafts sometimes occurred in close proximity. The former were dug by Chinese miners who were not well diggers and the latter by Chinese who were. It is now apparent that these carefully crafted round shafts should also be added to the typology (Type E2).

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I now turn to the question of where the Chinese lived, but confine my remarks to ‘joss house’ and pig oven sites, with particular reference to the Jembaicumbene goldfield in the Braidwood area. These sites illustrate several points that are instructive to those seeking the physical heritage of the Chinese in the mountains and elsewhere.

The typical pig oven is a large stone circular structure, hollow in the middle and with a hearth at one end, although as Peter Bell indicated at the ASHA Conference in Townsville in November 2002, there are variations in design and size. In good condition they are unmistakable, but in their usually collapsed state they are identified less easily, with the clues are often well hidden under years of silt and deposition. New sites continue to be located across Australia, and a possible site at Kiandra may be excavated Lindsay Smith and a team from the ANU in the very near future.

At Jembaicumbene, there has until very recently, been no identification of any sites connected with the main Chinese village, other than the Chinese cemetery, which is located several kilometres north of the main European village on the north east slope of a hill. Some guidance has been provided by an 1877 lease map (Fig.3), which shows an area of Chinese occupation near the main village occupied by You Watt and including a store and three huts, with five other Chinese huts located nearby. Evidence from local informants also suggested strongly that the ‘joss house’ was located near these buildings. The doors from the ‘joss house’ are located at the Braidwood Museum.

The only immediately obvious physical evidence of a settlement in this area, however, is a seemingly amorphous mound of stones and rubble, suggestive of a chimney but nothing else. More recently, Lindsay Smith visited the site and noted several platforms near the alleged ‘joss house’ site, south of the sites indicated on the 1877 map. He also located another platform area of land about thirty metres away, where wombats had been digging. Miraculously, they had dug out a large number of Chinese ceramics and opium tin remains, most of which had been in a layer of earth about 5 to 8 cm from the surface. A closer examination of the alleged ‘joss house’ site also revealed some nails.

On a subsequent field trip small mounds of stones exposed by a lack of grass in the paddock hinted at the sites of two of the huts on the 1877 map. At the store site a nail and a piece of ceramics was found, this time courtesy of the rabbits. A much closer examination of the hitherto neglected large mound indicates that it is likely to be the remains of a collapsed pig oven. Possible hearthstones can be seen in front; and although the back wall is substantially covered with earth, it has a telltale curvature on both sides. These sites will be excavated in the very near future. They are likely to be the nucleus of the main Chinese village on that goldfield.

Finally, mention should also be made of the graves, for they are also distinctive. Three separate Chinese cemeteries have been located in the Braidwood area, and a further three at Kiandra and Adelong. There are, however, no headstones or grave markers in situ, although in at least one case they were there at an earlier period. What these sites have in common are their exhumed graves. In the 1860s and beyond it was common practice to remove the bones and transport them to Sydney for packing and dispatch to China.

The exhumed graves are oblong and shallow, generally between two and three metres long, and are usually found in clusters rather than singly. They can, however, be covered with leaf litter and soil and be barely discernable. At the town cemeteries at Omeo and Tumut some of the graves have headstones, and at the latter there is a burning tower. Archaeologists in search of long lost Chinese camps and villages will not, however, have these obvious indicators to guide them.

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15 Peter Bell, 2002.
18 Sydney Empire, 4 May 1864; Wilkinson and Pebesma, 1999: pp.vi-vii.
**Conclusion**

The 1850s and 1860s saw a mass movement of Chinese people across the New South Wales landscape. They left their mark in almost every region including the Snowy Mountains. Questions arise: are there more fields or camps, and if so where are they? Archival records provide scant clues, for many have been lost, and it is to the material evidence that we must turn. It is here that the mining typology, cemeteries and pig ovens come into their own, for they provide very obvious visual clues to the Chinese presence on the goldfields. The importance of oral and anecdotal evidence in this process cannot be stressed too highly, for where documentation is scant every clue must be grasped.

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Abstract
Mountains are ‘other’ landscapes characterised by remoteness, environmental extremes and seasonal variations. The historic uses and buildings in these landscapes are found there because of these characteristics, or else they are modified in some manner because of these unusual characteristics.

After describing some of the historic landscape types within Kosciuszko National Park (KNP), in the Snowy Mountains region of NSW, this paper discusses three case studies to highlight opportunities for a more integrated approach to the management of natural and cultural values in the alpine national parks; the concept being that the sum (the pay-off) is bigger than each of the (natural and cultural) parts.

The location of huts, and other similar building such as ski lodges, can be closely associated with the type of natural landscape they are located in, or with particular historic processes or events. However, while buildings provide an entry ‘doorway’ into landscape appreciation by providing a marker of historic use, a substantive documentary and physical analysis of the broader landscape history will yield more meaningful results. A true appreciation of landscape thus achieved allows us to intellectually and emotionally access that landscape by providing a real sense of place.

Introduction
This paper addresses an objective of one of the three conference themes; the incorporation of cultural values into natural resource management, tourism and recreation. While conclusions of this paper are relevant to other types of landscapes, the particular aspects of remoteness and seasonal imperatives more sharply define human interaction with the mountain environment and the resultant physical and cultural imprints.

The title of this paper Buildings As Landscape is a short cut to the suggestion that models for the integration of natural and cultural values management are to be found most dynamically in the natural and cultural components of landscape. The problem is that it is easy to retreat to a separation of these values into traditional professional perspectives rather than deal with the sometimes messy bits between.

In positing the notion of using landscape as the way to integrate values this paper does not make light of institutional cultures and practical challenges that stand in the way. However, an integrated approach to natural and cultural resource management is akin to the concept that the sum (the pay-off) is bigger than each of the parts.
This paper describes the range of historic landscape resources in the Kosciuszko National Park that complements the identification of Aboriginal heritage values within this area at this conference. Three case studies are presented to provide the basis for discussing opportunities and constraints for a more integrated landscape approach.

**Historic Landscape Resources in the Snowy Mountains**

Discussed below are some of the historic landscape types in Kosciuszko National Park including those that are unique to these environments such as those associated with seasonal pastoral activity and skiing. These landscapes reflect the uses before, during the long period of transition to, and since reservation as a protected landscape. Many of these uses are associated with one place at different times.

**Pastoral Landscapes**

There are some 90 intact huts and a similar number of ruins or archaeological sites in Kosciuszko National Park. Over half of these huts are associated with pastoral activity. A number of these ‘huts’ were in fact permanent or semi-permanent outstation homestead complexes associated with Southern Tablelands and Monaro pastoral holdings, such as Old Currago, c1873. Gooandra Hut, dating from the mid 1860s, is another example of a homestead complex that is associated with both mining and pastoral phases. Currago is a 20th Century complex associated with a large pastoral company. Before and after the Second World War other timber vernacular huts, such as the timber slab Teddy’s Hut near the source of the Thredbo River, were built in association with summer grazing ‘snow leases’. These landscapes contain much evidence of this pastoral activity including fences, yards, tracks and telephone lines.

**Mining Landscapes**

Mining in this area started in the mid 19th Century with gold mining at Kiandra and the many kilometres of water races constructed by Chinese miners there are still visible in the landscape. Significant relics of mining remain in addition to Kiandra: gold mines at Lorna Doone and Grey Mare; silver mines at Lobbs Hole and Blue Creek and tin mines in the southern part of Kosciuszko National Park. Remains of settlements associated with mining include the chimney of the Chinese Yan’s Store and the Court House at Kiandra, the pisé hotel remains at Lobbs Hole and isolated huts such as Tin Mines and the ruins of Pig Gully Hut. Historic mining landscapes include the water races and workings constructed around the hills at Kiandra by the Chinese, and the races at Lobbs Hole copper mine on the Yarrangobilly River.

**Recreation Landscapes**

The first skiing in Australia had occurred at Kiandra in 1861 when snowbound miners from northern Europe took to skis for fun. In the later part of the 19th Century people started to visit the Snowy Mountains for recreation as part of the ‘discovery’ of nature that had became fashionable for urban dwellers. Following the first ascent of Kosciuszko on skis by photographer Charles Kerry in 1897, the government meteorologist Clement Wragge built an observatory right on its summit. The Yarrangobilly Caves tourist complex constructed by the State Government from 1885, the Hotel Kosciuszko, 1920, and the Charlotte Pass Chalet, 1930 (and rebuilt in 1939 after a fire) are important evidence of the NSW Government’s involvement in providing the transport and accommodation infrastructure to assist this recreation development. It is likely that the elites of Sydney influenced leading Government officials to bankroll these investments in tourism and recreation in this region.

Postwar Kosciuszko State Park Trust (KSPT) involvement in the creation of ski lodge resorts at Thredbo, Smiggin Holes, Perisher and Guthega followed.

More than a dozen huts were constructed for skiing and fishing recreation in Kosciuszko National Park, including Bullock’s Hut at the junction of Thredbo and Little Thredbo Rivers built by a keen angler, Dr Bullock. Seaman’s Hut constructed in 1929 as a memorial and shelter by the family of one of two young men lost in this area a year earlier is evidence of the ‘cultural imperative’ that reaching the summit of Mount Kosciuszko has long been.

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Forestry Landscapes
A number of places are associated with the timber industry apart from Sawpit Creek — other sawmills and logging artefacts are located in KNP at Rules Point, Cumberland Hill and Alpine Creek.

Water Conservation and Power Landscapes
The conservation of water is an important part of the landscape history of the Snowy Mountains. The water races at Kiandra and the use of water in hydro-electric schemes at the Yarrangobilly Caves and the Kosciuszko Hotel are precursor examples to the Snowy Mountains Hydro-Electric Scheme for which evidence survives of the construction phase, in addition to the existing utilities themselves.

Social Landscapes
With these uses came people of many different cultures who added another dimension to these various historic landscapes. First expressed in the naming of Kosciuszko by Polish explorer Strezlecki, after a famous countryman, it continued with the Chinese and European miners at Kiandra, then the northern European skiing enthusiasts early last century, and finally the ‘New Australian’ workers for the Snowy Mountains Scheme. This cultural diversity has not only left physical reminders within the landscapes, but has altered the social (and even the culinary) landscape of Australia.

Ongoing Landscapes
For over fifty years these landscapes have been the subject of changing and new uses as part of the NSW reserve system that started with the KSPT and then NPWS. This use now has its own living history and social value that needs to be understood and respected.

Cultural Landscape Case Studies
Three case studies are presented here to show how cultural and natural values can be integrated to assist management, interpretation and tourism (see Figure 1).

Case Study1: A Landscape Analysis of the Huts in Kosciuszko National Park
This example draws on the NPWS Huts Study 1992, Part C: Kosciuszko National Park Huts Review prepared by the author.

In addition to providing a thematic and typological analysis of huts (historic use associations and materials of construction) the study also compared this thematic analysis to landscape data (vegetation type and topographical data) to build a picture of the total landscape context of huts.

Figure 2 shows the distribution of intact huts within Kosciuszko National Park according to their primary historical association. There is a noticeable concentration of huts associated with pastoralism in the centre and eastern side of the Park. This distribution can be compared to the recorded movement of sheep and cattle into the Park during the 1954–1955 summer lease period that involved up to 200,000 sheep (Figure 3) and 17,000 cattle. The sheep arrived in the Park from western slope properties via Tumut and from Monaro properties via Yaouk (ACT), Adaminaby and Jindabyne. The cattle moved into the Park from many more routes (possibly because cattle can be herded through more broken country than sheep) and more cattle pass into the southern and western areas of the Park (rugged country more suitable to cattle).

Clearly the pastoral huts are located where the sheep and cattle were grazed, but why these fairly specific locations? Figure 4 is a map of vegetation types for Kosciuszko National Park with hut locations overlaid using the NPWS Environmental Resource Mapping System (ERMS) database. This map shows that the substantial majority of huts associated with pastoral activity are also associated with cold air drainage and herbfields vegetation areas. These natural grasslands are believed to have been formed by cold air drainage restricting growth of tree species. These grasslands were very attractive to graziers and were used particularly for sheep grazing. Comparison to the sheep movement diagram — Figure 3 — indicates that almost all the sheep movement was to these cold air drainage grass plains with almost no movement to the areas of alpine vegetation complexes. The cattle were generally moved into areas of alpine vegetation complexes.
Not only are huts shown strongly associated with the cold air drainage areas, but the huts almost invariably occur at the edges of these areas near the tree line. Supervision of stock, shelter from cold winds and the availability of shade would be some reasons for the location of huts at the edges of these plains.

Other topographic data were used to assemble comparative information on huts such as orientation, slope and height. For example, over half of the huts occur on slopes facing northeast to northwest or on flat land (no recorded orientation of slope) and occur on elevations between 1300 and 1700 metres. Other landscape associations can be identified by comparing environmental data layers with data on historical association or construction materials. For example, it appears that huts constructed of horizontal slabs which are often made from alpine ash (*Eucalyptus delegatensis*), mostly occur relatively close to vegetation shown as Tall Gum and Alpine Ash open forests.

**Discussion**

Huts act as a marker of, or door into, the history of a landscape. This is particularly the case in protected areas where huts provide evidence of land use no longer practised and/or permitted. Huts evoke other human responses: an emotional response based on the fragile/tenuous human interaction with the natural landscape; the emotive (visual and visceral) attraction of a hut as shelter and as something of human scale in an immense and potentially hostile environment.

Providing the above contextual information helps link huts to their landscape and can help the landscape stories come alive for visitors and fits within the current NSW NPWS ‘whole of landscape’ approach. However, while the ongoing conservation of huts is well deserved, the landscape history that gave birth to them is eroding away. A ‘whole of landscape’ approach means that adequate resources need to be made available to understand the landscape resource and to make sensible input decisions.

As discussed in this case study, historical and landscape data can be used effectively to link natural and cultural value management. Historical information is an under-used resource for landscape history. It can reveal useful information regarding natural landscape change (eg clearings) and it can be used to chart the important changes in Government land-management policy that is especially relevant to this alpine region as types of leases changed over time.

The subtle physical evidence of landscape use is also disappearing. Ruins (and in particular timber ones) are markers of history of the landscape that receive little attention as mostly they are not a management imperative. While archaeologists may be interested in collecting landscape archaeology data the financial imperative to employ them is seldom there. However, it does remain an area of research potential to institutions who train historians and archaeologists.

The problem is that the interface between natural and cultural values often falls between natural and cultural professional stools and methodologies for resolving issues at this interface in a collaborative manner are not strong. Issues where having these methodologies would be useful include natural re-growth in cultural precincts, restoration of natural landscape areas, cultural plantings and exotic re-growth in natural areas, fence lines, falling down stock yards, mine dumps, and the conservation of ruin sites.

Conservation Plans for huts are also costly and although recent streamlined methodologies have been developed by the NSW NPWS as *Heritage Action Statements*, they focus on physical conservation. This probably results in even less historical landscape analysis being possible. Broader thematic studies may be a better way of understanding landscape history but such studies need the financial support of those people who think broadly.

The professional skills brought to bear on these matters are, typically, an architect for the hut (with historical research) and a ranger with natural science training. The issues identified above suggest a larger professional mix should get involved, such as archaeologists and historians experienced in landscape assessment, and an ecologist (or similar) who is trained in balancing natural and cultural values. This approach would immensely increase knowledge of these values for management, interpretation and tourism.
Case Study 2: Ski Resort Landscapes in Kosciuszko National Park

This case study is drawn from the NPWS Kosciuszko National Park Ski Resorts Heritage Study, 1995. The ski resorts are a fascinating example of the ever changing historic relationship between conservation and recreation in protected landscapes.

Cultural attitudes towards the natural landscape of the Snowy Mountains prevalent in 1906 are evident in the first bill to protect the Snowy Mountains National Chase for “public recreation and preservation of game”.

The NSW Government involvement in either directly constructing, assisting with, or controlling ski accommodation and infrastructure stretches from 1907 to the present and follows a decision by the Premier at the time to build a 51km road from Jindabyne to the summit of Mount Kosciuszko to open the area to tourism and to build the Kosciuszko Hotel, constructed in 1909.

By 1920 ski-touring enthusiasts split from the Kosciusko Alpine Club that was centred around the more sedate Kosciusko Hotel to create the Ski Club of Australia by 1920. The SCA had a vision of a chain of ski huts and convinced the Government to build the Chalet at Charlotte Pass in 1930.

With the establishment of the Kosciusko State Park Trust (KSPT) in 1944, a balance of recreation and conservation was seen as appropriate and private ski clubs were encouraged as a way of limiting commercial interests. This dream went with the fire that destroyed the Kosciuszko Hotel in 1951.

Like the hut landscapes the five ski resort areas have specific historic reasons for being where they are located that is ‘written’ into their physical form.

Perisher had its genesis in the decision by the KSPT in 1947 to build Rock Creek Hut where Rock Creek crossed the Summit Road and to allow private ski clubs to build in this area. The dispersed quality of the cultural landscape of Perisher reflects the KSPT granting of individual ski lodge leases and the central aggregation of larger buildings reflect the granting of larger leases to provide commercial infrastructure. In the 1960s the KSPT rationalised roads and further lodge locations to create a landscape of ‘visual isolation’.

By contrast, the location of Thredbo was prompted by the construction of the Alpine Way as part of the Snowy Mountains Hydro Electric Scheme. Thredbo’s tight ‘European’ cultural landscape dating from 1957 reflects the fact that a head lease area was given to a private consortium following a KSPT decision to grant a commercial lease after the Hotel Kosciusko fire.

The cultural landscape history of Smiggin Holes is similar to that of Perisher in that it grew as individual club leases in a location that was initially occupied by several pastoral huts. These huts were also used by skiers en route to the Chalet from the Kosciusko Hotel.

Guthega like Thredbo is strongly associated with the Snowy Mountains Hydro Electric Scheme. It was established by Snowy scheme workers, initially without KSPT approval. At least two of the existing former workers accommodation barracks were used. The linear arrangement of lodges in the Guthega landscape reflects its history.

Charlotte Pass can be thought of as the first and last resort. The Chalet is from a period when the Government provided tourist accommodation. The commercial lodges there strongly contrast as a group having generally been constructed after 1974.

The 1995 Ski Resorts Heritage Study provided an analysis of the evolution of lodge design types, many of which show the influence of the materials guidelines adopted firstly by the KSPT and later NPWS to

4 ibid
5 Neville Gare pers com to Geoff Ashley.
ensure that the lodges responded to their natural setting. The influence of North American national parks models also found its way into the design language via the KSPT and NPWS. Some lodges show their European alpine stylistic influences and some are fine examples of contemporary modernist architecture.

The appropriately-named High Noon that was demolished at the end of 1995 is a good example of the culturally dynamic history of the ski resorts. This lodge (originally known as Roslyn) was associated with Charles Anton, a leading light in Australian ski history and with the Australian Alpine Club. It was a re-used Snowy scheme workers’ hut that was brought from Norway by the firm Selmar for the Snowy scheme and is even rumoured to have been built or used by the German Army during the War.

Discussion
The resorts in Kosciuszko National Park did not ‘fall from the sky’ into a national park landscape. Their development is closely associated with moves to create protected or controlled areas at the end of the 19th Century and they provide evidence of the dynamic relationship in the provision of recreation facilities and of nature conservation in the alpine areas.

While there has been a general shift from public to private sector investment in the creation of accommodation and infrastructure development in Kosciuszko National Park, this has been set against a dynamic Government response to its potentially conflicting responsibilities for both nature conservation and recreation. The landscape of the five resorts provide physical evidence of this dynamic relationship.

An example of a mid point in this dynamic relationship between recreation and conservation was when the KSPT, knowing that it did not have the financial resources to provide facilities, initially allowed only private clubs to develop as a way of limiting (unsuccessfully as it turned out) full commercial development. The establishment of the NPWS swung the dynamic towards nature conservation. A lack of appreciation of the past and a lack of resources to control the future left the resort areas as under-resourced ‘blind spots’ in this new ideological landscape; thus probably ensuring more private control and even less integration into a managed landscape.

Recent changes in development consent within the resorts may in part result from this historic ambivalence on part to the NPWS towards the resorts. These changes that see Planning NSW as the consent authority for the resorts could lead to an even greater movement away from integration of recreation facilities with the management of the conservation landscape unless the resorts are understood as an important part of the history of Kosciuszko National Park. This history has shaped the resultant form of each resort and the lodges themselves, many of which reflect key themes in the history of the Park.

Case Study 3: Illawong Lodge
This case study draws on a draft Illawong Lodge Conservation Plan prepared by Godden Mackay Logan for Illawong Ski Tourers in consultation with NPWS and currently with the NPWS for endorsement.

Illawong Lodge is located 2.4 km south of Guthega Dam adjacent to the Snowy River near where Pounds Creek joins the Snowy and close to Mount Twynam and Mount Anton that are part of the Main Range. It is unique as the only ski lodge outside the main resort areas. Constructed as Pounds Creek Hut in 1926/27 and adapted as Illawong Ski Lodge in 1956/57 it links the huts and lodge case studies discussed above. Illawong Lodge provides evidence of two key stages in the history of back-country ski touring in the alpine area and the Government’s changing role in the provision of accommodation in the Park. Its location is very specifically linked to these two phases of use (which is ongoing) and is an important part of its significance.

Pounds Creek Hut was probably constructed with NSW Government Tourist Bureau assistance, and certainly with its approval, for use by (Sir) Herbert Schlink in his trip, known as The Crossing, with a party of five on skis from Kiandra to Kosciusko in 1927. Schlink had formed the Ski Club of Australia, who were interested in ski touring, in its break from the Kosciusko Alpine Club in 1920.

This association with ski touring continued after the war when skiers who skied westward off the Main Ranges added to the original hut to form Illawong Lodge. These enthusiasts were members of the Ski Tourers Association established by Charles Anton in 1950. Illawong is the last remaining back-country lodges/huts constructed by the Ski Tourers Association with KSPT approval.
Illawong Lodge has historical and social significance for its association with the history of ski touring in the Australian Alps. It has particular social significance for the members of Illawong Ski tourers, most of whom have a long and close association with the lodge for its particular sense of place (remoteness), its unique history and unusual aspects of its occupation and maintenance.

**Discussion**

Like the huts and resorts of Kosciuszko National Park, Illawong Lodge is an example of how the location of buildings can speak strongly of the use and history of the landscape. Illawong Lodge has a sense of place that is strongly connected to the history of remote backcountry skiing in the alpine areas in two distinct phases before and after the Second World War.

The strength of the social significance of Illawong Lodge is such that if the building is destroyed, then its reconstruction is justified on heritage grounds and its association with location is such that this should be at or near its current location. Policy on reconstruction of huts and lodges in KNP is being considered in the current KNP Plan of Management review and this should take into consideration the nature of significance and the role that location has in this significance.

**Conclusions**

The historic places discussed in this paper show that buildings can be a ‘door’ through which the broader landscape and a sense of place can be accessed; provided, however, that the historic relationship between the building and its landscape is fully appreciated.

The future conservation of historic resources will be best achieved by integrating their conservation with the broader landscape. The examples discussed here show that understanding these historic resources in their environmental context will help achieve this integration.

The hut landscapes in Kosciuszko National Park record, in fabric and associations, a history from prior to and since its transition from a resource to be exploited to one conserved and appreciated. The resort landscapes evolved from a time when the preservation of alpine landscapes was beginning and they continue to reveal the changing relationship between conservation and recreation in alpine landscapes. The landscape setting of Illawong Lodge provides evidence of the history of alpine ski touring, including downhill skiing off the western face of the Main Range.

The future management of the ski resorts and huts in the alpine areas of NSW is a matter of coming to terms with the history and associations that are embedded in the landscape. An integrated approach to assessment and management of the landscape based on the foundation stones of natural and cultural heritage allows the story of landscape to be told and thus a true sense of place to be appreciated by all.
Figure 1 Three case studies of historic landscapes in Kosciuszko National Park. Constructed in 1873, Currango Homestead (top) is one of the earliest pastoral structures in the Park. High Noon Ski Lodge (middle) was a re-used Snowy Mountains Scheme workers’ barrack and one of the first lodges constructed in Thredbo. It was demolished in 1995. Illawong Ski Lodge (lower) began as Pounds Creek Hut (1927) and extended in 1956 (right) as Illawong Ski Lodge. This view looking west to the Main Range past the Snowy River.
Figure 2 The historic association of intact huts within Kosciuszko National Park (adapted from NPWS Huts Study 1992, Part C, KNP).
Figure 3 Sheep movement into Kosciuszko State Park in 1954–55
Figure 4 The relationship between vegetation types and hut locations in Kosciuszko National Park. Hut locations are shown as black dots. There is a strong relationship between the location of pastoral huts and the extent of Cold air drainage and herbfields natural grasslands which are shown here as the darkest tone.
Day Two – Mountains For The Future
Landscape - Level Conservation For A World Heritage Site In Nepal

Pralad Yonzon

Resources Himalaya

Abstract

Despite eight natural world heritage sites in the Himalayas (India 4, China 2, and Nepal 2), many countries including Nepal request for more. Recently, Shey Phoksundo National Park (SPNP) in west Nepal, has been proposed. This study suggests that Dolpo of SPNP and Mustang of the Annapurna Conservation Area (ACA), are similar in geology, soil, climate, rainfall and vegetation. In addition, Mustang and Dolpo form a single block of tertiary sedimentary zone in Nepal. Comparatively, Mustang is much richer in flora and fauna than Dolpo. Twenty-eight endemic plants are localized in ACA against the 14 species of SPNP. Of 18 endemic butterflies of Nepal, 8 species of butterflies come mainly from Mustang and one from Dolpo. Rare species like argali (Ovis ammon hodgsoni), brown bear (Ursus arctos), kiang (Equus kiang) and Tibetan gazelle (Procapra picticaudata) are found only in Mustang. In summary, the checklist overwhelms in favor of Mustang for its high endemism, species richness and diversity. Therefore, recognizing SPNP alone for its inscription is not comprehensive. Conversely, Dolpo and Mustang, collectively called Nepal’s Tibetan marginal land which also constitute the southern margin of the Tibetan Plateau, can be proposed as one world heritage site, to benefit many mountain communities through landscape-level conservation.

Background

Despite eight natural World Heritage Sites (WHS) in the Himalayas, which are also protected areas (India 4, China 2, and Nepal 2), many countries press for more. WHC site inclusion still has a great media appeal and tourist attraction because of significant economic benefits through volume tourism. With these benefits, there is also a profound responsibility to protect and manage the site, which is held in trust for the entire world community (Hogan, 2001).

Nepal contains four WHS: two cultural and two natural. Of the two natural sites in Nepal, Sagarmatha National Park (area: 1,148 km²) was declared a world heritage site in 1979 in recognition of the significance of the world’s highest peak Mt. Everest (Sagarmatha), its associated flora and fauna, and the unique Sherpa culture. The Royal Chitwan National Park (area: 932 km²), enlisted in 1984 in the WHS, has outstanding universal value as it harbors endangered rhinos and tigers.

In 1999, the Ministry of Forest and Soil Conservation of Nepal proposed Shey Phoksundo National Park (SPNP, area: 3,555 km²) (Figure 1) to WHC for inscription. The report entitled ‘Nomination of Shey Phoksundo National Park for Inclusion on the World Heritage List’ produced six criteria for its inscription: three natural and three cultural. Under the natural criteria, the Park is considered to have biological uniqueness because of climatic differences, altitudinal variation, trans-Himalayan conditions, and different zoo-geographical regions.
This paper is based on the earlier Habitat Himalaya write–up, entitled “The inseparable Tibetan landscape of Nepal” (Yonzon, 2001). The intent of such re-examination of Shey Phuksundo National Park and Mustang of the Annapurna Conservation Area (ACA; area: 7,629 km²) (Figure 2), both belonging to one contiguous trans-Himalayan region, is to suggest landscape-level conservation of Nepal’s Tibetan marginal land is much better option for WHS than to protect a single protected area.
Cultural Context

The southern margin of the Tibetan Plateau, constitute Mustang of ACA and Dolpo of SPNP, collectively called Nepal’s Tibetan marginal land. Key areas of SPNP are Crystal Mountain, Lake Phoksumdo, and Shey Gompa, collectively referred as Dolpo (also, inner Dolpo). Mustang of ACA, is epitomized by Lo Manthang — one of the last remaining walled cities in Asia and a frontier for mountain tourism in the Himalayas (Gurung and DeCoursey, 2000). Established in the 15th century, the walled city (35 ha) has some 200 households and two 15th century gompas: Thubchen and Jhyampa (Rai, 1989).

Local history suggests that the Lo Kingdom entered into cultural and political relations with Bhutan and Ladhak in the 16th century. The Dholwa (residents) of Dolpo, show close similarities in their social structure to the Loba (residents) of Mustang as Dolpo was once under the dominion of Lo (Rai, 1989). Lo had intensive socio-political engagement with Tibet before it came under the sovereignty of Nepal at the end of the 18th century. Mustang was one of the 15 vassal states (Rajya) of Nepal, where the chief (Raja) was required to pay an annual tribute (Sirto) to the government and appropriate the remaining land revenue for himself (Regmi, 1978).

Physical Similarities

Mustang and Dolpo are characterized by similar geology, soil, climate, rainfall and vegetation. For example, the rain shadow of the Nepal-Himalaya is an area with under 400 mm of annual rainfall, which lies north of Kanjiroba, Dhaulagiri and the Annapurna massifs. This is where both Mustang and Dolpo form one contiguous area (8,793 km²) (fig. 3). It is important to note that the Crystal Mountain, Lake Phoksumdo, and Shey Gompa of SPNP and most of Mustang including Lo Manthang and Damodar Kunda, lie in the rain shadow. The middle portion between Dolpo and Mustang is Tscharika Bhot. Similarly, of six geological zones in Nepal (Siwalik, Lesser Himalayan Crystalline, Lesser Himalayan Sediments, Central Crystalline, Major Tertiary Granites and Tertiary Sediments), Mustang and Dolpo form a single block of Tertiary Sedimentary zone (Land Resource Mapping Project. 1986) with an area of 11,843 km² formed between the Cambrian to Cretaceous period containing limestone, shale and quartzite (Fig. 4).

![Figure 3. Rain shadow in SPNP – ACA region (Resources Himalaya, 2001)](image1)

![Figure 4. Tertiary sedimentary zone in SPNP – ACA region.](image2)
**Issues of Conservation**

The nomination report recognizes that Mustang of ACA, is probably similar to SPNP. Nonetheless, its subject matter hinges on Dolpo’s lower human population density, higher mean altitude and remoteness to suggest that isolation maintains ecology and culture intact. These are difficult to prove where a long history of human-related disturbance prevails (Yonzon, 1990). For that reason, remoteness and human-disturbance are not mutually exclusive. Regarding mean altitude area, Mustang is prominent, and not Dolpo (Table 1).

Table 1. High altitude areas with scant rainfall (Resources Himalaya Database, 2001).

<table>
<thead>
<tr>
<th>Elevation Gradient (m)</th>
<th>Mustang (ACA)</th>
<th>Tscharka Bhot</th>
<th>Dolpo (SPNP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,000-3,000</td>
<td>65.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3,000-4,000</td>
<td>753.2</td>
<td>89.3</td>
<td>165.2</td>
</tr>
<tr>
<td>4,000-5,000</td>
<td>1,198.4</td>
<td>1,390.3</td>
<td>901.7</td>
</tr>
<tr>
<td>&gt; 5,000</td>
<td>1,723.8</td>
<td>1,730.6</td>
<td>714.2</td>
</tr>
</tbody>
</table>

The report becomes contentious because Dolpo is championed unduly for its biological riches. For example, SPNP and ACA are known to contain 74 endemic plants which is 31% of the total endemic plants of Nepal (246 species) (Shrestha and Joshi, 1996). As 28 species are localized in ACA against the 14 endemic plants of SPNP, endemism is decisively higher in ACA than in SPNP (Table 2).

Table 2. Nepal’s endemic plants in the Tibetan marginal land (Shrestha and Joshi, 1996).

<table>
<thead>
<tr>
<th>Locality</th>
<th>No. of Endemic Plant Species</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Localized</td>
</tr>
<tr>
<td>ACA</td>
<td>28</td>
</tr>
<tr>
<td>SPNP</td>
<td>14</td>
</tr>
</tbody>
</table>

The report is even more failing in fauna. Butterflies are immensely influenced by high relief, narrow habitats and environmental constraints such as low ambient temperature and trace rainfall. Hence, they are biological indicators of specific environment. Of 18 endemic butterflies of Nepal, half of them, occur in Dolpo – Mustang region (Smith, 1994) suggesting the Tibetan marginal land is extremely important for endemism. Of 9 endemic butterflies, 8 species come mainly from Mustang while Dolpo has only one species that does not occur in Mustang (Table 3).

Table 3. Nepal’s endemic butterflies in the Tibetan marginal land (Smith, 1994).

<table>
<thead>
<tr>
<th>Endemic species/subspecies</th>
<th>Globally Known Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paralas nepalica</td>
<td>Dolpo and Mustang</td>
</tr>
<tr>
<td>Parnassius cephalus horii</td>
<td>Dolpo and Mustang</td>
</tr>
<tr>
<td>Polvomatus nepalensis</td>
<td>Mustang</td>
</tr>
<tr>
<td>Albulina orbitulus lobbichleri</td>
<td>Mustang</td>
</tr>
<tr>
<td>Coenonympha amaryllis forsteri</td>
<td>Mustang</td>
</tr>
<tr>
<td>Parnassius epaphus capdevillei</td>
<td>Mustang</td>
</tr>
<tr>
<td>Parnassius acostis laurenitii</td>
<td>Mustang</td>
</tr>
<tr>
<td>Synchloe sherpeae</td>
<td>Mustang</td>
</tr>
<tr>
<td>Crebeta lehmani</td>
<td>Mustang and Manang</td>
</tr>
</tbody>
</table>
Similarly, the Kali Gandaki River Valley, world’s deepest valley, is an integral part of Mustang, where all six Himalayan pheasant species are found and not in Dolpo. Regarding mammals, rare species like argali (Ovis ammon hodgsoni), brown bear (Ursus arctos), kiang (Equus kiang) and Tibetan gazelle (Procapra picticaudata) are not found in Dolpo. But, Mustang has it all (BCD Project, 1993; Koirala and Shrestha, 1997; Shah, 2001). Also, a new mouse hare (Ochotona lama) was discovered here (Mitchell, R. and Punzo, F. 1975). In summary, the list overwhelms in favor of Mustang whose importance cannot be denied for its high endemism, species richness and diversity.

Development Through Conservation

Historically, the Tibetan marginal land is recognized as one of the key physiographic regions of Nepal (Hagen, 1960; Bista, 1991). However, only High Himalaya, High Mountain, Middle Mountain, Siwalik and Terai are recognized today and such impulsive planning have had isolated Nepal’s Tibetan marginal land and its people from many forms of mainstream development. Perhaps, recognizing Dolpo and Mustang together with Tsharka Bhot (area: 3,211 km²) as one contiguous WHS, may bring both conservation and development together.

Conclusion

The proposal to link Dolpo of SPNP with Mustang of ACA with Tsharka Bhot as the biological corridor to conserve a contiguous landscape of the trans-Himalaya region as WHS, is of utmost importance. A conservation effort of such nature, is not only to maintain its biodiversity but also to usher a long-term benefit to mountain communities by safeguarding their cultural heritage and identity.

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Addressing Invasive Plant Species As A Threat To The Natural Values Of The Australian Alps: English Broom As A Case Study

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Summary

English broom, Cytisus scoparius, is an upright woody legumeous shrub native to western and central Europe. Outside of its native range, English/Scotch broom (broom) is an aggressive invader of a broad range of ecological habitats and mountainous vegetation communities. Since its introduction into the high country in the early 1800s, broom has naturalised over 150,000 hectares from those first few planting’s, and has had a significant impact on invaded habitats through the formation of a chokingly dense understorey monoculture. Broom has reached management priority within the Australian Alps national parks (AAnps) due to its threat to and impact on biological diversity and its virtually unlimited potential to spread throughout the whole biogeographical region. This paper will outline the development of a strategic response to broom within the Australian Alps and will use Victoria as a case study to illustrate how effective that response has been in affecting change.

Introduction

English broom

Broom was introduced into Australia around 1800, after Governor King requested broom seeds from England, which were to be grown and used as a substitute for hops (Hoskings et al 1996). Since its introduction, broom has become an aggressive invader of a wide range of ecological habitats. Broom’s success as an aggressive invader rests with its ability to survive on low levels of resource availability. A wide tolerance of soil conditions, temperature and rainfall regimes, the ability to fix nitrogen in the soil, two flowering periods and the ability to set seed over a wide altitudinal range have contributed to its spread (Williams 1981). The absence of predators has also contributed to the spread of broom in south eastern Australia.

Broom is a prolific seeder with 2 flowering periods (spring and autumn). It is estimated that each mature plant produces on average 26,000 viable seeds per year, the majority of which are stores in a soil seed bank characteristic of broom infestations. There can be up to 50,000 seeds per square meter in the soil (CRC Weeds 2000). The latest viability figures for broom seeds stored dry stands at 80 years.
Broom In The Australian Alps

Introduction of English broom to the Australian Alps

Over 180 years ago an innocuous looking plant, English broom, was introduced into the Australian Alps. The early graziers, miners and timber getters who opened up the Alps nurtured in their settlements various plants that held either sentimental, aesthetic or more practical value. English broom, valued for its sentimental links to the ‘old country’ and prized for its showy yellow flowers, was among these plants. Evidence also exists that English broom, with other species like willows and poplars, were used as slope stabilisation and erosion mitigation techniques throughout the goldfields of the high country (Fallavollita and Norris 1992).

In more recent times the introduction of broom seeds into the Alps has been attributed to park users, including, bushwalkers, horse riders and 4WD enthusiasts and the use of broom infested fill material. The movement of cattle has also been suggested as contributing to the introduction of broom into the Australian Alps.

Distribution of broom within the Australian Alps

The current distribution of broom within the Australian Alps reflects its symbiotic relationship with the vectors of introduction and spread. Consequently broom infestations are found at old townships; camp sites, along tracks, trails and watercourses.

Broom occurs throughout the Alpine National Park in Victoria, Kosciuszko National Park in NSW and Namadgi National Park in the ACT. The distribution of broom is reflected in the following table:

<table>
<thead>
<tr>
<th>AREA</th>
<th>INFESTATION CHARACTERISTICS</th>
<th>TOTAL AREA INFESTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpine NP</td>
<td>Dense and Widespread.</td>
<td>Over 150 000 hectares</td>
</tr>
<tr>
<td>Kosciuszko NP</td>
<td>Generally characterised by scattered, isolated infestations.</td>
<td>Over 20 000 hectares</td>
</tr>
<tr>
<td>Namadgi NP</td>
<td>Generally characterised by scattered, isolated infestations.</td>
<td>Approximately 1000 hectares.</td>
</tr>
<tr>
<td>ACT</td>
<td></td>
<td>5000 hectares potential infestation</td>
</tr>
</tbody>
</table>

Table 1: Details of significant broom infestations in the Australian Alps.

Impact of broom in the Australian Alps

Broom has a significant impact on invaded habitats, primarily through the formation of dense understorey monocultures. Broom depresses biological diversity, out-competing most native understorey species and restricting the regeneration of the forest trees endemic to the area. Several species of rare and endangered flora are under threat from broom.

Broom impacts on recreational pursuits in the Alps by restricting access to watercourses, tracks and trails, significantly increases fire hazard, and provides harbour for feral animals. Broom also has the potential to degrade the water quality and hence catchment values of the Australian Alps, through the displacement of indigenous flora.
The Strategic Response To Broom

The invasive potential of broom has long been known. English broom was considered naturalised by 1887, and was declared a noxious weed in 1901.

To date the strategic response to broom by public land management agencies can be characterised by three broad eras, ‘going it alone’, ‘agency support’ and the era of cooperation.

Going it alone

Over the many years of management of the high country prior to the establishment of park agencies and the AALC weeds such as English broom were controlled in an ad hoc, reactive poorly planned manner (Grenier and Good pp351). There was a lack of coordination in the control of weeds, both between neighbouring land managers and within the whole biogeographical region.

The control programs were most often based on the application of herbicides and the effectiveness of these programs reflected the application technologies available. Prior to 1970s, spray technology was antiquated and it wasn’t until the adoption of diaphragm pumps in the late 1970s early 1980s that the widespread control of weed species became practical (Sedgman pers. com.). The limited and toxic nature of chemicals available for use against woody weeds and the increasing awareness of their detrimental impacts, not only on the environment, but also the health of the operators, also hampered the effective widespread and comprehensive control of English broom prior to 1970s. Integrated weed management, while perhaps occurring on an informal ad hoc basis, certainly hadn’t reached the vernacular of the land managers of the day.

Agency support

The formal declaration of the high country as national parks in each respective state and territory brought with it a degree of strategy towards the control of exotic plant invaders such as broom. The New South Wales National Parks and Wildlife Service has given a strong commitment to pest plant management since the declaration of the Kosciuszko National Park in its current form in 1967, of which broom has been identified as one of the highest priority weeds to control. Both the ACT and Victorian governments developed management plans for their parks in the late eighties, early nineties that gave representation to the need to manage invasive weed species. However each park agency still operated ostensibly independently despite facing the same challenges across the same biogeographical region.

Australian alps liaison committee

The signing of the MOU and the birth of the Australian Alps Liaison Committee (AALC) in 1986 saw the start of a coordinated strategic approach to the management of English broom in the Australian Alps. The Broom workshop held in the same year at Barrington Tops in northern NSW highlighted the need for both strategic planning and integrated management when addressing broom.

Fallavollita and Norris

In 1992, the AALC commissioned the first comprehensive study into the occurrence of broom in the Australian Alps national parks. The report by Fallavollita and Norris represented a significant turning point in the strategic management of broom. For the 9 years before it was reviewed, the report gave direction and a best practice guide to park ranges in the Australian Alps national parks. The report also consolidated the significant achievements of broom control in Kosciuszko and Namadgi National Parks and gave hope to those areas of the Alpine National Park in which broom appeared to be winning.
**Tumut workshop**

The English broom workshop held at Tumut in 1997 represents another turning point in the strategic management of English broom in the Australian Alps. The workshop gave land managers an opportunity to take stock of their progress in controlling broom. Two significant outcomes resulted from the Tumut workshop which we to define the new strategic direction of broom control. The first was the perceived need to update the 1992 Fallavollita and Norris report and the second was to identify the need to implement the widespread biological control of English broom in the Alps.

**Biological control**

Biological control involves using one living species (natural enemy) to control or suppress an unwanted species (target). Classical biological control, or the introduction of broom’s natural enemy from Europe, was identified as an important integrated control technique to limit the growth and spread of broom in the Alps. CSIRO had completed comprehensive testing into the host specificity of these agents, secured permission to release a suite of (to date) four agents and had conducted field trials in both Kosciuszko and Namadgi National Parks. Trials in the Alpine National Park were conducted by the Victorian Keith Turnbull Research Institute.

Post Tumut, commitment was given by the AALC, and a strong partnership of stakeholders in Victoria to facilitate the widespread establishment of biological control agents as part of IWM at suitable broom infestations throughout the Alps. The English broom biocontrol program forms a cornerstone of the strategic response to broom within Victoria today.

**Broom Management Strategy for the Australian Alps National Parks**

In 1998/1999 the AALC commissioned a review of the occurrence of English broom in the Australian Alps and the development of an integrated broom management strategy for use by field staff. The goal of the strategy was to assist land managers minimise the impact of broom within the AANPs. The strategy built on the earlier Fallavollita and Norris report and incorporated information and ideas on the best practice management of broom, gleaned from outstanding work such as the 1997 Barrington Tops broom control strategy and current research findings. It was written through close consultation with past and present land managers and reflected the many lessons learnt the hard way in the Kosciuszko broom program over the past 30 years. The strategy represented a ‘new breed’ of management plan that endeavoured to set out the actions and resources required to implement the ‘best practice’ management of broom.

**Protecting the natural treasures of the Alps**

In 2000, the AALC, through the Natural Heritage Working Group, established a project to document the significant natural features of the Australian Alps and identify and rank the threats to them. Peter Coyne’s project “Protecting the natural treasures of the Australian Alps” identified the significant natural features, identified threatening processes, current and potential, and ranked the magnitude of threat. Out of a list of almost 100 threats encompassing pest plants and animals, land degradation and habitat destruction through to climate change, English broom was identified as the number one most significant threat to the natural treasures of the Australian Alps.

**Has Strategic Planning Made A Difference?**

Case study – broom control in the Alpine National Park, Victoria.

The Eastern Unit of the Alps has arguably the worst infestation of broom in SE Australia, certainly in the Alps. The broom infestation, originating in the abandoned gardens and goldfields of the Glen Wills area, has spread 130 km downstream (Fallavollita and Norris 1992). It is characterised by dense, thick mature stands and approximately 45 Kilometres of this infestation borders the Alpine National Park (ANP). While the control of broom has been addressed in the area with varying degrees of commitment and
capacity for decades, in the broom season of 2000, Parks Victoria used the *Broom Management Strategy for the Australian Alps national parks* (McArthur, 2000) to guide their control programs.

The availability of the strategic plan has enabled Parks Victoria’s Alpine District to secure more funds and to better direct available resources. Investment in the broom control program has increased 5 fold in the last 3 years since the strategy was developed, and a dedicated English broom project officer for the Eastern Unit of the Alps has been appointed.

The strategy has facilitated a more pro-active and forward thinking approach to broom control within the ANP. It has facilitated a large icon project, Protecting the Pathways to the Alps, concerned solely with the integrated control of broom within the ANP. The program has largely removed the control of broom from the pressures of the normal pest plant programs. Protecting the Pathways to the Alps strongly supports the use of biological control in strategic areas and reaffirms Parks Victoria’s commitment to long-term integrated broom management.

On the ground, the strategy has enabled a containment line to be maintained around the heart of the infestation, and a prevention and eradication program to operate outside this area, where mainly scattered and isolated broom plants occur.

The last 3 years also seen great advances in the cooperative and cross-land tenure management of broom in areas adjacent to the ANP advocated by the broom management strategy. Industry bodies such as Goulburn-Murray Water and private landholders, united in the landcare movement, have joined forces with Parks Victoria and the Department of Natural Resources and Environment to address English broom issues.

**Discussion**

History shows that the strategic and repeated control of broom is effective in securing the progressive eradication of broom, while the ad hoc nature of reactive management will have dire consequences. The success of the broom control program conducted in Kosciuszko National Park over the past 20 years indicates that the containment and eradication of broom is a manageable and achievable goal if resource allocation is well directed and committed for long term management. Strategic planning helps to facilitate this.

At the very least, the success of our strategic response to broom lies in affecting change, empowering natural resource managers and increasing the understanding and awareness of both the visitors to and communities of Australia’s magnificent mountain landscapes.

**References**


Ecology Of Disturbance: The Effect Of Tourism Infrastructure On Weeds In The Australian Alps

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Abstract

Tourism is a major form of land use in the Australian Alps national parks. A range of tourism infrastructure has been provided within the region by state and territory governments (through protected-area managers and traffic authorities), local governments, and tourism operators. The construction, maintenance and use of roads, tracks, picnic areas, buildings and other artificial structures often cause disturbance to natural vegetation. Such disturbances can favour the establishment and spread of weed species. The majority of the 175 alien plant taxa in the Australian Alps are found in disturbed areas: along roadides/walking tracks (78% of taxa) and around resorts (58%). Around 20% of these taxa are naturalised; that is, able to reproduce and grow in the absence of further human activities.

The potential of different types of infrastructure to favour weeds over natives needs to be taken into consideration. This applies to the provision of walking tracks, which are long, linear disturbances through natural vegetation.

When upgrading or providing new tracks, the choice of track surface type may largely be influenced by initial construction cost. However, the ongoing cost of managing impacts (e.g. weeds) associated with various types of surface needs to be considered during the decision-making processes. Recent research by two of these authors has compared weed cover and loss of natural vegetation associated with four different walking track types: gravel tracks, concrete pavers, unformed tracks and raised steel metal walkways. Variation in the area of disturbance (weed cover and bare areas) associated with each track type was found. Gravel tracks were associated with the greatest area of disturbance (the Summit Road had 4292 sq. m of disturbance per km of track, and narrower gravel tracks had 2942 sq. m per km). For pavers there were 2682 sq. m of disturbance per km. Unformed tracks created much less disturbed area per km of track (266 sq. m per km), though the extensive network of unformed tracks in the alpine area (~106 km) meant that potentially 28,400 sq. m are disturbed. The raised steel metal walkway had the lowest impact on the vegetation, with only 62 sq. m of disturbance per km (47-fold less than the narrow gravel track), despite having the heaviest use of any of the track types. It is clear from this that the disturbance associated with some track types results in green weed verges and bare areas. These require costly ongoing management (e.g. spraying or rehabilitation). A more effective option would involve selecting tourism infrastructure that causes minimal disturbance during construction and use.

These results illustrate that more consideration needs to be given to ensuring environmental sustainability in the provision of tourism infrastructure in the Australian Alps national parks.
Natural area tourism

Tourism is the most rapidly growing industry in the world (Worboys et al. 2001; Newsome et al. 2002). It accounts for 12% of global gross national product, or around US$4.8 trillion dollars (Newsome et al. 2002). One of the fastest growing sectors of the tourism industry in Australia and overseas is tourism to natural areas, including national parks (Newsome et al. 2002). This incorporates nature-based tourism, where viewing nature is the primary objective; adventure tourism; wildlife viewing; ecotourism; and cultural tourism, where the cultural landscape or built environment occurs within a national park. In Australia, the primary objective of park agencies is to conserve the natural and cultural values of protected areas (Worboys 1997; Worboys et al. 2001; Eagles et al. 2002; Newsome et al. 2002; Worboys and Pickering 2002). However, they must also provide tourism and recreational opportunities where they foster the visitor's appreciation and understanding of the natural and cultural value of protected areas (Worboys 1997).

Tourism and recreation activities in national parks, along with the infrastructure provided, should be environmentally as well as socially and economically sustainable (Eagles et al. 2002; Newsome et al. 2002; Worboys and Pickering 2002). However, there is often inadequate knowledge and understanding of the negative impacts that tourism infrastructure can have on the natural environment (Worboys et al. 2001; Eagles et al. 2002; Newsome et al. 2002). Research into environmentally sustainable tourism has shown that there is a range of negative direct and indirect impacts of tourism (Buckley et al. 2000; Newsome et al. 2002; Buckley et al. In press). Research in the Australian Alps by the Cooperative Research Centre for Sustainable Tourism is examining impacts of a range of tourism activities and facilities, such as snow manipulation, camping, trampling, horse riding, resorts, track types, and the generation of human waste. In particular, the resilience of native vegetation to disturbance is being quantitatively assessed. In this paper, we report on the relationship between weeds and tourism infrastructure in the Australian Alps, and describe recent findings of research into the impacts on native vegetation of different track surface types.

Tourism and weeds in the Australian Alps

Infrastructure associated with tourism in the Australian Alps provides habitat for a wide range of non-native plants. In a recent review of alien plants in the Australian Alps (Johnston and Pickering 2001a), 175 non-native plant taxa were recorded in the Australian Alps above 1500 m. Of these, 78% were found along roadsides and/or paths, and 58% in the resort areas. Some species, such as the clovers (Trifolium arvense, T. dubium, T. pratense, T. repens, T. ambiguum, T. glomeratum, and T. hybridum) and some grasses (Agrostis capillaris, A. stolonifera, Dactylis glomerata, Festuca rubra, Lolium perenne, Phleum pratenses, Poa annua, P. pratense and Avena sp.) were deliberately introduced for use in rehabilitation (Johnston and Pickering 2001a). Others, such as broom (Cytisus scoparius), lupins (Lupinus incanus) and attractive daisies (Chrysanthemum parthenium, Anthemis punctata, Leucanthemum spp.) have been deliberately planted in gardens in and around resorts and other buildings (McDougall and Appleby 2000; Johnston and Pickering 2001a; Pickering et al. In press). There are also large scale weed infestations around some parks facilities such as Waste Point in Kosciuszko National Park (Author obs.).

In the recent biodiversity survey, 35% of the total flora recorded were 146 non-indigenous taxa found in the 27 sq. km area from Thredbo Village to the top of Mt Kosciuszko (Pickering et al. In press). The vast majority were associated with tourism infrastructure. Within the garden areas of Thredbo Village 103 taxa that are not indigenous to the region were recorded, mostly deliberately planted. In the disturbed areas around the resort, again non-indigenous taxa predominated, with 49 out of the 51 taxa recorded not native to the area. On the ski slopes there was also a relatively high diversity of non-indigenous taxa, with 29 identified (30% of the species recorded on the slopes).

The presence of so many non-indigenous taxa within a national park is of concern. Among these taxa are species that could potentially spread from garden beds into adjacent disturbed areas, and even into the natural vegetation, becoming environmental weeds. A high diversity of non-indigenous flora has also been found for the ski resorts in Victoria, creating similar issues for the management of the adjacent national parks (McDougall and Appleby 2000).

Why are weeds a problem?
Weeds are one of the most serious threats to Australia's natural environment (COA 1999). They can have a range of negative impacts, including displacement of native species and modification of ecosystem functioning. Specific impacts include acceleration of soil erosion, alteration of fire regimes, limitation of the recruitment of native species, alteration in geomorphological process, acceleration of extinction rates of rare and threatened flora and fauna, alteration in the hydrology of a ecosystem, alteration in the nutrient content of soils, and effects on herbivory rates (Carr et al. 1992; Csurches and Edwards 1998; COA 1999; Low 1999).

Intact native vegetation is thought to be relatively resistant to weed invasions (Csurches and Edwards 1998; COA 1999). However, once vegetation is disturbed, weeds can become established (COA 1999). The disturbance may be natural, but if weed propagules are present then weeds can become established, altering natural cycles (Csurches and Edwards 1998). Alternatively, anthropomorphic disturbance, such as clearing of vegetation for the provision of tourism infrastructure, can alter ecological processes and favour weeds (Csurches and Edwards 1998; COA 1999; Johnston and Pickering 2001a). In some cases, weed propagates can be deliberately or accidentally introduced during the construction and use of the infrastructure. Problem weeds tend to have high reproductive rates, vegetative growth and tolerance to a wide range of growing conditions. These characteristics make them highly competitive in the bare ground created by disturbance (Csurches and Edwards 1998). Continued use of an area can promote weeds because of repeated disturbance that results in damage to vegetation, and in some cases, because of increased nutrification from human waste and other materials.

Examples of impacts of environmental weeds in the Australian Alps are: alteration of stream ecology (willows); displacement of native species (broom and yarrow); alteration of behaviour of native wildlife, such as feeding (willows and blackberries); alteration of the visual appearance of natural areas (ox-eyed daises, lupins, sorrel, dandelions and yarrow); and changes in soil chemistry (introduced clovers) (AALC undated; Sainty et al. 1998; Johnston and Pickering 2001a, 2001b).

**Walking tracks, native vegetation and weeds**

When providing infrastructure such as walking tracks it is important to take into account environment impacts, as well as direct financial costs and social issues (safety, visitor preferences etc.) (Worboys et al. 2001). For example, there is variation in the impact of different track types on the native vegetation, particularly in relation to the presence of weeds and bare areas. Recent research in the Kosciuszko alpine area compared the impacts of four track types on the native vegetation: (1) unformed trails (former bridle paths or paths formed by tourists walking off hardened tracks); (2) gravel tracks, including both sections of the Summit Road and Charlotte Pass to Blue Lake track; (3) concrete pavers; and (4) raised steel mesh walkway. We compared species richness, bare area and cover of weeds between quadrats located under/on the track, on the verge and in the adjacent native vegetation (Hill and Pickering Draft manuscript).

Seven species of weed were associated with paved and gravel tracks: sorrel (*Acetosella vulgaris*), dandelion (*Taraxacum officinale*), flatweed (*Hypochoeris radicata*), white clover (*Trifolium repens*), browntop bent (*Agrostis capillaris*), Muller’s bent (*Agrostis muelleriana*), and swamp bent (*Agrostis sp.*). These weeds formed extensive cover along the verge of the concrete pavers and gravel tracks (40% of verge of pavers were weeds, and 20% of verge of gravel track). Only one weed, the naturalised species sorrel, was found on the verge of the raised metal walkway, (just 0.29% of the verge). However, this is the same as in the adjacent native vegetation. No weeds were associated with the unhardened track.

The total area of disturbance associated with each track type also differed. This has important implications for management decisions about new tracks or the upgrading of existing tracks. For each kilometre of unhardened track there was 266 sq. m of disturbed area, mostly bare ground on the footpad itself. If the unhardened track were to be replaced by pavers, then the area of disturbance (weed cover and bare ground, including the track) would actually increase ten fold, to 2682 sq. m free of native vegetation per km of gravel track. If gravel were to be used to replace unhardened tracks, then the area of disturbance would be even more, 11 fold greater than the informal track (2942 sq. m free of native vegetation per km of gravel track). For the Summit Road, the area free of non-native vegetation is even greater, at 4292 sq. m. If, however, an unhardened track were to be replaced with a raised steel mesh walkway, then the area of disturbance would decrease by 400%, to only 62 sq. m of non-native vegetation.
(bare areas and weed cover) per km of this track type. Moreover, in the sample studied, this is similar to the amount of bare areas and sorrel cover in the adjacent native vegetation and hence does not appear to be a consequence of disturbance caused by the walking track.

If the New South Wales National Parks and Wildlife Service was to control the extensive weed cover associated with tracks in the alpine area by rehabilitating the verges of the tracks, the cost would be $50,827 per km of paved track, $41,246 per km of narrow gravel track, and $32,078 per km for the Summit Road (using an estimate of $119 per sq. m for rehabilitation, Johnston 1998). There is no need for rehabilitation to control weeds for the raised steel mesh walkway. Clearly, if the cost of weed control (estimated as cost of revegetation) during use of the tracks is incorporated into their total cost then, even though the cost of construction of the raised steel mesh walkway is initially greater than that of gravel (Harrigan 2001), the total cost of this option is cheaper than that of other track types. In addition, it has far fewer negative impacts on the environment. This cost effectiveness becomes even more apparent if estimates of future removal of any of the tracks are taken into consideration. The cost of just rehabilitating the area of disturbance associated with the surface of the gravel or concrete pavers tracks is substantial. For the Summit Road it would be around $510,600 per km, while for a narrower gravel track it would be around $153,900 per km. For the raised steel mesh walkway little or no rehabilitation would be required, because the vegetation cover under and adjacent to the track is equivalent to the native vegetation.

What to do?

Currently, much of the control of weeds in the Australian Alps is by herbicide spraying, which is expensive, has limited success for some weeds, and may harm native vegetation (AALC undated; Forman and Alexander 1998; Sainty et al. 1998; Sanecki 1999). More recently, biological control programs have been introduced for weeds such as broom, St Johns Wort, Paterson’s Curse and blackberry (AALC undated). Also, parks agencies are encouraging resorts to use indigenous plantings rather than exotic plants, both on ski slopes and in the gardens (Pickering et al., In press). Active rehabilitation of previously disturbed areas is also critical for weed control (AALC undated; Parr-Smith and Polley 1998). While this tilts the ecological balance in favour of native vegetation, it can be expensive. In addition to these measures, we feel that careful selection of tourism infrastructure options is crucial. This should be based on a greater appreciation of the environmental and financial cost that can be incurred, in terms of disturbance to native vegetation and the introduction and establishment of weeds, when one form of infrastructure is chosen over another.

Acknowledgements

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Abstract

The Australian Alps and high mountain ranges yield relatively small total amounts of water to our streams and rivers but as the driest inhabited continent on earth this small yield contributes much to the quality of life of almost all Australians. As well as being the headwaters of the largest permanent flowing rivers in south-eastern Australia the catchments of the Alps and high mountains are also the catchment for thousands of tourists, bushwalkers and backpackers, and people seeking recreational, educational and inspirational pursuits.

As with other major continental mountain catchments around the world, the Alps and high mountain catchments of south-eastern Australia (and Tasmania) are also ‘catchments’ for biological diversity and centres of endemism, particularly that of the alpine plants. These mountains have also been the ‘catchment’ for thousands of years for the ceremonial activities of Aboriginal people, and for the past 180 years, European people, utilising the natural resources abundant in the high mountain and alpine environments. The mountain catchments play a very significant role in the social and economic well-being of Australian society.

Introduction

Mountain areas make up 24 percent of the earth’s land surface and support approximately 28 percent of the world’s closed forests. Some 550 million people live in high mountain areas around the world, being an integral part of mountain environments. A further two billion people have a close affinity with or attribute some form of deity to high mountain peaks, or have some reliance upon mountains, particularly the mountain catchments for drinking and irrigation water, hydro-electricity, recreation and education, and their physical well-being. Mountain areas around the world are usually considered in terms of being the headwaters of major rivers and the water yield they provide – the water towers of the world.

But mountain catchments are more than water catchments, as they are ‘catchments’ for biological diversity, plant and animal endemism, and significant ecosystem functions and environmental services. Mountains are also catchments for other cultural, recreational, spiritual, social and economic values. These values are a response to the very geographical features that define mountains – ruggedness, remoteness, extreme climates, soil and vegetation zonation and plant species diversity in both form and adaptation to the ecological extremes under which they have evolved.

Mountain areas around the world usually constitute a relatively small proportion of river basins, yet they provide the greater part of rivers flows downstream. Like other continents this is also the situation in Australia.
As the demand for fresh water increases, the potential for conflict over the source, yield and subsequent use of water from mountain catchments grows. While there is no potential international conflict over water resources in Australia, there is increasing conflict over the equitable sharing of water between environmental and commercial demands, and the sustainable use of water.

In the past the grazing of domestic stock in the Australian alpine catchments resulted in extensive disturbance and degradation of the native vegetation cover and over large areas, severe soil erosion. Grazing has now all but ceased in the alpine catchments, only occurring in several areas in the southern part of the Alps in the State of Victoria.

The grazing impacts have been replaced by the increasing development taking place within the mountain catchments, to provide for tourism and recreational activities. This is placing a renewed pressure on the soils, vegetation and water yields of the catchments. Management conflicts are increasing, hence careful management of mountain water resources must become a national (and global priority) in a world moving towards a water crisis in the next century.

Alps catchments for water yield

The world’s total freshwater reserves are in the order of 36 million Km\(^3\) but the rivers and lakes of Australia, hold and carry only about 0.007 percent of this total fresh water (34.5 billion m\(^3\)), or less than 9 percent of the annual flow of the Amazon.

The high mountain catchments of southeastern Australia cover a little over 25000sq km with 5200sq km being within alpine and subalpine elevations. (snow-covered for 1 to 3 months). These catchments are very efficient in capturing and delivering to rivers and streams, over several months, up to 1000mm of the annual total precipitation of 1800 to 2500mm. The catchments yield the greater part (approx 65% or 8000 to 10000 gigalitres) of the inflow to the Murray, Murrumbidgee and Snowy River systems. Of this water yield, 3780 GL of the Murray River flows are diverted to off-river uses and 2350 GL from the Murrumbidgee River. The bulk of the water is used for irrigation (approx 95%) with the remainder being used for stock and domestic requirements and for industrial use.

The Murray River catchments

The Murray River has its source about 45 Kms southeast of Mt Kosciuszko. The major NSW tributary rivers are the Swampy Plains River and the Tooma River which also arise in the Alps. The major Victorian mountain tributaries are the Mitta Mitta River and the Kiewa River. The Hume Dam on the Murray River and Dartmouth Dam on the Mitta Mitta River above Hume Dam store and regulate the downstream delivery of flows for irrigation, urban use and environmental purposes.

The mountain catchments above Hume Reservoir cover less than 1.5% of the total Murray-Darling Basin but yield about 38% of the total annual inflow to the Murray. About one third of the water yield is from the Mitta Mitta catchments in the Victoria alpine area and two thirds from the upper Murray catchments in the New South Wales alpine area. The total annual flow in the Murray is very low by world standards, for example the average annual flow is less than 3.5% of that of the Mississippi River and less than 0.25% of the Amazon. Approximately 66% of Murray River flows are diverted annually, providing water for irrigation over approximately 700000 ha. along the river downstream of Hume Dam.

Murrumbidgee River Catchments

The Murrumbidgee River rises in the Snowy Mountains north of Mt Kosciuszko where the headwaters are captured by Tantangara Dam and diverted to Eucumbene Dam from which is released for hydroelectric generation through the Murray and Tumut River systems.

The largest dam downstream of Tantangara Dam is Burrinjuck Dam, which stores, and regulates releases of approximately 1026GL annually to the Murrumbidgee and Coleambally Irrigation Areas and several smaller adjoining irrigation areas. The major tributaries to the river above Burrinjuck Dam are the Numeralla, Bredbo Goodradigbee, Cotter, Molonglo and Yass Rivers. Below Burrinjuck Dam the major
tributary is the Tumut River which contributes natural flows and that diverted through the Snowy Mountains Hydroelectric Scheme from the upper Murrumbidgee and Snowy Rivers, into Blowering Dam. This Dam stores 1628GL of natural river flows, and additional waters released from the Snowy-Tumut section of the Snowy Mountains Hydroelectric Scheme.

The irrigation agriculture industry is the greatest user of water from the regulated Murrumbidgee River with the annual volume of water diverted for consumptive use being in the order of 2350 gigolitres or approximately 50% of natural flows. Approximately 2800 ‘irrigation’ farms, covering some 561000 hectares occur within these irrigation areas, with around 150000 hectares being irrigated each year.

At the lower end of the Murrumbidgee River the Lowbidgee Irrigation District covers an area of some 400000 ha. encompassing a floodplain area in excess of 160000 hectares, including large areas of significant riverine wetlands.

**Catchments for Hydro-electricity generation**

The Alps and high mountain catchments provide water to two hydroelectric schemes, the Snowy Mountains Hydroelectric Scheme in New South Wales and a smaller scheme, the Kiewa Hydroelectric Scheme in Victoria.

The much larger Snowy Scheme has an installed capacity of 3740000 kilowatts with an annual output of 5000 million kilowatt hours. It utilises almost 2500GL of water annually which is then stored and regulated for irrigation use.

**Social and Economic benefits of water diversion**

A very large and significant economic benefit accrues for the community from power generation and the agricultural production from the irrigation industries. The annual farm-gate returns from irrigation farming in the Murray and Murrumbidgee Valleys are in the order of $1.8 to $2.5 billion annually. The irrigation industries also contribute greatly to the quality of life and well-being of the rural and urban populations (almost 300000 people) along the rivers, as well as those of Sydney, Melbourne and Adelaide, through the provision of many everyday food products.

More than two million people depend directly on the Murray and Murrumbidgee Rivers for domestic water supplies with a further 250000 dependent on the major tributaries for water supplies. South Australia as the driest State is almost totally dependent on the Murray River for its further economic development.

Over 50% of South Australia’s water is diverted from the Murray, and piped to Adelaide, Port Pirie, Port Augusta, Whyalla, the Yorke Peninsula and towns as distant from the river as Woomera and Keith. In drought years up to 90% of South Australia’s water demands are met by diversion from the Murray River.

Hydro-electricity generated from waters captured in the Alps catchments contributes a small but very significant amount (approx 500000 kilowatts) to the national electricity grid, this being valued at approximately $175 to $250 million annually. The significance of the hydroelectric schemes lies not in the dollar value of the electricity generated but the ready contribution the schemes make to peak load demands.

The mountain catchments as such contribute greatly to the economic well-being of society but the catchments are more than water catchments, being ‘catchments’ of significant biomes, native plant species diversity and endemism. They are also catchments of some unique plant and animal adaptations to extreme environmental conditions.
**Mountain Catchment Biomes**

As with mountain areas around the world the Australian Alps biomes are unique – the combined effect of rapid changes in altitude, climate, soil and vegetation over very short distances make them different from other biomes. An indication of the extreme climatic variation exhibited in all mountainous areas is that a rise in elevation of 100 metres is comparable to about 100 kilometres change in latitude. The rapid rise in elevation is sufficient to produce altitudinal zonation in the vegetation communities, particularly that evident in the zonation of the dominant Eucalypts, with different species occurring in defined elevation ranges and aspects.

**Catchment biological diversity**

Mountains are biologically diverse and of the 187 world centres of biological diversity more than half occur in mountain regions (Davis et al, 1995). The Australian Alps are identified as one of these centres with more than 500 plant species occurring within the Alps catchments of which 380 occur in the alpine and subalpine zones.

Plant endemism is high in all mountain regions around the world, (about 5%), but plant endemism in the Australian Alps at approximately 11% (Good 1992), is of particular note in comparison to other continental mountain regions. The Alps flora, particularly the alpine zone flora is unique on a world scale as it differs greatly in botanical composition, the level of differentiation, species richness and internal botanical zonation. Below the very diverse alpine zone the flora is dominated by a single genus (Eucalyptus), which has adapted to conditions from the highest elevations of the subalpine zone (the treeline) to the coast; this adaptation to the full elevation range and environmental conditions by a single genus is unique in the world floras.

The eucalypt woodlands, particularly at the higher elevations play a very significant role in the capture of precipitation and hence water yield, and in the stability of much of the mountain catchments.

While the number of native fauna species is low, which contrasts with other continental mountain areas, eight fauna species are endemic to the alpine and subalpine zones. Several of these species have restricted distribution ranges in the Alps catchments, eg Mountain Pygmy Possum Burramy parvus, Corroboree Frog Pseudophryne corroboree and Broad-toothed Rat Mastacomys fuscus. The Alps catchments as such capture, protect and maintain a unique genetic resource, but mountain catchments are more than water and biodiversity catchments; they are catchments for human enjoyment, recreational and educational use, and inspiration.

**Educational and recreational – catchment opportunities**

The diversity of the mountain landscapes provide for a wide range of recreational, educational, cultural and inspirational opportunities. The Alps attract and capture some 3 to 4 million visitors each year in pursuit of these opportunities.

The Alps have also been a catchment for much scientific research over the past 100 years and are now arguably, the most researched natural area in Australia. Over 2500 scientific and technical papers have been written on research undertaken within the Alps and this research has contributed greatly to ecological understanding and the establishment of principles for ecological sustainability in Australia.

**Environmental resources and benefits**

The natural systems of the Alps catchments are very significant and in many ways unique in the context of world mountain areas. A defining feature of the Alps catchments is the well developed soil cover which exists over almost all areas, to the highest peaks. This deep organic soil cover of the alpine and subalpine zones plays an important role in catchment hydrology.

The groundwater communities, the fen and bog areas where deep organic peatbeds have developed, are particularly significant in the storage and slow release of snowmelt waters to the streams and rivers and
ultimately to the hydroelectric schemes. The catchments are very stable under this complete soil and vegetative cover, but very minor impacts from external influences can lead to rapid deterioration of the ecosystem services that they provide. In the lower mountain catchment areas where eucalypt forests and woodlands dominate the landscape, the heavy ground litter layer provides a similar ecosystem service in terms of water yield and water quality. The water yield from the catchments provides for thousands of hectares of wetland watering and floodplain inundation downstream on the riverine plains. The environmental services / benefits provided by functional natural wetlands have been estimated to be valued at up to $1500 to $2000 per hectare or an estimated total economic benefit to society of up to $400 million.

**Catchment management**

Catchment stability and functionality are very sensitive to disturbance from factors, particularly where these are continuous or concentrated eg grazing, recreational activities, development sites, and changed fire regimes. Fire, due to the extensive nature of occurrence, poses the greatest threat to mountain catchment stability and the natural ecosystem services they provide.

Grazing has almost gone from the high mountain catchments but the increasing pressure of visitation and recreational activities has replaced grazing as a major detrimental impact influencing the long-term functionality of catchments and the ecosystem services they provide.

Several notable catchment rehabilitation and ecological restoration programs have been achieved over the past 40 years (Good 1992, 1999) and the rehabilitated catchments must not be allowed to degrade again under the pressure of human use. While the catchments are ‘catchments’, for water and human use the management of both without detriment to the natural catchment values is essential if society is to continue to benefit from the mountain catchments.

Many lessons have been learnt from past inappropriate management and the successful rehabilitation / management programs and these must continually be addressed in future mountain catchment management

**Summary - mountain catchment values**

Mountain catchments have many recognisable values and provide or contribute to many ecosystem services of economic and social benefit to society. The value of maintaining and protecting mountain catchments can therefore be recognised in a number of ways:

- through the natural physical features and biota, and the cultural history which provide for recreational, educational and inspirational opportunities. Mountain recreation and tourism is estimated to be valued at up to $750 million annually.
- in terms of the value of the water yield - water is now a tradeable commodity and at an average figure of between $40 and $120 per megalitre, the catchments can be valued at a minimum of $400 to $500 million annually, for water yield alone.
- in terms of the value of health and well-being of a large proportion of the community that utilise the mountains, which is estimated to be in the order of $100 to $200 million annually.
- in terms of the value of hydroelectricity generated (up to $250 million annually)
- in terms of agricultural production from irrigation farming, valued at up to $2.5 billion annually
- in terms of ecosystem services - functional wetlands provided for by discharges from mountain catchments alone are valued at about $400 million annually
- in terms of the total economic and social benefits estimated to be in the order of $4.5 to $5 billion dollars annually.
Reference


Snowy Mountains Hydro-Electric Scheme: Corporatisation and the Way Ahead

Nicole Shotter and Carol Bruce

Nicole Shotter, Principal Snowy Hydro Liaison Officer, NSW National Parks and Wildlife Service
Carol Bruce – EMP Project Manager, Snowy Hydro Limited

Abstract

The Snowy Mountains Hydro-electric Authority (SMHEA) was established as a Commonwealth statutory authority in 1949 to construct, operate and maintain the Snowy Mountains Hydro-electric Scheme, much of which is located in the Kosciuszko National Park (KNP). From 1949 to 28th June 2002, the scheme remained under Commonwealth control and was not subject to NSW legislation.

As part of the national electricity market reform, in 1993 the Council of Australian Governments (COAG) agreed to corporatise the SMHEA. On 28th June 2002 corporatisation was achieved, creating the company Snowy Hydro Limited (SHL).

The activities of SHL have been subject to NSW legislation since 28th June 2002. With this in mind, a series of agreements between the NSW National Parks and Wildlife Service (NPWS) and SHL were developed through the corporatisation process of the past few years. These agreements, known as the KNP Package, are designed to provide a framework for the on-going management and operation of the scheme.

The ongoing and future relationship between NPWS and SHL is firmly focused on managing the iconic Australian resource that is the Scheme in the equally iconic fragile mountain environment of KNP.

Snowy Mountains Hydro-Electric Authority And Corporatisation

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KNP Package, are designed to provide a framework for the on-going management and operation of the scheme.

The KNP Package includes:

- Snowy Park Lease and Schedule of Existing Developments (administered by Planning NSW);
- Snowy Roads Maintenance Agreement;
- Snowy Management Plan;
- Minor Former Scheme Sites Deed; and
- Major Former Scheme Sites Management Deed

In addition to the KNP Package, approximately 35 documents were developed as part of the corporatisation process in various other packages:

- Corporate Package
- Water Package
- Debt Package
- Tax Package
- Transfer Orders
- Transmission Undertaking Package
- Blowering Package
- Miscellaneous Package

Of particular interest is the Water Package, which includes the Snowy Water Inquiry Outcomes. The Snowy Water Inquiry Outcomes include the return of environmental flows to the Snowy River below Jindabyne Dam and montane streams within KNP. The Department of Land and Water Conservation is the NSW agency responsible for administration of the water agreements.

Of the KNP Package, the Snowy Park Lease and Roads Maintenance Agreement are principally commercial documents.

The Snowy Park Lease provides tenure for SHL’s operations and in association with a Schedule of Existing Developments (SED) details all of the scheme’s current developments and activities. All activities listed within the SED are ‘deemed’ by the Snowy Hydro Corporatisation Act 1997 (NSW) to have complied with Part 5 of the Environmental Planning and Assessment Act 1979 (NSW). SHL therefore do not require approval from the NPWS to undertake the activities listed within the SED.

The Roads Maintenance Agreement provides for the maintenance arrangements of those roads used by SHL within the park, whether they may be public, park management or snowy exclusive roads. The agreement includes a set of road maintenance guidelines which detail how both organisations must undertake road maintenance works on roads listed in the agreement.

The remainder of the documents in the KNP Package, the Snowy Management Plan and two former scheme site deeds, are the focus of this paper and are presented in detail below.

Each of the day to day operational documents between NPWS and SHL (Lease, Roads Agreement and Snowy Management Plan) has an associated committee, comprised of NPWS and SHL personnel. The role of each of the committees is to guide the ongoing relationship between NPWS and SHL and manage any issues as they may arise. The committees aim to continue the cooperative working relationship that has been established between NPWS and SHL in past years.
**Snowy Management Plan**

The Snowy Management Plan (SMP) is a plan of management under Part 5 of the *National Parks and Wildlife Act 1974* (NSW) and recognises that the current Kosciuszko National Park Plan Of Management (KNP PoM) did not adequately provide for the existence and operation of the scheme within the park. The SMP and KNP PoM are related documents and reviews of either must recognise the content of the other. The SMP however, deals exclusively with the operation of SHL in the park.

The SMP places general obligations (with respect to maintenance of developments and fire response) on SHL as well as the obligation to develop an environmental management plan (EMP). The purpose of the EMP is to address how SHL will environmentally undertake the activities listed within the SED i.e those activities ‘deemed’ to comply with Part 5 of the EPandA Act, commensurate with the location of the activities within a national park.

The EMP must:

- contain clear accountability for its implementation;
- demonstrate that an environmental assessment identifying environmental risks has been undertaken and a subsequent programme for risk reduction has been implemented; and
- demonstrate that a performance monitoring programme is in place.

In addition, SHL must:

- base the EMP on sound and credible information;
- improve the EMP; and
- with NPWS, monitor the effectiveness of the EMP.

The EMP is to be a 15 chapter plan which will be developed by SHL and reviewed and approved by NPWS. Development is to be staggered over the next three years, with all chapters completed and implemented by June 2005. The EMP requires SHL to detail how it will meet environmental obligations and responsibilities for the 15 chapter issues. The NPWS will be able to enforce the approved EMP through an associated regulation. The existing *National Parks Regulation 2002* (NSW) may also be applied to SHL activities within the park.

The 15 chapter headings of the EMP are:

- Aboriginal Heritage
- Aircraft Management
- Emergency Management (including fire management)
- Exotic Species (flora and fauna)
- Historic Heritage
- Public Health
- Water Quality
- Threatened Species and Significant Features
- Tourism, Recreation and Public Use
- Cabramurra
- Tunnel/aqueduct maintenance including desilting
- Road Maintenance
- Operational spoil dumps and quarries
- Landscape (including soil and vegetation management)
General environmental management

For each EMP chapter, the SMP details the NPWS management objectives for the scheme and the minimum content required in the first draft of the chapter (refer to Figure 1). Where possible, the chapters focus on NPWS and SHL cooperative activities. These activities are generally aimed at implementing Park wide strategies for the various issues.

This approach is highlighted in the exotic species chapter with the requirements for SHL to develop:

- a strategy to manage noxious and environmental weeds in accordance with NPWS priorities and strategies;
- a statement of NPWS and SHL cooperation with respect to exotic species management; and
- notification procedures between NPWS and SHL.

To ensure the final content of the chapters provides the maximum benefit to both NPWS and SHL, development of the chapters is being undertaken in a cooperative manner. Both organisations have developed small dedicated teams for each individual chapter and these teams meet and communicate as required.

As adoption of the EMP is to be staggered over the first three years of corporatisation, the SMP also places interim obligations upon SHL with respect to ‘deemed’ activities. These obligations stipulate that from the date of corporatisation until approval of the relevant EMP chapter, SHL must comply with all laws and accepted current practices.

To ensure that the EMP remains relevant, the SMP stipulates a time frame and process for the subsequent reviews of each chapter. The timing of the review process varies based upon the subject matter of the individual chapter. For example, the chapters on emergency management, public health and water quality must be reviewed every second year. In comparison, the chapters on operational spoil dumps and quarries, and general environmental management need only be reviewed every ten years. Provision has also been made for chapters to be amended more frequently should both NPWS and SHL agree that such an action is required.

All new activities proposed by SHL, ie any activity that is not listed within the SED, must be the subject of an application for approval in accordance with the requirements of any applicable law.
<table>
<thead>
<tr>
<th>Chapter 4: Exotic Species (Flora and Fauna)</th>
<th>General</th>
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<tbody>
<tr>
<td>1. To control and contain the spread of exotic species within the Areas.</td>
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<td>2. To prevent the replacement of native species by exotic species within the Areas.</td>
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<td>3. A summary of:</td>
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<tr>
<td>a) the Laws applicable to the containment and control of exotic species, pest animals and weeds species within the Areas; and</td>
<td></td>
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<tr>
<td>b) the noxious and environmental weed species within the Areas.</td>
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<tr>
<td>4. A strategy to control and manage noxious and environmental weed species in the Areas developed in accordance with NPWS weed management priorities and strategies within the relevant management units.</td>
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<tr>
<td>5. A strategy to minimise and control the planned and accidental introduction of exotic flora species into the KNP that:</td>
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<tr>
<td>a) Specifies procedures to minimise disturbance to the natural environment within the Areas when the Company carries out operations including road works, quarrying, construction and maintenance;</td>
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<td>b) Includes an appropriate revegetation policy for the Areas; and</td>
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<td>c) Includes procedures for minimising chance introductions of plant materials or pathogens, including procedures for machinery wash down and the use of seed free materials.</td>
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<tr>
<td>6. A plan for the control of exotic fauna within the Areas that specifies:</td>
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<tr>
<td>a) the procedures the Company will adopt to identify, minimise and control exotic fauna species including rabbits, starlings, goats, deer, non-native rats, house mice, foxes, cats and oriental weather loach; and</td>
<td></td>
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<tr>
<td>b) the Company’s participation in co-operative management of trout in any conservation streams specified by NPWS.</td>
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<tr>
<td>7. A statement as to how NPWS and the Company will cooperate in relation to the management of exotic species.</td>
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<tr>
<td>8. Notification procedures between NPWS and the Company with respect to all the matters above.</td>
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<th>Fauna</th>
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<tr>
<td>3. To reduce the impact of pest animals on native animals and their habitat, and native flora in the Areas.</td>
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<tr>
<td>4. To minimise disturbance, destruction and displacement of native fauna by exotic fauna in the Areas.</td>
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<th>Flora</th>
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<tr>
<td>5. To contain and control the spread of weed species in the Areas.</td>
</tr>
<tr>
<td>6. To minimise loss of habitat for fauna species within Areas.</td>
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</tbody>
</table>
**Former Snowy Scheme Sites**

The corporatisation project identified numerous former scheme sites within the park. These sites have resulted from the construction period of the scheme and the majority still require some form of rehabilitation. Required rehabilitation ranges from the need to remove a snow pole to extensive geotechnical rehabilitation of large spoil dumps and quarries.

Of the 400 or so former sites, 36 have been designated as ‘major’ sites requiring extensive rehabilitation. The remainder are designated ‘minor’ sites and require rehabilitation to a lesser degree. A major site is generally one that may potentially breach NSW legislation. Minor sites are not thought to breach NSW legislation.

During the corporatisation process, the three corporatisation governments (State of New South Wales, State of Victoria and the Commonwealth of Australia) agreed that NSW and more specifically NPWS were responsible for managing the land and any rehabilitation works required, and for any liability arising from either major or minor former sites. The exception is any liability arising under the *Contaminated Land Management Act 1997* (NSW) due to the scheme’s occupation of the site, for which SHL retains responsibility.

The minor sites category includes areas such as snow courses, weather stations, passive reflectors, radio stations, communication cables, roads, transmission lines, former works centres/depots, former townships/camps/construction sites, sand blasting areas, waste disposal areas, borrow pits, quarries and spoil dumps.

The predominant issue on minor sites is weed invasion, however other issues such as waste removal, erosion and native revegetation will need to be addressed on many sites. NPWS operational staff and contractors will undertake the rehabilitation of minor sites.

The major sites category includes areas such as spoil dumps, quarries, a former township and a waste disposal area. An independent investigation designated the major sites as potentially breaching NSW legislation. Issues identified include stability, erosion and sediment transport, hydrology, water course, water quality, flora and fauna, noxious and environmental weeds, solid waste, heritage, visual amenity, access during rehabilitation works, safety during rehabilitation and disposal/importation of material.

The investigation suggested an initial estimate of $78 million as the cost to rehabilitate the major sites to an agreed level based on what rehabilitation could potentially be undertaken in a practical sense. The NSW and Commonwealth agencies involved in the investigation acknowledged at the time that it would be extremely difficult and require an extensive financial input to rehabilitate the sites back to a standard commensurate with the surrounding national park.

As part of the corporatisation process, SHL is required to pay the NPWS $32 million towards the rehabilitation works for both major and minor sites; $25 million for major sites and $7 million for minor sites.

The difference between the potential original rehabilitation costs and the funding actually received poses a significant challenge for NPWS. The challenge will be to develop a program for the major sites that will achieve the best environmental outcome possible for the park within the funding available. It is proposed to meet this challenge by undertaking a risk assessment of the major sites as an overall project and basing any rehabilitation works on the results of that assessment.

Due to the size and complexity of the major sites, a dedicated project team will most likely be established to manage the project. In addition to NPWS, other relevant NSW agencies such as Department of Land and Water Conservation, Department of Fisheries, Environment Protection Authority will be involved as required.

Both the minor and major site rehabilitation projects will focus on long term rehabilitation, endeavouring to achieve the best environmental outcome possible across the full range of sites, on the funding provided.
A case study of both minor and major sites, and the range of issues and potential rehabilitation works required, is provided by the Happy Jacks group of sites. The Happy Jacks area is located approximately in the centre of KNP, approximately 2.5 km north of the Jagungal Wilderness area. Five major sites and four minor sites are located immediately adjacent to the Happy Jacks management trail.

The major sites include four spoil dumps and one quarry. Each of the spoil dumps contains material excavated during construction of the Happy Jacks Shaft and Eucumbene-Tumut Tunnel between 1954 and 1959. The spoil dumps range from a vertical height of approximately 30m to approximately 70m. The largest spoil dump has an estimated spoil volume of 300,000 m$^3$. The Happy Jacks Quarry, with an area of approximately 3 hectares, was used to manufacture aggregate for Tumut Ponds Dam, the Eucumbene-Tumut Tunnel, and the Tumut 1 Pressure Tunnel, also between 1954 and 1959.

Issues identified on the four major spoil dumps and single quarry include geotechnical stability, erosion and material transport, on-site hydrology, lack of native revegetation, lack of appropriate material to promote revegetation, weed invasion, watercourses obstruction, potential water quality issues, solid waste, heritage. In addition, associated issues such as access to sites, safety during rehabilitation, material requirements/disposal and data limitations will need to be addressed.

The minor sites include one spoil dump also formerly used as a crusher site by NPWS, a former township and two borrow pits. Issues identified include erosion and surface water run-off (spoil dump), lack of native vegetation growth (spoil dump and borrow pits) and weed invasion (all sites).

Rehabilitation of the major sites and any non-weed issues on the minor sites will likely be undertaken as a single project. The first stage in the planning of the major sites rehabilitation project will be for a risk assessment of all sites to be undertaken. The rehabilitation strategy that is ultimately implemented must be based on a risk assessment approach. Based on such a strategy, there is a potential that large geotechnical works will not be undertaken on the majority of the larger spoil dumps and quarries. Rehabilitation may instead be required to focus on ensuring long term stability of the site, weed management and encouragement of vegetation growth. A large component of the project will likely be long term monitoring of the sites.

The Way Ahead

The relationship between NPWS and SHL is two tiered with NPWS playing the role of both lessor and regulator. To ensure that this relationship works and produces the best environmental outcomes for the park at the same time as the best possible outcomes for the business of SHL, open communication between the two organisations is vitally important at all levels. Both organisations recognise the importance of ensuring the long term viability of the park and the scheme within the park.

The ongoing and future relationship between NPWS and SHL is firmly focused on managing the iconic Australian resource that is the Scheme in the equally iconic fragile mountain environment of Kosciuszko National Park.
Thatching The Roof Of Australia: Landscape Manipulation And History

Dr Michael Pearson

Heritage Management Consultants

Abstract

The conservation of the Main Range area in what is now the Kosciuszko National Park had its genesis, in the large part, in the movement to protect the catchments arising in the NSW Alps. The interests of the NSW Soil Conservation Commission, the nature conservation movement and the Snowy Mountains Authority converged to drive the moves towards grazing restrictions, erosion control and rehabilitation, and national park gazettal over a thirty year period.

The ways in which the history of this long process is recorded and interpreted to visitors to the park, and how the physical evidence of the process are conserved and interpreted, are issues of interest when considering the assessment and management of cultural heritage values of the Alps. The manipulation of the landscape to achieve stable catchments is a matter of fact—the manipulation of the history of that process to hide the role of the human hand in the creation of the current landscape is an ongoing threat.

Background

This paper, which concentrates on the Main Range within Kosciuszko National Park, is based on work undertaken for the Australian Heritage Commission to develop a nomination for the Snowy Mountains Scheme for the Register of the National Estate1. The generosity of Roger Good in sharing his great knowledge and memory is gratefully acknowledged.

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Map 1 - The Main Range showing the location of the treeline (roughly equating with area of soil conservation work)
Snow Lease Paddock To Protected Catchment

Graziers were sending stock into the Snowy Mountains from at least the mid-1830s. Dr Gibson lost a stockman and cattle to a blizzard in the Kiandra area in 1834, and in 1839 T.A. Murray moved cattle from his Yarralumla property through the Brindabellas to the high plains around Coolamine. Summer grazing in the higher snow country became desirable from the mid-1860s, as stock numbers in the surrounding districts grew. By the mid-1880s the mountains could be described by one observer during a dry summer as ‘overcrowded with sheep’. Cattle were increasingly taken into the mountains, able to be run on steeper country than the sheep, and it was mainly cattle that were responsible for the degradation of the Main Range. The grazing was not officially regulated until the passing of the 1889 Crown Lands (Amendment) Act, in which snow leases were established. By 1893 some 81,000 acres of country adjacent to Mount Kosciuszko was divided into 22 snow leases.

The Main Range land surface is commonly covered with loose soil and stones. The soil, thicker than in many other alpine environments, is derived from decomposed granitic rocks and is highly erodable. The elevated exposed location slows and limits plant growth, so that any disturbance of vegetation tends to take a very long time to recuperate. These factors, combined with the considerable slope of much of the land and the prevalence of summer rainfall delivered in heavy downpours, means that exposed soil is rapidly eroded. Once freed of its insulating blanket of vegetation, the soil is far more prone to frost-heave which in turn accelerates erosion.

Map 2 - Scale of cattle movements in 1954-55 season

Hancock 1972: 136

The impact of grazing on the environment of the Main Range was enormous, with stock grazing the native vegetation, trampling and causing drying and erosion of the moss beds and bogs, introducing exotic weeds, and through all this enabling the substantial loss of topsoil through erosion. By the 1940s the high country had large areas of grazed land marked by sheet erosion, and with deep erosion gullies marking the habitual routes of stock movement and of tracks cut by the stockmen’s horses.

A number of converging interests combined to promote the conservation and landscape rehabilitation of the Main Range area. Myles Dunphy had been leading a campaign since the 1930s to have a ‘Snowy-Indi National Park’ created, based on the nature conservation and wilderness values of the area. Schemes to utilise the rivers of the regions for hydro-electric power generation and irrigation purposes went back to the nineteenth century, and were gathering strong support during the early 1940s. The creation of the Hume Weir and reservoir on the Murray River in 1936 led to the first direct moves to protect the upper catchments of the river through their reservation as state forests.\footnote{see Mosley, G. 1992. ‘Conservers of the Australian Alps’, in Scougall, B. (ed) Cultural heritage of the Australian Alps—proceedings of the symposium held at Jindabyne, New South Wales, 16-18 October 1991, Australian Alps Liaison Committee, Canberra: 19-35. Wigmore, L. 1968. The struggle for the Snowy: The background of the Snowy Mountains Scheme, Oxford University Press, Melbourne.}

Utilisation of the upper Snowy River became a policy platform for the NSW Parliament opposition in 1941, and when William McKell became Premier later that year the protection of the Snowy Mountains catchments became a government priority. The head of the Soil Conservation Commission, E.S. (Sam) Clayton, was instrumental in formalising the direction of this policy. Clayton took McKell and the Minister of Lands, J. M. Tully, for a two-week ride through the Snowy Plain area on the Gungarlin River, to stress to them the damage that would be done if a closer settlement proposal then being promoted should go ahead. Clayton argued for the cessation of grazing leases and the transfer of the area to a Board under the Department of Lands administration.

McKell’s immediate response was to instruct Clayton to use the forthcoming review of leases (in June 1943) to achieve a two-thirds reduction in the stocking rate in the high country and to decide a safe carrying capacity for each lease and permissive occupancy\footnote{Mosley 1992; 23-24.}. A Bill for the creation of a State Park followed shortly afterwards. The park idea has been credited in part to the influence of the Director of Physical Education, Gordon Young, who saw it as an opportunity to create a protected playground comparable with Jasper National Park in Canada, but the genesis of the idea leads back to Myles Dunphy’s campaign.\footnote{Mosley 1992; 24.}

On introducing the Bill in 1944, Minister Tully emphasised three principles:

the permanent preservation of all water catchments in the Park;

the permanent reservation and development of the Park for recreation and the enjoyment of the people; and

the controlled use of the park for pastoral purposes, consistent with the first two principles.

From 1944 onwards the battle to remove grazing from the park was fought mainly from a catchment protection perspective, though strongly supported by the nature conservation objective. Ironically, the State Park Trust argued for the continuation of the high altitude snow leases in the face of mounting opposition, because lease fees was one of the few sources of revenue available to it through the Department of Lands.

A key factor reinforcing the need for catchment protection and rehabilitation was the advent of the Snowy Mountains Scheme, and of the Snowy Mountains Authority which had the political clout and financial resources to implement its objectives. The long history of plans for hydro-electricity and irrigation water...
systems in the Snowys resonated in the context of planning for post-WWII reconstruction. The Commonwealth Government in 1946 directed officers of the Departments of Works and Housing and Post-War Reconstruction to investigate the proposal put forward by O.T. Olsen of the State Electricity Commission of Victoria. The recommendations of that investigation led to the setting up in late 1947 of the Commonwealth / States Technical Committee to pursue the proposals for utilising the waters of the Snowy and Murrumbidgee for power generation and irrigation. The key aspects of post-war reconstruction, of which the Snowy Scheme was to be a major component, were to include:

- the maintenance of full employment by judicious use of public works, of which the Snowy Scheme was to be the prime example;
- the promotion of economically viable agriculture (while placing 9,000 ex-servicemen on the land), of which the Snowy-fed irrigation schemes were a part;
- bolstering manufacturing by tariff barriers, but also by facilitating the required infrastructure, such as a guaranteed power supply substantially augmented by the Snowy Scheme; and
- the use of immigration to stimulate overall development, targeting continental Europeans, many of whom went straight to the Snowy Scheme.

After much debate and political posturing by the states about the various options for the extent of the scheme, a plan was finally adopted by the Committee in November 1948, and the recommendations of its report were approved by the relevant Governments in July 1949. The Commonwealth’s Snowy Mountains Hydro-Electric Power Act came into force on 7 July 1949, bringing into being the Snowy Mountains Hydro-Electric Authority (SMHEA).

William (later Sir William) Hudson and the other Commissioners of the new Authority were keenly aware of the risk to the Scheme from siltation of its dams, and took action to reduce erosion from construction sites by cleaning them up after use.

Sam Clayton worked closely with the Authority, and Hudson, to broaden their understanding of the erosion issue, and it is this prompting that led to Hudson’s strong support for the cessation of grazing in the high country. The two men combined in the campaign to stop renewal of leases in the high altitude areas (above 1370 m) in 1958. The SMHEA overcame the State Park Trust’s reluctance to forgo the revenue from snow leases by making up the cash shortfall, though in a clever twist it was agreed that the Authority’s contribution would be transferred from the State Park to the Soil Conservation Commission to do erosion control and rehabilitation work in the Park.

The success over the snow lease issue, however, was not the end of grazing—the State Park did not have the staff to patrol the park, and the ban was virtually ignored by many graziers. It was not until 1969 that grazing was finally made illegal within the Park, when the new National Parks and Wildlife Act, with stronger land management teeth, came into force, and the last leases were not terminated until 1972.

Erosion Control and Revegetation

The history of rehabilitation and revegetation of the high country has been one of trial and error. Work by the Soil Conservation Commission (SCC) started in a small way in 1959, and increased considerably by 1962, funded by the SMHEA contribution to the State Park coffers, which were transferred to the SCC programs. Initial surveys found that some 5,560 hectares of minor to severe sheet erosion occurred along

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13 based on Good 1996 and personal communication 29/8/00.
the Main Range between Dead Horse Gap and the Schlink Pass Road, the worst areas being between Mt Kosciuszko and Mt Twynam.\textsuperscript{14}

Initial attempts utilised standard soil conservation solutions developed for agricultural lands, involving contour banks and drains, rock-paved drains, and the sowing of European exotic grasses and clovers. The rehabilitated area was fertilised, and mulched with sterilised hay, which was held down with galvanised wire netting pegged into place. The first area worked on, and most effected by this technique, was around Carruthers Peak, where evidence of the approach can still be seen on many slopes. It was found that the high fertiliser rate inhibited the growth of native species adapted to low-nutrient levels, and actually caused native species to die back from the revegetation areas. The mulch, if applied too early in the season, insulated the soil and prevented its warming, inhibiting germination of seed, and the high humidity in the mulch contributed to fungal growth which attacked native seed. It was later found that another problem with the method was the release into the soil of zinc from the galvanised wire netting, causing zinc toxicity in soils with normally a very low level of the element\textsuperscript{15}. Early experiments on the slopes of Mt Carruthers also investigated the potential of tree propagation. A plot of *Pinus mugo* was planted, stunted specimens of which survived for 30 years before their removal.

\begin{figure}[h]
\centering
\includegraphics[width=0.8\textwidth]{image1.png}
\caption{Stone-lined contour bank and drain on Main Range walking track, Carruthers Peak, 2002}
\end{figure}

\textsuperscript{14} Irwin, F. 1991. *Above the treeline: how the high country was rescued*, Soil Conservation Service of NSW, Sydney.
\textsuperscript{15} Good 1996
By the late 1960s it was recognised that the use of exotic species was not a viable long-term solution in the high country, neither practically nor philosophically. Native plant propagation trials started in 1967, and between 1969 and 1972 some 500,000 peat pots of montia (*Neopaxia spp*) were over-planted on stabilised areas. It was then found that direct planting of small amounts of sod was just as successful as planting propagated stock, and later still that seeded mulch also worked.

Improved techniques were introduced as the soil conservation and revegetation work moved slowly north along the Main Range in the period between 1959 and 1973. The overall area needing such work extended from Mt Kosciuszko to the Bulls Peak area 35 km to the north, and 10 km east to the Ramshead and Perisher Ranges. New methods of holding down the mulch were tried, including black steel mesh, paper netting, plastic polymers, biodegradable nylon netting and water soluble anionic bitumen. The latter proved to be the best solution, consolidating the mulch long enough for the enclosed seed to germinate and become established, then breaking down over two or three years. The use of rock drains and dams in eroded water courses was replaced where feasible with jute mesh and sod laying\textsuperscript{16}.

The Carruthers Peak area was revisited late in the program, and some areas of wire mesh were removed, and native species over-planted. Most exotics have now disappeared and been replaced by natives, though some white clover and exotic fescues survive, and Caucasian clover has become a pest species\textsuperscript{17}.

The mark of successful soil conservation and revegetation work is that it is not noticed, and this is generally the case with the high country rehabilitation works. Apart from rock-work in erosion gullies (most of which is now buried by silation), most rehabilitation work is invisible to the casual observer. However, the evidence is still there to be seen in the landscape if the right information is provided to the observer.

In a number of areas, but on Carruthers Peak in particular, can be found areas with decaying wire and later fabric netting, revegetated contour drainage banks, some stone lined, still visible on the slopes, and the many steel stakes used as monitoring reference points. These features are clearly seen, for example, from the Main Range track above Blue Lake and across Carruthers Peak.

\textsuperscript{16} Roger Good, pers comm 29/9/00
\textsuperscript{17} Roger Good, pers comm 29/9/00
The landscape has been stabilised, but, as Roger Good points out:

‘...it will be many years before the full diversity of native species is to be found in each rehabilitated vegetation community. In a number of sites, such as the erosion feldmark areas, stable feldmark-like communities have replaced tall alpine herbfield communities. Thus these changes have led to the creation of a mosaic of vegetation communities somewhat different to the pre-grazing communities. While a stable native vegetation does exist in the restored fen and bog communities it will be decades before these bogs and fens recover their functional capacity in terms of groundwater storage and slow release of water to the streams and rivers.18

Good also points out that maintenance of the rehabilitation work, necessary for the long-term recovery of the alpine areas, has lapsed over the last five to ten years, leading to decline in the native vegetation cover, and the start of active erosion in a few locations.

Acknowledging the history of conservation on the Main Range

From the heritage assessment viewpoint, the substantial erosion control and revegetation work along the Main Range has considerable historical significance. It represents a major shift in soil conservation thinking in coming to grips with an Australian environment and conserving it rather than manipulating it with exotic species. The work is an important part of the overall Snowy Mountains Scheme, and indicates the degree of concern for catchment protection associated with the Scheme’s development. It also is indicative of shifting public and, more importantly, political attitudes to the protection and appropriate use of natural environment areas of high heritage value.

The soil conservation work has had a major impact on the alpine landscape, though most observers would not be aware of it without access to the historical information that makes the signs visible. The work has put a bandaid on the wounds inflicted by grazing, but the underlying scar will take much longer to heal. The simplistic interpretation of the program is that it has returned the Main Range to its natural state. However, this is clearly not the case. The area will never be in the state it was in before grazing, though it will eventually develop the species diversity and ecological and hydrological processes that replicate that state to varying degrees.

In a manner similar to the often blinkered interpretation of wilderness, there is a risk that the Main Range may be interpreted to the public as a ‘natural’ area, and the history of degradation and rehabilitation will be ignored or glossed over. The Main Range is not part of a gazetted wilderness area, but the parallels in thinking are worth considering. The identification of an area as ‘wilderness’ often results in a conceptual and management position that defines an area of land as being devoid of human history and having evolved in the absence human processes, regardless of the demonstrated facts about the human use of the area. Aboriginal landuse practices are simply regarded as part of the ‘natural’ state, regardless of the extent of ecological impact it may have had. Evidence of ‘modern’ human landuse is either ignored or actively removed. Tom Griffiths has argued that the definitions of ‘wilderness’ rely at their core on the look and feel of an area, and that ‘… “wilderness” need not be actually ancient, pristine and timeless; it just needs to seem so.’19

In the case of the Main Range, the undoubted scenic beauty and high natural values of the high country dominate the conceptualisation and interpretation of the area. In that context the historical processes that have led to the present character of the Main Range could be overlooked as irrelevant distractions, or worse, could be actively suppressed in the interpretation of the area to visitors. This tension between natural history and cultural history, and natural conservation and cultural conservation, has been explored by others20.

In trying to see how NPWS is dealing with this tension, I looked at what information about the landuse history and rehabilitation of the Main Range was readily available to the visitor at the NPWS Jindabyne headquarters visitor display, at the Charlotte Pass car park, and on the Main Range Track. The interpretation panels at the Jindabyne Visitors Centre included information about the history and impacts of grazing, but nothing about the post-grazing soil conservation rehabilitation work. Similarly, the NPWS leaflets and brochures available there contained no information about the post-grazing rehabilitation work. Upon asking the very helpful counter staff if anything on the Main Range soil conservation work existed, I was given a very informative and well illustrated brochure put out by the Soil Conservation Service of NSW, but this came from the inside storeroom, and was not available to the passing visitor. At the information shelter at Charlotte Pass, where the track to the Main Range starts, one panel had some information and one photograph about the soil conservation work, but nothing to link this information with what the walker would see on the track. On the track itself there was no information that mentioned the thirty-year rehabilitation program, even where the evidence of that work was most visible and easily interpreted.

While NPWS is clearly not suppressing the history of degradation and rehabilitation, it equally does not appear to rank this part of the history of the area as a very important aspect to impart to visitors. I would argue that a fuller knowledge of the human history and impacts on the Main Range should enrich the understanding of the visitors to Kosciuszko. The history of the recent (150 year +) degradation caused by grazing can be used as a powerful educational message about the fragility of the environments of the Alps (and indeed elsewhere in Australia), and the history of the development of appropriate soil conservation responses can equally be used to demonstrate that good conservation-oriented and research-oriented management is essential if these fragile environments are to survive. The history of the Main Range, if fully told, would highlight for the visitor the need to be continuously alert to future environmental threats to Australia’s mountain heritage.

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Day Two – Mountains For Tourism
No Dogs in the Parks!

Anne-Marie Tenni

Falls Creek Alpine Resort

Abstract

Managing land in a Resort surrounded by the Alpine National Park has many social and environmental challenges for both Falls Creek Alpine Resort, the land manager, and Parks Victoria, managers of the National Park. The key to success is alignment of basic principles, philosophies and ideals both between the Resort and the Park and also within the leaseholders of the Resort. Dog sled rides, weeds, gardens, recreational pursuits, pets, a nature-based or eco-tourism experience, a hot spa, a gourmet meal, a cosy tent and an MSR meal – this paper explores it all with a view to creating good Karma all round.

The land management system in Victoria is principally governed by the Planning Scheme. Much of the recommendations for reserves and parks that we see today resulted from the work of the Land Conservation Council throughout the 1950s and 1980s. These detailed reports looked at attributes of different parcels of land and in particular the flora, fauna and geological values of an area.

This situation is different to NSW where the Resorts lie clearly within the National Park and thus are subject to the provisions of the National Parks Act. However, in Victoria, there are two other “resorts” that do lie within National Park ie: Mt Buffalo and St Gwinear. In Victoria the Resorts have had various development histories, however this talk will focus on the Falls Creek experience.

The land comprising the Falls Creek Resort was originally managed through the Lands Department (now incorporated into the Department of Natural Resources and Environment) who provided the State Electricity Commission (SEC) with a permissive occupancy permit. In 1959 the Falls Creek Tourist Area Management Committee was established and the licensing function was transferred from the Lands Department to the SEC through provision of a Crown Grant to the SEC. In 1984 the Alpine Resorts Commission (ARC) was established. The ARC managed the six ski resorts that we have today. During this time the mandate was for developing the skiing industry and creating year round Resorts where appropriate. In 1998 the ARC was disbanded and replaced with six Alpine Resort Management Boards. This system is in place today where the Falls Creek Resort Management Board is the land manager for the Falls Creek Alpine Resort. Minister for Environment and Conservation appoints Board members directly and also signs off on all site leases. In 1989 the Alpine National Park was declared and this resulted in Falls Creek becoming entirely surrounded by National Park.

Under the Catchment and Land Protection Act, 1984 the Kiewa catchment area is designated as being for the purposes of hydro-electric power generation and water supply. This purpose statement has influenced the way in which the land in and around Falls Creek has been developed.

The SEC had a social conscience in its management of the land resource as evidenced by the guided bus tours of the dam (and hence a desire to maintain a certain water level). Inadvertently there was a triple...
bottom line approach whereby social, financial and environmental aspects were all included in decision making; although the environmental decisions were a product of the times and not terribly environmental by today’s standards. A primary example of this was the way in which emigrant workers were encouraged to plant a wide range of exotic species that were reminiscent of their European homelands. The planting and subsequent proliferation of these exotic species has left a legacy of weed control for today’s land managers. The hubs of these exotic plantings lie around the power stations and villages created for workers ie: Bogong Village, Falls Creek Village and Clover Power Station.

Another major impact on the landscape of the Bogong High Plains has been that of the agricultural industry in the form of cattle and sheep grazing. Sheep grazing ceased in Victoria during the 1940’s as reports of soil erosion problems were documented by the then Soil Conservation Authority and reported in Parliament. The increased disturbance due to grazing has created further niches for weed establishment.

Today there is an increasing emphasis on environmental management in Resorts. In recognition of this many Boards have created an environmental position. At Falls Creek, a Manager Environmental Services was employed and at Mt Buller an Environmental Officer. Other Resorts have incorporated environmental management into the role of the senior operations person. At Falls Creek the creation of a management position is an indication of the emphasis the Falls Creek Board has placed on environmental management.

Falls Creek has the greatest number of permanent residents of all Resorts – a legacy of the SEC. The Village is nestled in the sheltered valley of Rocky Valley Creek and provides a pleasant living environment. Many residents are long term and own lodges that have been operating for over 20 years. There are very divergent views within the community as to what constitutes good environmental management. The main issue challenging Falls Creek’s Resort Management Board is that of creating an alignment of views amongst the many stakeholders involved in the Resort.

Environmental change is being encouraged through the Board’s desire to attain Green Globe certification. Green Globe is an international certification program specifically designed for the travel and tourism sector. In Australia, Green Globe has focused on creating measurable environmental improvements within the travel and tourism sector. The science behind their activities is provided through the partnership with the Co-operative Research Centre for Sustainable Tourism associated with Griffith University.

Falls Creek is unique among the Alpine Resorts in that it is entirely surrounded by National Park. In the past this asset has not been recognized to the fullest extent for the tourism potential it attracts. Traditionally Resorts have targeted the downhill winter skiers and not really promoted the obvious connection with the Park and its natural assets nor made much of an attempt to smooth the transition between Park and Resort. As the Resort moves towards developing into a true all-year round tourism destination greater links between the Resort and the Park are being forged.

Falls Creek is working co-operatively with the Alpine National Park on a number of initiatives. I shall now elaborate on the co-operative programs undertaken so far.

**a) Weed control**

The history of European settlement in the Resort and the legacy of the hydro-scheme workers have created a landscape of bright, colourful exotic species. In 2000 the Resort engaged Ecology Australia, Geoff Carr and Andrew McMahon, to undertake a survey of the Resort and develop an exotic flora code. The survey revealed around 250 exotic species and divided these into three schedules: Environmental weeds with a known ability to invade (46 species), potential environmental weeds that may become invasive in the alpine environment (47 species) and non-invasive weed species (157).

The Resort has now begun a weed control program that concentrates on the control and possible eradication of the environmental and potential environmental weed species. The non-invasive species are a lower priority for control.

Over the last two years the Resort has been steadily building co-operative links with Parks Victoria as both agencies develop an integrated weed control program across their borders. There are instances now
where contractors employed by the Resort have been asked to undertake some of the control works in Parks eg: willows in Rocky Valley Creek below the dam wall.

The Resort’s approach has been to initiate weed control works along all boundaries and then to target some of the more obvious infestations on land that is not specifically leased. The program will then progress into the Village proper and work co-operatively with lodge site holders and the lift company. This year site holders with specific weeds have been approached for their consent to have the Board remove these weeds and then these people have been offered a plant voucher for replacement with indigenous plant species. To date around 15 site-holders have taken the Resort up on this offer with some of the sites being high profile.

b) Predator control
Two years ago Parks Victoria co-ordinated a predator control program across the Bogong High Plains incorporating both Falls Creek and Mt Hotham. Since then Falls Creek has drawn up a three-year contract with the contractor and this year will again work co-operatively with Parks in delivering a co-ordinated campaign. The challenge here is to develop a program with measurable results. The aim of the predator control program at Falls Creek is three-fold:

- to protect populations of threatened species such as the Mountain Pygmy Possum, Broad-toothed rat and Alpine Bog Skink;
- to protect vegetation and in particular revegetation sites from hare and rabbit damage and
- to improve amenity within the Resort by controlling feral cats and dogs.

The aim of course is to have no (feral) dogs in the Park or the Resort!

c) Development of tracks (walking and mountain biking) that link the Resort and the National Park and a Master Plan for Rocky Valley Dam.

Parks Victoria in the Alps has always appeared under-resourced for the task at hand. This has caused a narrowing and focusing of works to high profile areas where there is a definite need to manage the impacts of tourism in this fragile environment.

This year, Falls Creek Resort Management was able to secure $40,000 from the Minister for Environment and Conservation. These funds are for the development of walking tracks and trails that specifically link the Resort with the Park and also to develop a masterplan for Rocky Valley dam. The dam is an important asset to the Resort but lies completely within Parks land. The Resort is providing a further $40,000 for the project. All the background work to obtain this grant and the project administration is being undertaken by the Resort while the majority of the works will be within the Park.

d) Provision of Cross-Country skiing facilities
Parks Victoria and the Resort work closely together to provide a good cross-country skiing experience for our visitors. The groomed cross-country trail network extends into the Park, provided snow conditions are suitable. Grooming is undertaken by the Resort under guidance from Parks Victoria. Currently both Parks and the Resort are working on the development of a partnership agreement that clearly outlines the expectations of both land managers and provides some operational guidance.

e) Improved information forums
Along with cross-promotion of products is the need to better exchange information about particular visitor and land management approaches. Forums such as this are one opportunity but more regular involvement of Resorts with Parks is needed. The Department of Natural Resources and Environment (NRE) convenes a Biodiversity Network that has in more recent times split to form an alpine sub-set. It has been interesting to watch how the alps are leading to cross-regional co-operative programs. Not only within NRE, but also EPA and the waste management groups. It is better to manage land according to type rather than management boundary.

f) Marketing
Parks Victoria have a general “Healthy Parks Healthy People” marketing campaign. The efforts in the North East have not previously integrated well with the Resort marketing campaigns. Both organizations have focused on their own areas. This is a peculiarly Victorian (no pun intended) approach that is not evident in NSW where the Resorts are an integral part of the Park.

Recently however, the Resort is better recognizing, acknowledging and promoting the asset offered by the surrounding National Park (see Falls Creek Summer brochure 2002). There is no doubt that more co-operative marketing efforts will occur in the future as Parks Victoria has recently joined the Legends, Wine and High Country Campaign Committee that co-ordinates tourism marketing program in North East Victoria for Tourism Victoria. The marketing campaigns for the North East will have a strong focus on nature based and adventure tourism with particular emphasis on promoting the region’s tracks and trails.

One of the keys to achieving a high level of co-operation has been the development of close personal working relationships between Resort and Parks officers resulting in a greater understanding of what each land manager is trying to achieve. A good working relationship also means that mutually agreeable solutions are likely to be found rather than meeting an impenetrable barrier. Another key to successful co-operative programs is the sourcing of appropriate funds to undertake works. The Falls Creek Board has been successful in this area over the last 18 months.

**Future Co-operative Efforts**

There has often been two types of visitors to the Alps – those who want a national park experience – roughing it, at one with nature, wide open spaces and little evidence of human impact - and those who want a Resort experience – good food, restaurants, hot showers and comfy beds. These two types have often been treated as two completely separate markets. Falls Creek is developing strategies to break down the divisions between these groups of people. For example, it is not unheard of for a group of bushwalkers to want a hot shower and sauna after being out in the elements for a few days! The focus for future visitor marketing is to provide an experience that integrates the experience of the Park with the Resort.

**a) Development of adventure/nature based and eco-tourism opportunities**

Falls Creek is working hard to develop soft adventure tourism opportunities and further expand the nature-based tourism product. The aim is to provide a range of adventure products combined with a little luxury while seeking to appeal to the socially-aware and family-oriented market segments. Falls Creek has limited eco-tourism products available, however this is an area that we would also like to build. Some of the work in this area has involved running a weekend titled “Adventure in the High Country” where the different activities available were showcased to the public. The key issues are product density and product supply.

Many operators do not have an on mountain outlet and travel from Bright and Mt Beauty to provide their service. This circumstance is no different for Parks Victoria that has offices in Bright and Mt Beauty but no outlet on the mountain. Currently the Parks interpretations program is limited to summer ie: Christmas to the Australia Day weekend in January and then four days over Easter. The interpretations officer has no base on the mountain yet many of the clients for walks, slide nights and the like are mountain visitors. There is a need for Parks and the Resort to work more co-operatively in providing an interpretations service to visitors. There is much scope for cross-promotion of the different products offered by the Park and the Resort.

**b) Visitor management**

Visitor management within the Park and the Resort has a similar goal in that both organizations hope to provide their visitors with a good memorable experience. However there is some room for discussion as to what constitutes a memorable experience!

I would like to explore a couple of instances where conflict has the potential to arise due to the different management focus of the two organizations. Falls Creek is surrounded by National Park and has limited area on which to operate tours and the like hence there is a desire to extend services into the Park.

There is a need to improve the tourism experience on offer at the Resort by providing a greater range of activities and opportunities for connecting with nature. However, these activities should not be offered at
the expense of the environment but rather in a manner that recognizes the values of the alpine environment and its ecological limitations.

In a National Park where a primary objective is to preserve the biodiversity of the area, the environmental impact of an activity is a key driver. In the Resort, where the provision of a recreational experience is a key driver, the environmental values of the area have been somewhat compromised in the past. The management challenge is to find a way to achieve a range of recreational experiences while minimizing or eliminating any adverse environmental impacts.

The Resort is seeking to assess all recreational activities in this context. This is leading to management changes in many areas including the development of tracks and trails, downhill ski slope management and the offering of attractions such as skidoo and dog sled rides. A point of difference with National Parks is the governing legislation that mandates rules rather than an approach that uses ecological assessment criteria.

A tourism/recreational activity should be assessed within a framework that identifies its ecological impact. Those activities with adverse ecological impacts should be re-evaluated for their suitability in the alpine area while those activities with minimal or short-term impact can be continued with appropriate management practices.

Falls Creek is keen to improve its visitor numbers over both summer and winter periods. One way is to offer a wide-ranging customer experience that incorporates not only skiing but also other activities designed to cater for the non-skier or the skier who wants a day to rest up the knees. Falls Creek currently offers dog sled and skidoo rides to increase the opportunities available to the visitor. However due to the limitations of the snow within the Resort there are times when the extension of these activities into the Park would create a more consistent and improved customer experience. The ecological impact of such activities within the Park would be transitory, i.e., noise and could be managed effectively to minimize disturbance to Park users.

It is interesting to note that dog sled rides cannot be extended into the Park however cattle grazing is allowed to continue and the use of dogs as a part of this business operation is acceptable. The allowance of a dog sled operation in the Park is not acceptable yet there would be no ongoing maintenance costs such as those associated with the need to rehabilitate areas that have been damaged by cattle – in particular walking trails. Resorts have always had a policy of excluding cattle because of the potential environmental damage and conflict with visitors.

There is a need to find some common ground for some of these seemingly intractable issues. The offering of an activity in these sensitive alpine areas should be guided in the main by its impact on the environment. The use of an ecological framework to assess the impact of an activity is one means of bringing together the different land use objectives of Parks and Resorts. It may well be possible for both land managers to achieve their objectives – do we remember the moral of the children and the orange? Both wanted the orange however upon closer investigation, one wanted the peel and the other the pith – both were satisfied with this different way of dividing the resource.

There is no doubt that summer tourism to the High Country must increase – just look at the success being experienced by Thredbo-Kosciusko in this endeavour. Resort and Park managers can either wait for increased tourists to arrive before taking action or else manage the tourism growth in a sustainable way. I always look to Uluru as a classic example of how good management can mitigate adverse visitor impacts. Uluru today takes over a million visitors annually and its surrounding environment is in a much better state now than it was in 1978 when I first visited and the concept of tourism management, within a framework of environmental sustainability, was not yet on the agenda.

The Alps too can potentially be the chosen destination for thousands of people in the years to come particularly if the impact of global warming is to take hold. It is up to us as land managers in the alps to work co-operatively bring our management philosophies into alignment to provide an overall better experience for the people who visit our region while enhancing the environmental sustainability of this most fragile part of Australia.
References


High Quality Wastewater Reclamation for Use in Snow-Making – Resource Rather than Waste

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Abstract

All alpine resorts in Australia face the constraints of climate variability and unpredictable snow fall. Often the timing and quantity of natural snow falls vary significantly creating unpredictability for the industry. Snow-making is a vital enterprise to the survival of the ski industry in Australia. Snow making at both Mt Buller and Mt Hotham Alpine Resorts has demonstrated an excellent adaptation to the shortage of natural snow.

The Victorian Resorts also have a requirement based on the State Environment Protection Policy - Waters of Victoria, to manage effluent discharge from the respective treatment plants in a manner that reduces impact on aquatic ecosystems and water quality.

The Resorts have recognised that these circumstances present a unique opportunity to utilise reclaimed water for increased snow making capacity. It is one of the unique opportunities where the wastewater is valued as a resource rather than merely viewed as a waste problem. The proposed water reclamation schemes at both the Resorts are considered to be the first application in the world in this direction.

Introduction

The Victorian Alps are a Victorian, national and international winter tourism destination. Over 1.3 million visitors are attracted to the Victorian Alps each year, adding $99.5 million to the Victorian economy and supporting 3181 full time equivalent jobs. Mt Buller, Mt Hotham and Falls Creek are the most popular Resorts, as they have been able to use snowmaking technologies in recent years to assure visitors of quality snow cover.

Mt Buller Alpine Resort is approximately 2300 hectares of natural bushland with approximately 400 hectares developed for snowfields, the Resort village and environs. It is adjacent to the Alpine National Park and State Forests and caters for year-round recreational activities. The Mt Hotham Alpine Resort is approximately 3,450 hectares in area, of which 245 hectares is developed for snowfields.

Scientists around the world acknowledge that global climate change is occurring and will produce varied local effects. Many aspects of climate change are agreed; there has been an increase in greenhouse gases
over the past 200 years and a measurable increase in average global temperature has been observed. The implications of climate change are far reaching. Governments and organisations are beginning to develop adaptive strategies.

Snow-making is a vital enterprise to the survival of the ski industry in Australia. This situation has already been recognised by the State Government in the release of the recent Alpine Resorts 2020, Discussion Paper (DNRE, 2002). Snow making at both Mt Buller and Mt Hotham has demonstrated an excellent adaptation to the shortage of natural snow. Further enhancement to the infrastructure will allow additional areas to operate when natural snow is low. Plans to expand snow making capacity to increase the viability of skiing have been developed, but due to water constraints have not been implemented.

Concurrent with this water shortage, the Resorts have a requirement based on the State Environment Protection Policy (SEPP) – Waters of Victoria 1988, to manage effluent discharge from the treatment plant in a manner that reduces impact on aquatic ecosystems and water quality within the highland catchments.

The Resorts have recognised that these circumstances present a unique opportunity to utilise reclaimed water for increased snow making capacity. Reclaiming wastewater to supplement water supply for snow making is an initiative of both of the Resort Management Boards’ policies intended to enhance the environment. It demonstrates clear and measurable efforts to close the use and re-use loop; to achieve the purposes for which the Resort was established; while eliminating potential impacts to local waterways; and increasing the efficiency of use of water.

Wastewater Treatment In Alpine Environments

The Resort Managers at both resorts are responsible for the operation and maintenance of the water supply and sewage treatment facilities. Both resorts have invested significantly in the development of sewage treatment infrastructure, each which produces a very high quality secondary effluent, low in nutrients and pathogens, complying with EPA licence conditions.

The Mt Buller Resort generates approximately 195 ML of treated effluent per year with approximately 70% of effluent produced during winter. Presently, the treated effluent flows overland via a natural wetland, and eventually flows into the Howqua River. The river water quality is also closely monitored, with satisfactory results from testing agencies.

Approximately 90 ML per annum of treated effluent is generated from the Mt Hotham Resort. Presently, the treated effluent is discharged overland through a natural wetland, which then joins No-name Creek, before flowing into the Dargo River.

The Victorian state policy for wastewater management specifically promotes beneficial reuse of treated effluent, with an emphasis of land irrigation where environmentally sustainable. There is very limited scope for agricultural reuse in alpine resorts, particularly considering the fact that most of the wastewater load is generated during the winter. Effluent reuse in supplementing water supply for snowmaking is the only viable solution to maximising compliance with the State Environment Protection Policy.

Proposed Wastewater Reclamation Schemes

Mt Buller Resort

Since 1993 Buller Ski Lifts (BSL), Mt Buller’s chairlift operator, has been producing additional snow cover through snowmaking technology. This helps extend the duration of Mt Buller’s snow season by improving the natural skiing surface and maintaining safety conditions. Snowmaking technology, in tandem with nature, extends economic benefits to the Resort. The process requires a series of snowguns, a reliable water supply, power supply and suitable atmospheric conditions to manufacture artificial snow. Water is blasted into the air, to settle on the slopes as crystallised snowflakes.

The Resort is committed to minimise its impact on flows in the watercourses. The current pumping infrastructure makes insufficient water available to the snow-making reservoir to keep up with snow-making need after domestic water supply needs are met. While increasing the pump capacity is feasible, it is not an environmentally desirable option.
Given the limited number of days/hours suitable for snow-making – one night in four, or approximately 700 hours per season (compared to more than 2000 hours in the northern hemisphere) - pumping capacity and availability of water supply are critical. In an average season BSL will use 190 ML of potable water pumped up from Boggy Creek to the Sun Valley Dam, which has a storage capacity of 75 ML. BSL can pump 20 ML/d through its system, so Sun Valley Dam stores no more than 3 to 4 days supply. The dam can only be re-supplied at up to 4 ML/d. Thus it takes a week to pump one day’s snow-making supply. The full scale implementation of effluent re-use for snow-making will approximately double the available supply of water for snow-making without taking any more water from the environment.

![Figure 1 – Schematic of Mt Buller Resort Water Reclamation Scheme](image)

**Mt Hotham Resort**

Snow making at the Mt Hotham Resort is currently managed by Mt Hotham Ski Lift Company (MHSC) Pty Ltd. The water supply for snowmaking is sourced from Swindlers Creek, via a 1 ML storage weir constructed downstream of the existing resort water supply weir. Goulburn Murray Water is responsible for the supply of water to MHSC, administered under a diversion licence, which allows MHSC to abstract a maximum of 1.6 ML per day.

MHSC obtain water supply from the 1 ML storage weir downstream of the water supply weir. The approximate quantity of water used for snowmaking can be as high as 1.6 ML overnight. The average snowmaking potential is dependent on the prevailing weather conditions. Based on the records over the last 5 years, the average snowmaking window of opportunity is 40 hours per week over an 18 week season, i.e. 720 hours available for snow making during the winter season.
During the 2000 ski season, approximately 100 ML of water was used for snowmaking. MHSC plans to increase snowmaking capacity within the next two years and therefore there will be a demand for more water, approximately doubling current requirements. The additional 0.55 ML/d of reclaimed water (averaged over the winter period) would provide a significant supply for snow making expansion and would reduce the additional demand for water supply from Swindler’s Creek. This would have the benefit of maintaining higher environmental flows in Swindler’s Creek. The total yearly wastewater generated (90 ML) could theoretically be used for snowmaking, thus significantly reducing the quantity of treated wastewater discharged directly to Swindler’s Creek.

The proposal to pipe the reclaimed water to the Swindler’s Creek catchment has the added advantage of taking effluent flows out of No-name Creek, which runs dry during the summer months, and ultimately out of the Dargo River catchment, which is a more sensitive water supply catchment.

![Figure 2 – Schematic of Mt Hotham Alpine Resort Water Reclamation Scheme](image)

### Snow-Making Using Reclaimed Water

There are several examples of effluent disposal via snow making, particularly in North America. The primary objective of many of these schemes is to store wastewater as snow during the severe winter months. During the winter, biological treatment is not very effective and this can potentially result in the discharge of untreated wastewater or the need to store large quantities of wastewater, awaiting treatment in the warmer months. In some instances, the process is used as the primary method of sewage treatment. As the snow mounds melt in the spring nutrients are released and absorbed into the soil, while any residual nutrients are diluted by the overall snow-melt in the catchment. Examples also exist of reuse of treated effluent for snow-making, such as at Snowmass Resort in Colorado, USA, as an alternative disposal route.

Under the U.S. Environmental Protection Agency’s guidelines of water reuse (U.S. Environmental Protection Agency, 1992), reuse of treated effluent for snow making is permitted for unrestricted recreational use, provided the treated effluent quality meets the following standards:
- Treatment standard: secondary, filtration, disinfection;
- BOD$_5$ < 10 mg/L
- Turbidity < 2 NTU
- Faecal coliforms: not detected
- Chlorine residual: 1 mg/L
- pH: 6 to 9

To the best of the authors’ knowledge, there are currently no schemes around the world that use reclaimed effluent for snowmaking on areas with human contact. Therefore, the proposed water reclamation schemes at both the Mt Buller and Mt Hotham Resorts is considered to be the first application in the world in this direction.

**Water Quality Requirements For Snow-Making**

The conditions at both Resorts present a unique opportunity to utilise reclaimed wastewater to allow increased snow-making capacity. It is one of the unique opportunities where the wastewater is valued as a resource rather than merely viewed as a waste problem.

Wastewater reclamation for snow-making will require additional treatment for pathogen removal, due to the potential for exposure to humans (secondary contact). An investigation of alternative technologies was undertaken with the proposed recommendation that following the existing level of nutrient removal and UV disinfection treatment technology, the effluent will require further treatment with membrane ultrafiltration and ozonation and/or chlorination. The proposed treatment system will offer four to five barriers for pathogen removal.

Currently, the quality of the treated effluent is of a high standard, as would be expected from an advanced nutrient removal treatment system. The treated effluent quality complies with the U.S. Environmental Protection Agency’s standards for unrestricted recreational reuse, including snow making, except for the fact that the effluent is not treated by filtration.

Membrane systems including microfiltration (0.2 micron) and ultrafiltration (0.01 micron) are typically considered in effluent reuse applications (Jacangelo et al, 1995; Kamp, 1995; Panglisch et al, 1998). The major technical factor influencing the choice of membranes for effluent reuse is the need to establish a multilevel barrier against pathogens. As an indication of the likely effectiveness of microfiltration versus ultrafiltration in terms of pathogen removal, the various sizes of typical pathogens are listed in Table 1.

Table 1 – Pathogen Size Comparison

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Size (microns)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giardia muris</td>
<td>7 to 14</td>
</tr>
<tr>
<td>Cryptosporidium parvum</td>
<td>4 to 6</td>
</tr>
<tr>
<td>E. coli</td>
<td>1</td>
</tr>
<tr>
<td>Pseudomonas dim.</td>
<td>0.3</td>
</tr>
<tr>
<td>MS2 virus</td>
<td>0.025</td>
</tr>
</tbody>
</table>

Membrane Filtration System:  
- Microfiltration: 0.2  
- Ultrafiltration: 0.01
Several studies have been undertaken recently assessing the removal of pathogens with ultrafiltration and microfiltration in water and wastewater (Jacangelo et al, 1995; Kamp, 1995; Panglisch et al, 1998). It can be concluded that while, in general, all membrane systems gave very good removal of parasites, the removal of viruses was much higher with ultrafiltration membranes. This is understandable when the pore size of these materials is investigated.

Due to the individual nature of each treated effluent, it was considered prudent to undertake piloting of an ultrafiltration system at both Mt Buller and Mt Hotham so as to demonstrate filtration and recovery rates as well as pathogen removal. At Mt Buller, the pilot trials commenced in June 2000 and continued until October 2001. The pilot plant has continued to operate at Mt Buller until the present time. At Mt Hotham, pilot trials were conducted between June and October 2002.

**Pilot Plant Wastewater Reclamation Trials**

**Mt Buller Resort**

The pilot plant at Mt Buller consisted of a fully skid-mounted, PLC controlled filtration system, with a capacity to treat up to 1 L/s, i.e. about one-tenth of the full-scale plant. The system consisted of 2 No. 127mm diameter X 1220mm long polysulphone hollow fibre cartridges, supplied by Koch Membrane Systems. Bundles of hollow fibres are contained within cartridges as shown in Figure 3. A typical cross section of a hollow fibre is shown in Figure 4.

The filtration cycle has been 30 minutes between backwashes, with chlorine backwashing on every third cycle. The rejection rate during filtration has been between 5% and 15%. The temperature of the effluent being filtered has been as low as 7°C during the winter months. This low temperature operation has not significantly affected the operating regime of the filtration system. Figure 5 shows the arrangement of the membrane ultrafiltration pilot plant at Mt Buller, housed within a container.
The pilot plant commenced operation in June 2000 and has been operating intermittently over the last year. The filtration trials were completed in October 2001, although the pilot plant has continued to operate during 2002. Independent water quality analysis was undertaken to test the effectiveness of the ultrafiltration system at Mt Buller. A summary of the filtration results are shown in Table 2.

The pilot plant included a 20 m³ treated water storage tank and snow gun to demonstrate snow-making potential and assess the quality of the manufactured snow from treated effluent. Mt Buller Alpine Resort’s core business in winter is providing high quality snow for hundreds of thousands of visitors taking to our slopes for skiing and snowplay. Figure 6 shows the snow gun in operation making artificial snow using ultrafiltered reclaimed water. The snow-making trial was considered a success by the Mt Buller community and paves the way for full implementation.

Table 2 – Summary of Effluent Ultrafiltration Pilot Plant Trials

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Raw Water (Secondary Effluent)</th>
<th>UF Treated Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Organic Carbon (mg/L)</td>
<td>8.5</td>
<td>6.5</td>
</tr>
<tr>
<td>Total Nitrogen (mg/L)</td>
<td>4.5</td>
<td>3.2</td>
</tr>
<tr>
<td>Total Phosphorus (mg/L)</td>
<td>0.5</td>
<td>0.03</td>
</tr>
<tr>
<td>Apparent Colour (PCU)</td>
<td>100</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>Turbidity (NTU)</td>
<td>30</td>
<td>0.1</td>
</tr>
<tr>
<td>Cryptosporidium (ocysts/50 L)</td>
<td>265</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Giardia (ocyst/50 L)</td>
<td>320</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Reovirus (orgs/50 L)</td>
<td>130</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Adenovirus (orgs/50 L)</td>
<td>310</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Enterovirus (orgs/50 L)</td>
<td>1600</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Clostridium perfringens (orgs/100 mL)</td>
<td>1500</td>
<td>N.D.</td>
</tr>
<tr>
<td>Campylobacter spp (orgs/1000 mL)</td>
<td>N.D.</td>
<td>N.D.</td>
</tr>
<tr>
<td>Salmonella spp (orgs/1000 mL)</td>
<td>N.D.</td>
<td>N.D.</td>
</tr>
<tr>
<td>E. coli (orgs/100 mL)</td>
<td>9000</td>
<td>&lt; 2</td>
</tr>
<tr>
<td>Total coliforms (orgs/100 mL)</td>
<td>61000</td>
<td>&lt; 2</td>
</tr>
</tbody>
</table>

Notes: UF = Ultrafiltered; orgs = organisms; N.D. = Not Detected
Mt Hotham Resort

A pilot ultrafiltration plant has been operating at the Mt Hotham wastewater treatment plant site since June 2002 and will continue to operate until early 2003. The pilot plant consisted of a fully skid-mounted, PLC controlled filtration system, with a capacity to treat up to 1 L/s, i.e. about one-tenth of the full-scale plant. The system consisted of a 50 micron pre-filter, and 1 No. 200mm diameter X 1800mm long polysulphone hollow fibre cartridges, supplied by Koch Membrane Systems. Figures 7 (a) and (b) show the arrangement of the membrane ultrafiltration pilot plant at Mt Hotham, housed within a container.

![Figures 7 (a) and (b) - Mt Hotham Ultrafiltration Pilot Plant, June 2002](image)

The filtration cycle has been 30 minutes between backwashes, with chlorine backwashing on every third cycle. The rejection rate during filtration has been between 5% and 15%. The existing wastewater treatment plant does not have facilities for chemical dosing for phosphorus removal. Alum dosing was undertaken as part of the pilot plant trials. Alum was dosed into the pilot plant raw effluent feed tank to simulate alum dosing in the ultimate upgraded plant.

Independent water quality analysis was undertaken to test the effectiveness of the ultrafiltration system at Mt Hotham. A summary of the filtration results are shown in Table 3.

The pilot plant also included a 20 m³ treated water storage tank and snow gun to demonstrate snow-making potential and assess the quality of the manufactured snow from treated effluent. The snow-making trial was considered a success by Mt Hotham RMB and paves the way for full implementation.
### Table 3 – Summary of Effluent Ultrafiltration Pilot Plant Trials

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Raw Water (Secondary Effluent) Range</th>
<th>UF Treated Water Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Organic Carbon (mg/L)</td>
<td>5.5 – 10</td>
<td>4.6 – 7.7</td>
</tr>
<tr>
<td>Total Phosphorus (mg/L)</td>
<td>1.0 – 4.9</td>
<td>0.04 – 3.0</td>
</tr>
<tr>
<td>True Colour (Pt/Co units)</td>
<td>35 – 75</td>
<td>18 – 60</td>
</tr>
<tr>
<td>Turbidity (NTU)</td>
<td>2.2 – 3.6</td>
<td>&lt; 0.1</td>
</tr>
<tr>
<td>Cryptosporidium (ocysts/50 L)</td>
<td>&lt;1 – 3</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Giardia (ocysts/50 L)</td>
<td>1.5 – 2</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Reovirus (orgs/50 L)</td>
<td>&lt;1 – 6</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Adenovirus (orgs/50 L)</td>
<td>7.5 – 16</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>Enterovirus (orgs/50 L)</td>
<td>4.5 – 8</td>
<td>&lt; 1</td>
</tr>
<tr>
<td>MS2 phage (orgs/50 L)</td>
<td>19 – 62</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Clostridium perfringens (orgs/500 mL)</td>
<td>170 – 7000</td>
<td>N.D.</td>
</tr>
<tr>
<td>Campylobacter spp (orgs/500 mL)</td>
<td>N.D.</td>
<td>N.D.</td>
</tr>
<tr>
<td>Salmonella spp (orgs/500 mL)</td>
<td>N.D.</td>
<td>N.D.</td>
</tr>
<tr>
<td>Enterococci (orgs/500 mL)</td>
<td>120 – 22000</td>
<td>N.D.</td>
</tr>
<tr>
<td>E. coli (orgs/250 mL)</td>
<td>73 – 110000</td>
<td>N.D.</td>
</tr>
<tr>
<td>Faecal coliforms (orgs/250 mL)</td>
<td>&lt;250 – 130000</td>
<td>N.D. – 1</td>
</tr>
<tr>
<td>Coliforms (orgs/250 mL)</td>
<td>&lt;250 – 1200000</td>
<td>N.D. – 19</td>
</tr>
<tr>
<td>SPC (orgs/mL)</td>
<td>110 – 41000</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

**Notes:** UF = Ultrafiltered; orgs = organisms; N.D. = Not Detected

**Conclusion**

Every alpine resort in Australia faces the constraints of a limited ski season, generally from June to September, due to relatively low altitudes and seasonal climatic conditions, and the high costs of providing expensive infrastructure to service small communities. Snow-making is a vital enterprise to the survival of the ski industry in Australia.

Analysis of the quality of treated water used in the pilot trials at both Resorts allows the Resort Management Boards to confidently state that the ultrafiltered reclaimed water will be “safe to ski on”. The results showed that the ultrafiltration system completely removed pathogens, including E. coli, coliforms, Cryptosporidium spp., Giarda spp., Clostridium perfringens, enteroviruses, adenoviruses and reoviruses, thus complying with Australian drinking water guidelines.

The installation of a full-scale ultrafiltration plant at both Mt Buller and Mt Hotham, with associated snow-making activity will enable the Resorts to guarantee pure, white and environmentally friendly snowfields for the sustainable benefit of recreational users, the district economy and wider community.
REFERENCES


Perisher Range Resorts Environmental Management System

Alistair Henchman and Cathlin Collins

Alistair Henchman, Project Director, NSW National Parks and Wildlife Service
Cathlin Collins, Project Environmental Engineer, URS Australia Pty Limited

Summary

During 2001, NSW National Parks and Wildlife Service, with the assistance of URS Australia Pty Limited, developed an improved framework for environmental management in the Perisher Range Resorts in Kosciuszko National Park: a place-based environmental management system known as the ‘Perisher Range Resorts EMS’. The Perisher Range Resorts EMS is based on the international standard for environmental management (ISO 14001), and represents a systematic approach to managing the environmental impacts and risks associated with the operation of a ski resort in one of Australia’s most sensitive environments.

This place-based EMS applies to NPWS and all tourism operators within the Perisher Range. The EMS defines the mechanisms through which environmental impacts and enhancements due to future development and operations will be managed in a sustainable manner. Through the development of the EMS, resort managers, commercial operators, ski lodges and NPWS share the vision of becoming a recognised leader in ecologically sustainable mountain tourism.

This paper summarises the purpose and benefits of an EMS, the triggers for developing an EMS as a tool to help manage the Perisher Range Resorts, and the involvement of stakeholders in the development and on-going implementation of the EMS. It also discusses the tools developed to help ski lodges improve their environmental performance.

Background

The need for the Perisher Range Resorts EMS

The Perisher Range Resorts is an area of 1250 hectares within Kosciuszko National Park in New South Wales. The Perisher Range Resorts are made up of the ski areas and villages of Perisher Valley, Smiggin Holes and Guthega, as well as the Blue Cow ski area.

The NSW National Parks and Wildlife Service is the state government authority responsible for the management of the resorts in their national park context. All businesses which operate in the Perisher Range lease their land from NPWS. As well as the major ski field operator, Perisher Blue Pty Limited, there are 87 club lodges and 34 commercial lodges and accommodation facilities.

Combined, the resorts have 52 lifts and over 100 km of cross-country ski trails, making the Perisher region a major winter snow sports destination. In summer the area is also popular; its proximity to Mt Kosciuszko being a major attraction.
Kosciuszko National Park attracts around 3 million visitors per year, with a 60/40 percent split between winter and summer. In total, an estimated 600,000 visits are made to the Perisher Range Resorts each year. In the peak periods of the winter ski season, as many as 20,000 people visit the resorts in a day, with around 3,600 people being accommodated overnight.

In May 1999, approval was granted by the NSW Government to extend the Perisher Range Resorts by 1,320 beds, improve infrastructure and access, and to create a village centre in Perisher Valley. In addition, the ski area operator, Perisher Blue Pty Limited, has proposed a major expansion of ski slope capacity.

These developments will certainly attract more visitors to Perisher each year, increasing the potential risk to the environment. Some of these environmental risks include:

- Vegetation loss and habitat degradation resulting from clearing for ski run and resort facilities;
- Introduction and spread of feral weed and pest species;
- Water quality and aquatic ecology health degradation from pollution;
- Soil erosion and instability resulting from vegetation removal and alterations to hydrological regimes;
- Local air pollution resulting from particulate and gaseous emissions, transportation and fuel use;
- Noise pollution from day and night recreational activities and the operation of heavy equipment;
- Use of non-renewable resources;
- Impacts resulting from poor waste management practices, including littering by park visitors, and poor collection, storage and disposal of domestic and building wastes; and
- Impacts on visual amenity and sense of place.

One of the recognised approaches to mitigating environmental impacts and risks posed by development is to adopt an environmental management system or plan. The development of an EMS was therefore made a key condition of consent for the expansion of the resorts. The development of an EMS is also part of the long-term strategic vision of NPWS to facilitate the holistic management of Kosciuszko National Park.

**What is an EMS?**

An EMS is essentially a framework to help organisation reduce their impact on the environment through targeted, continuous improvement in environmental management. EMS are defined by ISO14001 – the international standard for environmental management – as “that part of the overall management system which includes an organisation structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy”.

Environmental management systems are usually developed for a single corporate entity, operating at one or multiple sites, and ISO 14001 is commonly applied to manufacturing and processing industries. However the Perisher Range Resorts are operated by over 120 organisations, varying from large, corporate entities, to government agencies and utility providers, to small, volunteer organisations.

Due to the high number and variability of operators involved in the Perisher Range Resorts, a place-based EMS was developed to provide a framework for these organisations to work together to improve environmental performance throughout the resort.

To ensure that the EMS would be a practical and equitable tool for all parties, it was developed in close consultation with all key stakeholders in the Perisher Range. Stakeholder involvement in the EMS development process is discussed further below.
**Stakeholder Involvement**

**Reference Committee**

A ‘Reference Committee’ of stakeholders was established to oversee the EMS development process. The Reference Committee comprised representatives from the following organisations:

- National Parks and Wildlife Service Resorts Division
- Perisher Blue Pty Limited
- Kosciusko Chamber of Commerce (representing commercial operators)
- SLOPES (representing Club Lodges)
- Elgas
- Telstra
- Nature Conservation Council
- National Parks Association
- PlanningNSW

The Reference Committee worked together for more than 12 months, contributing extensively to the development of the EMS. The establishment and operation of the Reference Committee helped to ensure the system was practical and was accepted by all stakeholder groups.

Some of the key outcomes and achievements of the committee include:

- Development of a shared Environmental Vision and an Environmental Policy statement in which each organisation has agreed to work cooperatively to achieve better environmental outcomes;
- Identification of the environmental risks, and development of strategies to mitigate these risks under the EMS;
- Establishment of a series of common environmental objectives coupled with targets and key performance indicators that all resort stakeholders are required to work towards. The environmental objectives are presented in Section 4.1 below; and
- Agreement on the EMS Framework – this being an overarching structure and set of requirements which gives stakeholders the flexibility to develop their own systems or use the tools and procedures provided for them. The structure of the EMS is discussed further in Section 4.2.

The establishment, operation and agreed outcomes of the Reference Committee are a positive example of community, business and government working together to ensure a sustainable future.

**Gap analysis**

NPWS also undertook a gap analysis of the current systems which it and other stakeholders were using to manage the environmental impacts of their operations to make sure that the Perisher EMS could be consistent with these existing systems. This included a review of existing manuals, policies and procedures.

This analysis showed that various stakeholders had quite different understanding of and progress in the implementation of environmental management. This reinforced the need for the EMS to provide for the wide range of organisations operating in the Perisher Range.

**The Perisher Range Resorts EMS**

The key components of the Perisher Range EMS are the agreed Policy and environmental objectives, the overarching structure – made up of procedures, registers and forms – that direct the requirements of all parties, and the reporting requirements that provide essential feedback to ensure environmental
improvements are ongoing. An EMS Operational Committee has been established to oversee the system in the long term.

The Lodge Workbook – a tool to assist smaller operators meet their obligations under the system – is an important component of the system.

Common Environmental Objectives
The Perisher Range EMS establishes a process for setting and achieving targeted environmental performance goals, not only for NPWS, but for each of the operators in the resort.

The EMS requires all stakeholders to measure and report on their progress towards achieving the common environmental objectives which were agreed to by the Reference Committee.

The common environmental objectives comprise:

- To achieve a high quality environment for indigenous flora and fauna in the Perisher region and to preserve the biodiversity of the area.
- To improve the quality of aquatic ecosystems through improvement of water quality, maintenance of environmental flows and control of sedimentation and erosion.
- To identify and remEDIATE all soil and groundwater contamination and to prevent future contamination of soils or groundwater.
- To improve local air quality, reduce greenhouse gas emissions, and reduce the use of ozone depleting substances.
- To reduce the consumption of renewable and non-renewable resources through water, waste, energy and materials management.
- To conserve the cultural heritage values of the Perisher region and archaeological sites in the National Park through increased site assessment and visitor education.
- To ensure that existing and future development and activities do not compromise the visual amenity and sense of place of the surrounding National Park.
- To ensure that the ski, summer and other recreational facilities are provided sustainably and to a world-class standard within the ecological carrying capacity of the region.
- To ensure that all persons working within, and visitors to, the National Park are well educated about the region’s natural and cultural environment.
- To increase the proportion of staff and Park visitors who use sustainable transport systems to and within the region.
- To have effective environmental management in the Perisher Range Resorts.
- To ensure ongoing communication and cooperation amongst stakeholders on the environmental management of the Perisher Range Resorts.

All stakeholders are required to work towards the achievement of these objectives, and must report their progress towards the objectives to NPWS periodically. This is discussed further below.

Perisher Range Resorts EMS Procedures
The Reference Committee helped to define the final structure of the EMS framework for the Resorts. This framework is based on the principles of ISO 14001, and follows the ‘Plan, Do, Check, Improve’ management cycle.

NPWS has developed a series of procedures which direct the requirements of all stakeholders under the Perisher Range Resorts EMS. These procedures are listed in Table 1.

NPWS will use these procedures as tools to manage their own activities on a daily basis, and to manage stakeholders and assets. Other stakeholders can adopt these tools directly, or can develop their own system as long as it is in compliance with the overarching framework.
The ‘Lodge Workbook’ was developed for small scale accommodation operators, to help them meet the requirements of the Perisher Range EMS without the need to follow each of the procedures. The Lodge Workbook is discussed further in Section 5, below).

Regardless of whether stakeholders choose to directly adopt the overarching procedures to develop their own systems, all stakeholders are required to report their progress towards the set of common environmental objectives and targets.

The Perisher Range EMS is a structured and coordinated way for each organisation to demonstrate its environmental performance and to meet, and continue to meet, its legal and policy requirements.

Table 1 – Perisher Range Resorts EMS Procedures

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Aspects</td>
<td>To identify, assess and prioritise the impacts and aspects of every existing or new activity which occurs within the resorts area.</td>
</tr>
<tr>
<td>Legal and Other Requirements</td>
<td>To identify all legal obligations that apply to the activities of each stakeholder, and ensure ongoing compliance with these obligations</td>
</tr>
<tr>
<td>Objectives and Targets</td>
<td>To establish goals which will ensure continual environmental improvement.</td>
</tr>
<tr>
<td>Training</td>
<td>To ensure that all personnel whose work in the resorts area may create an impact on the environment receive appropriate training.</td>
</tr>
<tr>
<td>Communication</td>
<td>To ensure efficient and effective communication within and between NPWS and stakeholder organisations on environmental matters</td>
</tr>
<tr>
<td>Document Control and Records</td>
<td>To ensure that only correct and current versions of relevant documents are being used in the management of the EMS, decision making, and to manage environmental records.</td>
</tr>
<tr>
<td>Operational Control</td>
<td>To ensure that all significant environmental issues that relate to a particular operation or activity are being appropriately managed by each operator.</td>
</tr>
<tr>
<td>Emergency Preparedness and</td>
<td>To establish appropriate processes for preparing for and responding to environmental incidents and emergencies in the resorts.</td>
</tr>
<tr>
<td>Response</td>
<td></td>
</tr>
<tr>
<td>Monitoring</td>
<td>To prescribe the monitoring, measuring and reporting of the environmental impact of activities within the Perisher Range area, in order to demonstrate compliance with regulatory requirements and operational control procedures, and to measure and record performance so that this can influence future decision making.</td>
</tr>
<tr>
<td>Nonconformance and Action</td>
<td>To prescribe how actual and potential non-conformances will be managed, and for taking corrective and preventive action for responding to these non-conformances.</td>
</tr>
<tr>
<td>EMS Audit</td>
<td>To conduct a systematic and defendable assessment of the implementation of the EMS by NPWS and stakeholders.</td>
</tr>
<tr>
<td>Management Review</td>
<td>To describe the methodology to be employed by NPWS and the EMS Operational Committee for the periodic review by management of the EMS.</td>
</tr>
</tbody>
</table>

**Reporting Requirements**

To capture data relating to each of the common objectives, and allow performance to be tracked, a series of common key performance indicators have been developed. These include:

- The amount of energy consumed by facilities in the resort (including electricity, heating oil, gas and wood fires), and the amount of greenhouse gas generated;
- The proportion of energy used from renewable sources;
- The number of woodburning appliances and fireplaces in compliance with AS 4013;
- The amount of water consumed at facilities in the resort, covering human consumption, hygiene, landscaping, maintenance and snow making;
- The amount of waste produced from facilities in the Resort that is disposed to landfill;
- The amount of non-biodegradable cleaning chemicals used;
- The amount of ozone depleting substances used;
- The number of releases of chemicals (eg spills) to land and/or water;
- The proportion of positive feedback from visitor surveys;
- The proportion of visitors using environmental interpretation / education services; and
- The proportion of staff trained with respect to environmental management.
All stakeholders are responsible for collecting environmental data for each of these performance indicators to track their performance against the objectives and targets. While small operators can use the workbook, NPWS and larger commercial operators are required to develop and follow procedures for collecting relevant environmental data specific to their operations, in addition to the common requirements.

In addition to the common key performance indicators, NPWS has identified the need to measure a wider set of parameters to monitor the condition of the Perisher Range environment. These include the diversity of fauna habitat, status of threatened species and their supporting ecosystems, visual amenity, protection of cultural heritage sites, and abundance of weeds and pests.

Perisher Blue Pty Limited are currently identifying the environmental aspects relevant to their own activities, especially on-mountain activities such as slope and snow grooming.

NPWS will compile data and provide statistics on environmental performance and achievements of the Resorts as a whole. Improvements made by individual organisations can also be tracked from year to year.

The EMS will ensure that the data collected is meaningful, transparent and targeted, and provides a real indication of environmental performance. Compilation of the data twice per year (summer and winter) will allow NPWS and other stakeholders to set research priorities, develop education packages, invest in infrastructure or personnel, and make informed decisions for future planning.

**EMS Operational Committee**

An environmental sustainable future in Kosciuszko National Park’s delicately balanced environment needs a strong level of commitment from all stakeholders beyond the EMS development stage. The Perisher Range EMS therefore includes processes for ensuring ongoing consultation and cooperation into the future.

The EMS includes an ongoing “EMS Operational Committee” made up of representatives from each stakeholder organisation. The role of the Committee is to review and advise on the ongoing implementation and cooperative operation of the EMS. The Committee will also review the environmental performance of the Resort against the environmental objectives and targets, and will help define new environmental goals into the future.

The Perisher Range EMS also establishes a defined process for stakeholder and NPWS communication on environmental matters, ensuring that it is regular, transparent and proactive.

**Tools Developed for Ski Lodges - the ‘Lodge Workbook’**

While the Perisher Range EMS is based on the International Standard for Environmental Management (ISO 14001), certain changes were made so that the EMS could adapt to the differing organisational structures operating in the resort.

One such adaptation was the development of the ‘Lodge Workbook’ to help ski lodges manage their environmental impacts and report against the common objectives and targets.

While individual ski lodges may not have a major impact on the environment, the cumulative impact from lodges is potentially a significant risk to the environment. Because of this the operations of individual lodges needs to be captured under the system.

It was not realistic to expect ski lodges to invest time and resources into developing unique environmental management systems and procedures given the voluntary and small scale nature of their organisations, or to expect them to follow the overarching Perisher Range EMS procedures.

The Lodge Workbook was developed to combine environmental education with information about environmental obligations and EMS reporting requirements. The Lodge Workbook allows clubs and
small commercial lodges to work towards environmental improvements without needing to invest resources in the development of individual systems or procedures.

The Lodge Workbook is a creative way of helping lodges recognise areas where they may be causing environmental impacts, and has been designed to change the behaviour of stakeholders in the resort so that the way they do business presents less risk to the environment.

The Lodge Workbook includes a separate chapter for each of the 12 environmental objectives. It has spaces for lodges to identify how they control environmental issues, and provides useful prompts and ideas for lodges that do not have a good understanding of the environmental risks posed by their operations. In this way, lodges can either use the workbook to demonstrate to NPWS that they are taking responsibility for the environment, and they can use it as a tool to help them become more sustainable.

By filling out the workbook and undertaking the activities as directed, lodges will be able to plan, document, measure and evaluate their environmental performance. In future years, lodges will be able to compare their performance to the environmental performance of the resort as a whole.

The workbook will also help lodges identify and manage some of the environmental risks associated with their business, and achieve and maintain compliance with relevant environmental requirements.

The Lodge Workbook is an innovative and practical solution for managing the cumulative environmental impacts of small businesses and organisations in the Resort.

**Conclusion**

The Perisher Range Resorts place-based EMS is an example of how all stakeholders at a single tourism destination have worked together to produce an innovative and comprehensive system for managing their environmental impacts. NPWS and URS are confident that the EMS will greatly benefit both the health of the tourism industry in the area as well as Kosciuszko National Park.

The Perisher Range EMS will help NPWS and stakeholder meet the following goals:

- Reduced environmental impacts, and protection of the resources upon which the long-term viability of the tourism industry depends;
- Increased efficiency and reduced operating costs through conservation of resources;
- Clear setting of priorities and allocation of resources;
- Identification and prioritisation of environmental issues, based on a risk assessment approach.
- Competitive advantage through the ability to market products as sustainable. For instance the Perisher Range EMS is consistent with certification systems such as Green Globe;
- Achievement of a significant development consent condition; and
- Improved relationship between government and stakeholders.

We believe the development of place-based management systems for tourism destinations is potentially an excellent way forward for the tourism industry. Many tourism destinations may profit both financially and environmentally from the implementation of comprehensive and tailored environmental management systems.

The commitment made by the tourism industry and government to move forward sustainably is embodied in the Perisher Range Resorts common environmental Vision Statement, which concludes this paper:

‘The Perisher Range Resorts will be widely recognised for the exemplary environmental management of the area’s natural, cultural, aesthetic and social values in the national park setting, and for sustainable, recreation-related development that respects, conserves, enhances and restores those values’.
The small communities of remote and rural centres in south-eastern Australia share a common affinity with the mountains. Their brief history and cultural heritage is built on the pioneering spirit and legendary stories of hardships endured as European settlers sought grazing land, mineral wealth and timber resources as they pushed out from the coast into the mountains. In contemporary times these communities are again facing hardships as world economies and conservation values impact on traditional lifestyles and their ability to sustain economic viability. These changes are forcing communities to embrace new challenges and re-evaluate the potential of their common asset, the mountains, to provide economic stability and growth in lieu of decline and decay.

This project has engaged communities in practical demonstrations through participation, to explore the potential for economic sustainability through co-operative asset utilisation and partnership building. These partnerships include stakeholders from all sectors including managers of public and private assets in the region. A key feature of this project is the application of information technology to engage a wide range of people across traditional boundaries, encompassing four local government areas and two tourism regions. All discussion and exercise planning has been done with minimal need for meetings, using email and web publishing as the key information distribution mediums.

Through email discussion, the backpacker market was identified as providing great potential for economic growth with relative low levels of new investment and manageable impacts on the total environment. This market segment matches the available asset very well, recent survey (August 2001 TNT Magazine and USIT World) identifies the top four activities sought as:

- 73% camping
- 72% scuba diving
- 68% bush walking
- 62% 4X4 safaris

The mountain region of south-eastern Australia is well place to provide visitors with unique experiences in three of these top four activities.

The key stakeholders needed awareness of this potential market, and an understanding of what this market is seeking and how best to position the region to cater for the market. The project engaged the local communities to collectively invite a group of backpackers from around the world to experience a free tour of the region. The prime objective being to expose the local communities to the needs of the
market and invite feedback from the visitors on the suitability of the region, the quality of the products provided and the perceived value for money.

With financial support from local government and in-kind contributions from operators ten backpackers were treated to a 2-day tour through the high country between Licola and Dargo. Following the success of this exercise a second was arrange for eleven backpackers on a three day tour beginning at Bairnsdale, travelling via Ensay, Swifts Creek, Cassilis, Omeo and Anglers Rest to Glen Wills at the foot of the Bogong High Plains. In each case the visitors were taken to the attractions which locals considered to be their main drawcards.

The emphasis was to identify and utilise existing infrastructure to provide unique experiences for the visitors, and ensure that the market potential was exposed to as wide a cross section of the communities as possible. Examples of the range of experiences offered to the visitors were:

- Camp oven cooking and interaction with locals at Wallaby Rise
- Purebred dingo’s at Licola Lions Village
- Visit to thunder egg geological site
- Visit to mountain cattlemans hut
- Fire lookout station on the Pinnacles
- 4X4 drive on the Billy Goat Bluff Track
- Social evening in the Dargo Hotel
- Visit to Grant Historical area
- Wonnongatta River barbecue
- Town barbecue at the Omeo Historic Precinct
- Australian Stockman whip-cracking demonstration
- Visit to Glen Wills gold mining ruins
- Bush walk to Wombat Falls
- Lunch at the Blue Duck Inn, Anglers Rest
- Visit the Omeo Historic Precinct and Courthouse
- Visit Mt Markey Winery Cassilis
- Clay Target shooting at the Tambo Valley Gun Club
- Mountain Bike ride from Swifts Creek to Ensay with students from the Alpine School, Dinner Plain
- Country Pub lunch at the Little River Inn, Ensay

For each activity/product encountered the visitors were surveyed with three basic questions, a) product suitability to the backpacker market, b) hospitality experienced, c) value for money. The visitor response to the surveys were comprehensive, a total of 670 individual questions answered providing excellent feedback to the product providers. The overall responses to the three questions for each exercise are recorded in Table 1.

<table>
<thead>
<tr>
<th>Suitable Product</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licola - Dargo</td>
<td>49%</td>
<td>35%</td>
<td>12%</td>
<td>4%</td>
</tr>
<tr>
<td>Ensay - Omeo region</td>
<td>28%</td>
<td>48%</td>
<td>24%</td>
<td>0%</td>
</tr>
<tr>
<td>Hospitality</td>
<td>Excellent</td>
<td>Good</td>
<td>Fair</td>
<td>Bad</td>
</tr>
<tr>
<td>Licola - Dargo</td>
<td>55%</td>
<td>33%</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>Ensay - Omeo region</td>
<td>62%</td>
<td>32%</td>
<td>6%</td>
<td>0%</td>
</tr>
<tr>
<td>Value for Money</td>
<td>Excellent</td>
<td>Good</td>
<td>Fair</td>
<td>Bad</td>
</tr>
<tr>
<td>Licola - Dargo</td>
<td>15%</td>
<td>65%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Ensay - Omeo region</td>
<td>27%</td>
<td>48%</td>
<td>22%</td>
<td>3%</td>
</tr>
</tbody>
</table>
The exercises confirmed the belief that the region has much to offer the backpacker market, but also emphasised the need for communities to work together to become “product ready” for the market. The market requires the “total package” of the three critical components to be successful:

- Accommodation
- Transport
- Activities

Accommodation needs to be under $20/day, be in a secure homely environment with other backpackers, provide cooking and laundry services and be close to socialising opportunities.

Transport is a real issue for regional areas, 80% of backpacker rely on public transport, and often these links are not available to remote communities. The Alpine project is currently working with local and state governments to develop “passengers on mail-runs” as a possible solution to public transport infrastructure.

Activities need to be easily accessed, priced to meet the market expectations and be unique to the region in order to become a “must see/do” experience for the backpacker market. Often communities can provide these activities with minimal infrastructure investment requirements, as demonstrated by the Swifts Creek community. Backpackers were treated to a unique experience, clay target shooting at the local gun club which proved to be very popular, allowing the visitors to interact with the local community in an activity which is a part of everyday life here, but unique to the visitors.

Marit, backpacker from Holland

These exercises involving partnerships between remote communities have demonstrated a potential to utilise the mountain region in attracting visitors aware of environmental issues, interested in heritage and desiring interaction with locals in the region.

Full details of this project are published on the Maffra Community Resource Centre website at, [www.maffra.net.au/alpine](http://www.maffra.net.au/alpine).
Tourism in Protected Areas: Continuing Challenges and Emerging Issues for Sustaining Visitor Experiences

Stephen F McCool

School of Forestry, The University of Montana  USA

Mountains and Visitor Experiences

The high levels of growth in nature-based tourism in mountain landscapes continue to challenge land managers to sustain the experiences that parks and other protected areas were established to provide. Mountain protected areas provide valuable opportunities for tourists to be tested, to learn about and appreciate nature, to strengthen family togetherness and build lifetime friendships, to find solitude, to attain escape from the pressures of an increasingly chaotic and frenzied urban culture, to seek spiritual insight, to become physically fit, and to develop and reinforce outdoor recreation skills.

The ability of mountains to provide such opportunities is no accident. Their topography, climate and vegetation have often made extensive development difficult, so that they have remained as remote vestiges of a more primitive and earlier landscape. The absence of continuous development and agriculture leaves their meanings and opportunities to the human imagination. While we can argue whether these benefits of mountains are solely dependent on their largely undeveloped status, these benefits are often sought in mountain landscapes.

The emergence of mountains in the 20th century as havens for recreational opportunities has lead to important questions for managers of the protected areas that lie within them, the small communities that were once established to exploit mineral and timber resources found in mountains, the tourists themselves, and the private sector entrepreneurs that seek to capitalize on a growing market for these opportunities. What experiences do visitors seek? What do they find acceptable and what is preferred? Which of these experiences is appropriate in mountain landscapes? How do we manage landscapes to provide for these appropriate experiences? How do we decide on what is appropriate? Who gets to decide? How do we listen to those visitors who are excluded from study? What types of areas provide for what kinds of opportunities? How do we, as managers, both think and act regionally? How do we reconcile competing objectives and conflicting experiences? How do we transition from one economy to another? What capacities do communities have for a tourism economy? What role does the private sector have in providing experience opportunities in publicly administered areas? The challenge to sustain visitor experiences in protected areas encompasses these questions and many others.

In addition, the developing expectations that parks provide a variety of ecosystem goods and services, serve as refuges for endangered species of fish, wildlife and vegetation, and function as centers for learning about the effects of development and other human endeavors act as a complex overlay upon the traditional roles of parks in providing opportunities for nature and culture based recreation. These newer expectations in combination with growing desires that parks and protected areas also provide the
foundation for a variety of income producing recreation activities serve to test even the most perceptive
and competent manager.

Mingled with an ever more conservative political agenda that increasingly replaces a publicly funded
model of management with a market driven one, it would be easy to abandon a principled, conceptually
sound and socially acceptable method of management for one that relies solely on market tendencies and
fancies. This is the natural propensity when adopting a private sector model for managing publicly
administered resources. Yet, such resources are driven by mandates that go well beyond the market
responsive desires of private sector business.

Managers, visitors, communities and business leaders have somewhat different interests in sustaining
visitor experiences, and as a result these interests may at times collide, at others reinforce each other. The
challenges and issues emerging from the intersections of these interests with protected area mandates are
usually complex, frequently contentious, and filled with uncertainty. Within a social and political
environment that is increasingly turbulent and volatile, sustaining visitor experiences has become, if
nothing else, a messy job. In this paper, I review the significant challenges and emergent issues that
confront the four interests as they seek to sustain visitor experiences.

**Continuing Challenges**

Sustaining visitor experiences over the time scales necessary to build a business, to protect a park, to
make available quality tourist opportunities or to assist a community requires vigorous engagement of
business leaders, community activists, visitors and park managers. The ability to provide high quality
opportunities over long time frames is fundamental to being competitive in the global arena that
characterizes 21st century tourism.

There are three significant challenges that confront those for whom providing high quality recreation and
tourism opportunities is important. First, mapping and measuring the experiences visitors desire persists
as a major challenge, not only for researchers, but also for the park managers mandated to provide
opportunities and businesses seeking to find a profitable market. Second, linking these desired
experiences to the attributes that are needed to provide for them remains problematic. And, third, the
relationship between the natural environment, which serves as the foundation for these desired
experiences and the tourism industry that often exploits them is often poorly understood, yet is
fundamental to sustainability.

**Mapping and Measuring Visitor Experiences**

At the heart of sustaining visitor experiences is a significant research task that involves understanding
what outcomes tourists seek when visiting mountain landscapes. In one sense, the technology for
mapping and measuring visitor experiences is well advanced, but evolving, broadening the repertoire of
methodologies available. In the US, a strong research tradition built upon the work of Driver, Brown,
Knopf and associates (e.g., Driver, Tinsley and Manfredo 1991; Driver, Brown and Peterson 1991) has
informed many a park and protected area manager of the experiences, outcomes and benefits that tourists
seek during a visit. This approach to identifying visitor experiences is based on the proposition that a
satisfying experience is determined by the extent to which the actual outcomes sought compare to those
experienced. This approach largely attempts to identify the specific social-psychological outcomes sought
by visitors, thus being specific about what it is that visitors seek.

I offer up two examples of this approach in which I was involved. In the first study (McCool and Reilly
1994), we examined visitors to three state parks in Montana. The purpose of the study was to provide
information about what outcomes visitors seek when they visit a state park and how those may be used in
determining how managers might deal with specific attributes of the park. In this study, we assessed the
importance of a number of expected outcomes by asking sampled visitors to complete a mail return
questionnaire: nature appreciation, solitude, activity participation, escape and family togetherness. Among
these motivations, we found that nature appreciation was the most important as shown in Table 1, a significant finding in itself. However, we know that visitors often bring with them expectations

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5 Complete details about the methodology are found in McCool and Reilly (1994).
for a variety of outcomes: it is this package or cluster of outcomes that more appropriately describes the experience people seek in a recreational engagement.

However, visitors to a recreation site or protected area are not all the same: there are likely to be a variety of visitors seeking somewhat different outcomes (Shafer 1969): what benefits or outcomes that are important for one subgroup of visitors may be unimportant for another. To identify the potential subgroups visiting these parks, cluster analysis was used to group visitors together based on the similarities in their pattern of scoring on the outcome domains identified, as shown in Figure 1. Four types of visitors, based on how they viewed the importance of various outcomes or benefits of visiting these parks were developed in this cluster analysis. This analysis developed essentially four market segments.

The second example deals with visitors on a day hiking trip in several areas in Glacier National Park (Miller, McCool and Freimund 1997) in Montana. This study used a similar approach as the state park one: we asked visitors to complete a questionnaire that included their ratings of the importance of several outcomes, including solitude, security, appreciating wildlife, introspection, and personal control. The results of clustering visitors on these different dimensions of the experience are shown in Figure 2.

Both studies identified the experiences people seek, and indicated that visitors to these parks are composed of a series of minorities (each cluster in the two studies is around 25% of the population sampled) based on the cluster of outcomes they seek. Each of the experience minorities shares with the others some similarities, but is differentiated from the others by the importance to which certain outcomes are held. The presence of several minorities thus advances the notion that there is diversity in the types of experiences people seek. One particular mountain landscape may thus provide the setting for different opportunities. In a sense, a setting is several settings, as it evokes different meanings for different visitors.

Borrie and Birzell (2001) discuss several other approaches to identifying the experiences visitors seek when entering a protected area. These include meaning-based approaches (where scientists attempt to understand the role of wilderness or other protected areas within the larger context of the visitor’s life), experience-sampling methods (where researchers, through the use of a beeper or other means ask study respondents to describe moods and other feelings about wilderness at specific points in time) and importance performance analysis (which calls upon visitors to rate the importance of certain setting attributes to their experience and how those attributes functioned during their visit). Each of these approaches has certain advantages and has varying utility for how a specific mountain setting would be managed.

**Linking Site Attributes to Desired Experiences**

Mapping the outcomes that visitors expect to attain from a recreational engagement is important, but understanding how to manage settings so that they may achieve these outcomes is critical to sensitive stewardship. In terms of visitor experiences, all managers can do is provide the opportunity for visitors to achieve the experiences they seek; visitors create experiences by interacting with the attributes or conditions they encounter at a recreation site. Recreation sites contain many attributes, biophysical, social and managerial (Clark and Stankey 1979). Only some of which may be relevant to particular experiences, others may be salient to all experiences. When recreationists visit a site they essentially “pick and choose” the salient attributes and from those “produce” a recreational experience.

Recreationists may have norms or standards by which they judge the acceptability of the salient attributes or conditions they encounter, thus leading to a favorable or unfavorable evaluation of those attributes. However, these norms will be related to the importance of the outcomes sought. Thus, for example, a backcountry hiker for whom solitude is an important dimension of the experience would likely have stronger and more well-defined norms for encountering others on a trail than another recreationist who is not expecting solitude. The former would evaluate encounters with others more negatively than the latter.

Yet, there is a subtle issue here. Managers can only provide opportunities for people to achieve certain desired outcomes. The visitors themselves produce the experience. Managers manipulate setting attributes and conditions in order to increase the probability that a certain set of experiences can be produced, but as
noted above, often visitors will realize experiences not necessarily intended by managers. Thus, in order for managers to increase the probability of certain experiences, objectives for a protected area must be stated in order to clearly define the intended experience.

If our objective is to sustain experiences, then we need to understand how setting attributes are related to these experiences. Figure 3 show how this may occur using some of the data from the study of Glacier National Park visitors. We asked visitors to what extent the conditions and attributes they encountered during their hike “threatened” the reasons for visiting the park. The figure shows that different types of visitors had, in some cases, different reactions to conditions, and in other cases, their reactions were similar.

The data suggest that how a park or other protected area is managed will affect the ability of a visitor to achieve the outcomes sought. For example, if management decides that too many people are visiting the park, and implement a use limit policy, people who are sensitive to high use levels and encounters will be favored. If managers provide lots of development, those visitors seeking experiences related to appreciating nature or scenery would be negatively impacted.

**Linking Experiences Dependent on Natural Environments to the Tourism and Recreation Industry**

The third challenge concerns how the tourism and recreation industry views stewardship of mountain landscapes. Much of the tourism and recreation industry in mountain landscapes is directly linked to the quality of the natural environment that exists there. In the State of Montana, one study reported that about 50% of the state’s tourism industry, measured as gross retail expenditures of non-resident visitors, was directly linked to activities occurring on wildlands (Yuan and Moisey 1992). A marketing study by the Angus-Reid Group of California travelers observed that “a place that takes care of its environment” is a very important consideration in selecting out of state destinations. Further, “a chance to see wildlife and undisturbed nature” was ranked as very important by 44% of the respondents. Menning and McCool (1993) reported that where there was congruence in visitor attitudes between an environmental motivation and an image of a destination as “natural”, respondents were more likely to visit an area than other tourists.

This data suggests that good stewardship of the natural environment lies at the foundation of a successful tourism and recreation industry, particularly in mountain landscapes that are sensitive to impacts. Good stewardship requires active, competent managers, a socially acceptable plan to identify a future and how to get there, and the funding resources (and in some cases policy) to ensure that the actions designed to secure a desired future indeed are implemented as scheduled. Fundamental to these requirements themselves is the political activism needed to draw attention to management challenges and to allocate the money required to deal with them. Here the interests of managers, visitors, communities and businesses converge, for without good stewardship, the recreational and tourism values underlying and important to each interest may be threatened or even lost.

Of all these groups, the tourism industry generally wields the most influential political power. Its comments and input into the political process are important in determining policy, allocating funds, and in implementing management actions. Yet, I have detected reluctance, particularly in the US, to engage in lobbying for stewardship of mountain protected areas. Often we see industry lobbying against certain proposed actions, but rarely do I see tourism organizations lobbying for increased park budgets, pressuring for new management plans, and advocating for protection over utilization.

There may be systemic reasons for this. It may be difficult for a motel owner, a restaurant proprietor, a service station manager, or even a transportation vendor to see the connections between a business and the quality of a nearby park. It may be that the management of the park is viewed with disdain or not trusted. The tourism industry may not possess much ownership in the park or a management plan. Regardless, of the reason, visitor experiences are destined to decline in quality or become more exclusive without the active political engagement of all interests, but particularly tourism dependent business and trade organizations.
Emerging Issues

The above challenges have confronted the managers of mountain protected areas for a long time. Against this backdrop of continuing challenges, three issues are emerging that will confront stakeholders interested in these areas. What experiences are to be provided has become a major developing issue as recreational interests have diversified. Second, we are increasingly confronted with the challenge of managing within the context of a region. And, third, how do we manage to be adaptable in a world of change, uncertainty and competitiveness?

For Whom do We Manage?

Looking back on the two examples of park visitors, we observed that each of the studies demonstrated that there were several clusters of visitor types. And, we observed that each type had somewhat different perceptions of preferred setting attributes. A major implication of these findings is the question of who (in terms of clusters of visitor types) should the park be managed for.

Not all visitor types may be expecting outcomes that are consistent with park objectives. It would be inappropriate to manage setting attributes and conditions consistent with these expected outcomes. There may be several visitor types that can be accommodated within park objectives, but their preferences for setting conditions may be substantially different. Attempting to satisfy all visitor types may lead to a situation where none are really satisfied, and where each conflicts with the other. Thus, the recreational benefits flowing from the park will not be maximized.

By choosing one group to manage for, planners can increase the flow of benefits for that group, but, by managing setting attributes for one group managers may meet the needs of other groups. Careful examination of outcomes expected and how those are related to setting attributes can help managers better understand the consequences to visitor experiences, and thus ultimately the flow of benefits arising from satisfactory recreational engagements.

Making decisions about for which group to manage may be an uncomfortable one. Parks are for everybody, after all. Yet, quality is best assured through diversity of settings. Over a variety of jurisdictions, managing for different groups will actually maximize this flow of benefits (Wagar 1966). To do this will require regional level venues for discussion and allocation.

Managing Within a Regional Context

One of the fundamental tasks of protected area managers is to make tradeoffs between environmental protection and recreational access. Managers do this to ensure that the biophysical attributes serving as the foundation for recreation are not unacceptably impacted and reasonable, unrestricted access is provided for recreationists. But in making these decisions, managers often deal only with the area under their specific jurisdiction, attempting to reduce impacts and optimize recreation opportunities. Yet a single protected area exists within a regional system of areas, that is parks and other reserves that, while potentially managed by different agencies, are linked together in an informal system, such that management actions in one area affect management and recreation opportunities in another.

Sustaining high quality visitor experiences requires that we provide diversity of opportunity, generally within a region. Yet, there are few mechanisms and venues for managers to consider how to think and act at a regional level with respect to visitor experiences. Lessons from conservation biology, where corridors and reserves are being designed at large scales to provide habitats may be useful here.

The one area at a time approach has the potential negative impact of homogenization of recreation opportunities as each manager listens to the visitors currently entering the area. Visitors who are dissatisfied with current site attributes and conditions no longer visit and thus will not be consulted in determining visitor experiences. But since only those visitors entering the park are consulted, it is their opinions for which managers may be attempting to respond. Over a series of areas, we can end up in a situation where each area caters to approximately the same type of visitor, and thus the range of
experiences that are provided are reduced, ultimately to a point of homogenization (McCool and Cole 2001).

**Becoming Adaptable**

For 98 years, ending in 1969, a large bonfire would be lit every evening on the edge of Glacier Point in Yosemite National Park. At 9 PM, down on the valley floor, someone would call out “Let the Fire Fall”, and someone else 3,000 feet above would slowly push the burning coals and embers over the cliff with the words “The Fire is Falling”. For these 98 years, the Firefall was a component of a preeminent national park experience. But things change. What once was acceptable is no longer. The last Firefall occurred in 1969 because this activity, this experience was no longer acceptable.

While most of us would probably agree that being adaptable in the face of global change is a desirable characteristic, we face threats to experiences first, by being too adaptable and second, by having institutional designs that restrict adaptation in the face of overwhelming evidence that change needs to happen. The first threat is that of fads. Preferences shift; values and beliefs fluctuate, change occurs; but will the institutions respond?

Thus an emerging challenge to sustaining visitor experiences is adapting to changing visitor needs, but doing so consistently with the social mandate that established the protected area.

**Conclusion**

Sustaining visitor experiences remains one of the most challenging tasks of protected area managers for they must integrate sociology, psychology, political science and biology into a set of decisions that can only provide opportunity, not determine quality. Visitor experience decisions remain challenging because they also require integration of science and planning to develop opportunities that are difficult to tangibly describe. In addition, because managers of protected areas are generally rewarded for the stewardship they provide their area, there are distinct possibilities that gaps in the spectrum of opportunities may occur, opportunities may be homogenized, and duplication may occur.

The science of managing visitor opportunities within a systems context is not particularly well developed (McCool and Cole 2001). The science of identifying the experiences visitors seek has a strong conceptual foundation and is evolving to be more inclusive of different approaches and paradigms. We understand how to differentiate different types of experiences, we understand somewhat less how to manage to provide opportunities for people to experience these opportunities, we understand least, and are uncomfortable most with, how to make decisions about for whom—in the sense of experiences—a park should be managed.

Table 1. Mean scores and ANOVA significance levels on scales for respondents visiting each of the parks included in Montana State Park study (source: McCool and Reilly, 1994)

<table>
<thead>
<tr>
<th>Park</th>
<th>Benefit Scale</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nature</td>
<td>Solitude</td>
<td>Escape</td>
<td>Affiliation</td>
<td>Activity</td>
</tr>
<tr>
<td></td>
<td>Appreciation</td>
<td></td>
<td></td>
<td></td>
<td>Participation</td>
</tr>
<tr>
<td>Flathead Lake</td>
<td>4.2</td>
<td>4.6</td>
<td>4.7</td>
<td>3.7</td>
<td>2.6</td>
</tr>
<tr>
<td>Lewis and Clark</td>
<td>4.6</td>
<td>3.2</td>
<td>3.8</td>
<td>3.5</td>
<td>2.3</td>
</tr>
<tr>
<td>Makoshika</td>
<td>4.5</td>
<td>4.4</td>
<td>3.7</td>
<td>3.2</td>
<td>2.4</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>4.4</td>
<td>4.1</td>
<td>4.1</td>
<td>3.5</td>
<td>2.4</td>
</tr>
<tr>
<td>F Significance</td>
<td>.002</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>.027</td>
<td>.137</td>
</tr>
</tbody>
</table>
### Importance of Benefits by Segment

<table>
<thead>
<tr>
<th>Segment</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature Appreciation</td>
<td>5</td>
</tr>
<tr>
<td>Solitude</td>
<td>4</td>
</tr>
<tr>
<td>Escape</td>
<td>3</td>
</tr>
<tr>
<td>Affiliation</td>
<td>2</td>
</tr>
<tr>
<td>Activity</td>
<td>1</td>
</tr>
</tbody>
</table>

**Figure 1.** Results of cluster analysis that shows importance of various expected experience benefits by segment.
Figure 2. This figure shows the benefit segmentation of Glacier National Park day hikers (source: Miller and others 1997).
Figure 3. Figure showing how different experience or benefit segments felt that the conditions they encountered during their visit to Glacier National Park "threatened" the reasons (vertical access) for visiting the Park (source: Miller and others 1997).
Literature Cited


Communicating Minimal Impact Messages
In The Australian Alps National Parks

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Abstract

Millions of visitor-days are spent in the Australian Alps national parks (AAnp) each year, so the potential for environmental impact is great. By making visitors aware of why and how they can modify their behaviour to lessen that impact, interpretation provides cost-effective resource and visitor management. In the 1990s, the AAnp developed ‘Minimal Impact Code’ leaflets for different recreational pursuits. Evaluation in 1998/99—through extensive stakeholder consultation—showed the leaflets were reasonably effective at communicating, but had design deficiencies and were poorly distributed. To meet the identified need for a generic code of minimal impact (MI) behaviour across audiences, new MI messages were developed in 2001. Using an innovative research-based and consultative approach, a four-tier hierarchy of texts was created under the overarching slogan ‘Care for the Alps—Leave No Trace’. This paper summarises the processes and outcomes of that redevelopment.

Minimal Impact Education In The Australian Alps

With large numbers of people bushwalking, camping, canoeing, horse-riding, skiing, mountain biking or climbing—often in fragile habitats—there is significant potential for environmental impact in the Australian Alps national parks (AAnp). To minimise this, managers apply the three ‘Es’—engineering (site hardening at ‘honey-pot’ areas), enforcement (regulation of group sizes, ‘fuel-stove only’ zones) and education, showing visitors how and why to modify their behaviour to lessen their impact while still enjoying their recreational activities. Spurred on by Tasmanian successes (O’Loughlin, 1989, 1996), in the 1990s the AAnp introduced a leaflet series of ‘Minimal Impact Codes’ (Bushwalking, Car-based Camping, Mountain Bike, Horse-Riding, River Users, Snow-camping and Huts Codes).

Evaluating The Minimal Impact Codes

In 1998/99, these Codes were evaluated through extensive stakeholder consultation (interviews with visitors in Kosciuszko, Namadgi and Mt Buffalo National Parks; surveys and interviews with special-interest user groups; interviews with rangers and tourist/visitor centre staff—Beckmann, 1999a, 1999b). While the Codes did communicate MI information, specific deficiencies in content, design, amount of text and graphics decreased their effectiveness. Stakeholder feedback was comprehensive, including the identification of subtle and unintended messages, such as the bushwalker ‘looking miserable’ on the Bushwalking Code, or the illustration of young riders, but older bushwalkers, in the Mountain Bike Code. Overall, distribution was the main weakness: many Alps backcountry visitors and user groups were
simply not receiving the leaflets. User groups received moderate to high levels of MI messages through their own material, but these messages sometimes conflicted with management policy. There was widespread support for additional MI media, especially signage, face-to-face ranger contact, leaflets and feature articles in user-group/specialist magazines (Beckmann 1999a, b).

Redeveloping The Minimal Impact Messages—The Task

On the basis of the evaluation’s findings and recommendations, it was decided to redevelop the Alps MI messages to apply to all Alps visitors across a variety of settings and media using extensive formative evaluation (the developmental testing of material for its suitability for its intended purpose with its intended audience). The process involved literature research; development and testing of messages through stakeholder consultation; consideration of delivery media; and development of a medium-term monitoring framework.

Minimal Impact Education—The Theory

Modifying Behaviour Through Persuasive Communication

Minimal impact education aims to encourage visitors to adopt types of behaviour that reduce the level, or risk, of environmental impact. When the desired behaviour is already practised, MI messages act as reinforcement. When the desired behaviour is relatively novel (e.g. as with MI toileting), the objective is behaviour modification, and effectiveness depends on how well the visitor is persuaded to behave in the desired manner. Effectiveness of ‘persuasive communication’ is influenced by many factors—how the audience receives messages and relates them to underlying beliefs and attitudes; the relevancy and detail of information provided; the format and channel of presentation; and the timing of message delivery (Finn, 1985; Ajzen, 1992; Petty and Wegener, 1998; Beckmann, 1999c; S. Ham, pers. comm., 2002). Developing effective persuasive communication thus requires an understanding of how verbal and non-verbal messages influence human attitudes and behaviour, as suggested, for example, by the Theory of Planned Behaviour (Ajzen, 1991), the Elaboration Likelihood Model (Petty, McMichael and Brannon, 1992) and the Activation Theory of Information Exposure (Donohew, Palmgreen, and Duncan, 1980). Principles of behaviour psychology—the relevance of audience beliefs and attitudes—have long been applied by health communication professionals (Hochbaum, Sorenson and Lorig, 1992), and are now being addressed in road safety (Parker and Stradling, 2001) and wildlife-related visitor safety (Beckmann, 2001; S. Ham, pers. comm., 2002).

Research Findings From The Literature

Relatively little empirical research specifically relates to the communication of MI messages, but five key findings emerged.

1. Information conveyed through simple brochures disperses wilderness users, enhances opportunities for solitude, and reduces site impacts, with personalised information contacts more successful (Roggenbuck and Watson, 1986).

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1 Without formative evaluation, unexpected communication problems may arise. For example, one river safety poster was less effective than expected largely because the slogan ‘Don’t Croak in the River’ and its accompanying graphic of a frog clinging to a reed simply did not convey the intended message ‘Don’t die in the river’. Audience feedback showed that many people associated frogs with conservation rather than safety, and did not know the colloquial phrase: this lack of immediate understanding made it more likely that the whole interpretation would be dismissed, despite the safety messages elsewhere on the poster (Beckmann, 1994). Where resources permit, formative evaluation is becoming more common (Moscardo, 1999).
Figure 1 USA Leave No Trace Principles (LNT Educational Review Committee, 1999)

- Plan ahead and prepare
- Travel and camp on durable surfaces
- Dispose of waste properly
- Leave what you find
- Minimize campfire impacts
- Respect wildlife (new in 1999)
- Be considerate of other visitors (new in 1999)

These principles (each with several sub-headings) were chosen to reflect the most important visitor impacts and to communicate broadly.

2. In the mid-1970s, US Forest Service wilderness managers introduced face-to-face ‘no trace’ education (Marion and Reid, 2001). By the 1980s, a more formal program emphasised wilderness ethics and more sustainable travel/camping practices. In 1987, a ‘Leave No Trace Land Ethics’ leaflet (developed by the US Forest Service, National Parks Service and Bureau of Land Management) complemented the national ‘Tread Lightly’ program geared to motorised visitors (Marion and Reid, 2001). By 1990 the ‘Leave No Trace’ message was adopted nationally, with the principles revised in 2000 (Figure 1; Watts, 2000).

3. The Tasmanian MI Bushwalking campaign (O’Loughlin, 1996) showed the importance of:
   - knowing the audience (e.g. origin, motivations, MI attitudes);
   - using eye-catching messages, preferably humorous, sharp and short;
   - aiming and disseminating the messages to stakeholders; and
   - monitoring effectiveness (especially biophysical impacts and attitude changes).

4. Phrases used to focus MI education are reasonably familiar to visitors in Australian national parks—54% of 204 visitors to Bunya Mountains National Park (Queensland) knew the phrase ‘minimal impact bushwalking’ or ‘no trace camping’ (Parkin, 1997), while many Alps backcountry visitors knew all common MI phrases (Beckmann, 1999a; Table 1).

Table 1 Awareness and Perceptions of Common MI Phrases Among Visitors to Australian Alps national parks (adapted from Beckmann, 1999a)

<table>
<thead>
<tr>
<th>Phrase used in minimal impact education in Australia</th>
<th>Proportion of all interviewees who knew this phrase (n=109)</th>
<th>Proportion of all interviewees who thought this the most meaningful phrase (n=109)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal impact bushwalking</td>
<td>76%</td>
<td>20%</td>
</tr>
<tr>
<td>Take nothing but photographs, leave nothing but footprints</td>
<td>74%</td>
<td>49%</td>
</tr>
<tr>
<td>Minimal impact camping</td>
<td>61%</td>
<td>10%</td>
</tr>
<tr>
<td>Tread lightly</td>
<td>61%</td>
<td>4%</td>
</tr>
<tr>
<td>Walk softly</td>
<td>51%</td>
<td>0%</td>
</tr>
<tr>
<td>No trace camping</td>
<td>32%</td>
<td>7%</td>
</tr>
</tbody>
</table>
American researchers had examined the effectiveness of presenting up to eight MI messages on trailside bulletin boards in wilderness areas (Cole, Hammond and McCool, 1997; Cole, 1998). Reading the messages did increase visitors’ knowledge about appropriate practices, but very few actually read them, with ‘the attention devoted to each message and the ability to retain the message content’ declining as the number of messages increased, although using a simple ‘appeal’ increased attention time significantly. Hikers exposed to eight messages could not identify more of the recommended practices than those exposed to only two messages. Attention per message was greatest with just four messages, with the most retention of message content occurring with only two messages present.

Planning The New Messages

Trying to apply these empirical findings where possible, the project sought to define target audiences, identify content to be addressed in key messages, and develop a message structure.

Intended target audiences included independent visitors; special-interest recreation groups; commercial guides leading recreational/educational groups; young people participating in outdoor learning; and Alps residents, especially those involved commercially (e.g. tour operators, information centres, gear suppliers). Relevant experiences, beliefs, attitudes and behavioural norms vary across these audiences, so the new messages could make few assumptions.

Stakeholder consultation—with AAnc staff, special-interest groups and other visitors—was crucial. Consultation aimed to canvass ideas on proposed messages, to collect detailed feedback on draft wording (e.g. Did it patronise experienced visitors, or deter inexperienced ones?), to suggest supporting graphics, and to consider distribution.

An overarching and consistent slogan was essential. The messages themselves—limited to just six—needed to focus on communicating specific behaviours, not just concepts. Wording had to convey complex information clearly but with some language ‘play’ to enhance memorability, with each message supported by a visual element for sight learning and recognition.

At a February 2001 workshop, AAnc staff discussed slogans, branding, content, wording preferences, message structures and dissemination. The most important MI messages—i.e. relating to behaviours that cover the widest range of AAnc audiences and impacts—were identified as trip planning, use of tracks, use of fires, toileting, waste (litter) management and multiple-user recreation. Additional content areas—such as washing, health issues, interaction with wildlife and group size—were to be addressed within the detail of the six key areas.

The new messages were constructed in a four-tier hierarchy (Figure 2).

- Level 1—Slogan—a single phrase to communicate the overall MI message through a simple directive (i.e. telling people what to do), and to provide continuity and cohesion across all MI materials;
- Level 2—Key Message (KM) —short, memorable phrase to summarise the specific behavioural directive in each of the six key areas of MI impacts/practices; suitable for use on almost all media, and supported by easily recognisable graphics (Message Icons) to provide a visual reminder/reinforcement;
- Level 3—Key Message Support (KMS)—additional phrase to extend and interpret each Key Message, useable across most media;
- Level 4—Extended Sub-Text (EST)—more extensive (though concise and readable) text to expand on specific behaviours and their rationale, to be used in media/circumstances where visitors are receptive in terms of time/interest, or in situations when managers/interpreters want to target one or two messages in depth.
This hierarchical structure was designed to facilitate the overall communication process. Each level has different characteristics and content, with each successive level providing more information on the recommended behaviour and its rationale. Each level thus has different relevance to potential media and dissemination—a leaflet may use all four levels while an accessory could carry just Slogan and Message Icons. Not all KMs need be used in every situation, nor in the same order: where the main issues are behaviour on tracks and toileting, for example, these two KMs may be given priority. Conversely, on a well-used track three small signs at spaced intervals, each with two KMs, may be more effective than just one trackhead sign with all six messages.
Formative Evaluation

Between February and May 2001, the message structure and draft texts were developed in close collaboration with AAnp staff, then formative evaluation occurred from May to August 2001. First, students from the University of Canberra’s Cultural Heritage Management stream—representing inexperienced but supportive visitors—provided feedback on proposed group-work processes and draft text. Next, some 50 ACT- or NSW-based special-interest user groups (e.g. bushwalking/camping, vehicle-based touring, skiing, climbing, canoeing, cycling, outdoor education, Scouts, tour operators, gear suppliers) and independent recreationists—including contributors to the earlier evaluation—were invited to a workshop in Canberra. About 25 people attended, overall widely representative of target audiences.

Discussions were focused but wide-ranging. Consideration of the proposed slogan centred on the pros and cons of known MI ‘umbrella’ phrases. ‘Take nothing but photographs, leave nothing but footprints’ was popular in terms of awareness and memorability, but was considered inappropriate for fragile environments (where even footprints constitute an impact) and too strongly directed at walkers. Participants discussed three alternatives of the first three levels of each message. Having alternatives stimulated debate and identified audience perspectives (although individual written feedback ensured that verbal consensus was not dominated by a few). For example, participants felt that many campers are convinced they make safe campfires, so that it was better to emphasise fuel stoves being quicker and easier rather than safer.

After AAnp staff had checked revised wording/content for relevance across jurisdictions, 50 additional groups based in Victoria, NSW and ACT were invited to provide on-line (web-based) feedback. About 20 people responded (representative of Alps users both in activities and locations). Wording of all levels of text was then finalised and Message Icons commissioned by the AALC (Figure 3).

Message Structure—The Practice

While the final text at each message level appears simple, careful semantic analysis has been involved. For example, the Slogan Care for the Alps—Leave No Trace is to be used on all media both as a stand-alone summary/reinforcement element and as an introduction/summary of the key messages.
Figure 3  New Minimal Impact Messages for Australian Alps national parks Slogan, Message Icons, Key Messages (bold) and Key Message Support

Care For The Alps—Leave No Trace

Plan ahead. Think before your trip—about weather, equipment and safety.

Use a fuel stove—quicker and cleaner for you, better for the bush.

Carry it in, carry it out. Don’t burn, bury or leave anything.

Got to ‘go’? Use a toilet or take a walk—at least 100 paces from water and campsites. Dig 15 cm deep and cover well.

Stay on track—even if it’s muddy or dusty. Don’t widen tracks or take shortcuts.

Leave no trace. Walking, driving, camping, skiing, riding, climbing, paddling—whatever you do, aim to leave no trace.
The two-part directive is short, all-encompassing and acceptable across age/interest groups, and reinforces/expands the ‘no trace’ phrase used in the Alps Codes. ‘Care’ is a positive directive, well associated with environmental protection (e.g. LandCare). Direct mention of the Alps provides a clear ‘branding’ element. Linking the word ‘care’ to *Leave No Trace* identifies the nature of the care required while still retaining the wider interpretation of environmental protection in its broadest sense. Each of the six KMs addresses behaviours relevant to important impacts, with the final KM having both summary and appeal elements. The ESTs communicate the ‘official’ view of AAnp managers simply and concisely, but can be shortened, expanded or rewritten as needed. All wording is positive, simple and straightforward—only the toileting message has a potentially culturally- or linguistically-restrictive element (i.e. an understanding of the colloquialism ‘got to go’), but this adds a humorous element, explained by the KMS and Message Icon.

### Relating the Message Structure to Media Selection and Dissemination

Each level has different relevance to potential media and dissemination (Figure 4). Thus a water bottle may convey just the Slogan, Key Messages and Icons, while all four levels are appropriate in media expected to be read in full. Individual KMs and associated KMS can stand alone where just one impact needs highlighting. Visitors pay more attention to information in smaller ‘chunks’ and prefer information that is stimulating as well as informative (Donohew *et al.*, 1980; Finn 1985), so changing the number and combination of messages on different media at different sites may encourage greater attention. The broader design context is important too: the effectiveness of written media, for example, is influenced by typeface, colour and graphic design (Moscardo, 1999). Though outside the scope of this project, these design aspects will be crucial to the success of the strategy and each individual product. The aim is to present the Slogan and KMs sufficiently often to promote familiarity and reinforcement, but maintaining interest through different presentations. Formal monitoring (developed as part of the project) will depend on funding availability, but community awareness of the new Slogan and KMs could be assessed as part of the broader-focus Alps Benchmark Awareness Surveys.

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**Figure 4  Sample Media-Selection Matrix—Interpretive Media for Alps MI Messages**

<table>
<thead>
<tr>
<th>Interpretive Medium</th>
<th>Level 1 Slogan</th>
<th>Level 2 KM</th>
<th>Level 3 KMS</th>
<th>Level 4 EST</th>
<th>Appropriate Placement/Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flier, mini-poster (DL/A5)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>—</td>
<td>Major distribution sites (visitor centres etc.)</td>
</tr>
<tr>
<td>Leaflet (tri-fold A4)</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Major distribution sites; as insert into group magazines; commercial tour operators</td>
</tr>
<tr>
<td>Sign / display shelter</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>(+)</td>
<td>‘Honey-pot’ visitor congregation sites e.g. trackheads, chair-lifts</td>
</tr>
<tr>
<td>Accessory e.g. water bottle</td>
<td>+</td>
<td>(+)</td>
<td>(+)</td>
<td>—</td>
<td>Gear suppliers, visitor centres</td>
</tr>
</tbody>
</table>

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2 Widespread US use of ‘Leave No Trace’ for branded MI education (Marion and Reid, 2001) provides potential for external reinforcement. Not unexpectedly, similarities occurred between the principles/wording of Leave No Trace Inc. and the AAnp (Figures 1 and 3 respectively), but there are distinguishing cultural, linguistic and management perspectives.
Conclusions

Ever-increasing visitation in the AAnp make awareness, knowledge and implementation of MI practices essential. Using formative evaluation to develop the new messages provided relevant and cost-effective feedback, with consultation also providing positive promotional outcomes. Dissemination of MI messages is as important as wording or media (Beckmann, 1999a, b), so consistent effort and funding will be needed. The new messages are already being used—in an International Year of Mountains feature (280,000 copies distributed via information centres and regional newspapers, January 2002); in an educational insert (The Canberra Times, 45,000 copies provided to readers and in class sets to schools, February 2002); and towards the end of 2002 in a new AAnp icon brochure, a revised Huts Code, a water bottle, an avant card, a new Alps Walking Track brochure, and the website (C. Renwick, pers. comm., 2002; AAnp 2002). Informal staff and audience feedback is very positive. The research-based perspective has given Alps managers confidence in the likely effectiveness of the new messages, as well as continuing the process of engaging AAnp users and managers in co-operative MI education.

Acknowledgements

This work was commissioned by the Australian Alps Liaison Committee. Very special thanks to the Project Team—Cath Renwick, Simon Allender, Karen Civil and Virginia Logan—for enthusiastic support and feedback; to Dr Linda Young, University of Canberra; and to the many people participating in the consultation.
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The Cooperative Research Centre for Sustainable Tourism, Mountain Tourism Subprogram

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Abstract

The Mountain Tourism Subprogram of the Cooperative Research Centre (CRC) for Sustainable Tourism was established in 1999, to enhance the economic, social and environmental sustainability of tourism in Australia’s high country. In its first four years, the subprogram has been involved in research into visitor monitoring in the Kosciuszko alpine area and at Mt Buffalo; environmental education and interpretation; the economic benefits of the Australian Alps National Parks; impacts of human waste on alpine ecosystems; impacts of snow manipulation on vegetation; the role of tourism in the spread of weeds in the Australian Alps; national parks staff perceptions of the environmental impacts of tourism; environmental issues associated with the provision of walking tracks; climate change and tourism; and environmental management of mountain tourism and resorts. Within the program, at the School of Environment and Applied Sciences at Griffith University alone, we have produced four scientific papers, with a further five under review; four refereed book chapters; three CRC research reports, with another two under review by refereed publications; and 34-plus conference presentations. We have also provided support for three honours theses and three PhD projects.

What are Cooperative Research Centres?

The Cooperative Research Centres and Development Initiative was set up by the Commonwealth Government in 1990. The program was established to strengthen collaborative links between industry, research organisations, educational institutions and relevant government agencies. It aims to bring research providers and industry together to focus on outcomes for business and the community.

What is the Cooperative Research Centre for Sustainable Tourism?

The Cooperative Research Centre for Sustainable Tourism (CRC ST) was established under the Australian Government's Cooperative Research Centre (CRC) program, to underpin the development of a dynamic, internationally competitive and sustainable tourism industry. Its goal is to deliver innovations to business, community and government, in order to enhance the environmental, economic and social sustainability of tourism. Partners in the CRC ST include 14 universities; the peak government tourism bodies in each state and territory; and 20 industry partners, including Qantas, KPMG, American Express Travel Related Services, and the Bureau of Tourism Research.
Within the CRC ST there are seven programs: 1) Tourism, conservation and environmental management research, 2) Tourism engineering design and eco-technology research, 3) Tourism policy, events and business management research, 4) Tourism information technology and infomatics research, 5) Post graduate education, 6) the Centre for tourism and risk management and 7) the Centre for regional tourism research. Within 1), the Tourism, conservation and environmental management research program, there are four subprograms: 1) Adventure tourism, 2) Wildlife Tourism, 3) Nature tourism and 4) Mountain Tourism.

**What is the Mountain Tourism Subprogram?**

The Mountain Tourism Subprogram is a research partnership established between ski resorts, universities, national parks, and local tourism organisations, in the Snowy Mountains, the Victorian High Country, Tasmania and the Australian Capital Territory. Our goal is to enhance the environmental, economic and social sustainability of mountain tourism in Australia.

**Why do we need research into mountain tourism?**

Mountain tourism is a large, important and distinctive area for tourism in Australia (Hill and Pickering 2002; Worboys and Pickering 2002). As with other sectors of the tourism industry, there is a vital need for research to ensure sustainability. Key aspects of mountain tourism in Australia include ski resorts, summer tourism, backcountry tourism, the potential impact of climate change, economics and visitor monitoring.

Ski resorts are one of the most intensive forms of tourism development in mountain areas (Buckley et al. 2000). They have large capital and operating costs, significant reserves and potential profitability, and often operate in very sensitive natural environments. As industry members compete for clients, they are increasingly seeking to expand visitation by broadening their range of activities. They are evolving from "ski resorts" into "winter resorts" and, by lengthening their operating season, from "winter resorts" into "mountain resorts" (Konig 1998; Buckley et al. 2000).

Mountain tourism is not all resort based. In winter it also includes wilderness touring on cross-country or telemark skis, or snowboards and snowshoes; guided commercial backcountry tours; visits to huts; and the use of rope tows, small club skifields, larger commercial skifields without accommodation, and skifields with lodge accommodation only (Buckley et al. 2000; Pickering and Hill In press).

Summer mountain tourism includes car touring, guided walks, horse riding, paragliding, mountain biking, camping in organised camp sites, backcountry camping, hiking on trails, hiking off trails, sightseeing, wildflower viewing, rock climbing, hang gliding, fishing, and golf (Good 1992; Hill and Pickering 2002; Worboys and Pickering 2002). Some of these activities make use of resorts and associated facilities. Others use facilities such as roads, trails, and organised campsites away from resorts (Arkle 2000; Hill and Pickering 2002). A growing number of these activities occur in remote wilderness areas with high conservation requirements (Worboys and Pickering 2002).

Dramatic changes in the climate of alpine areas in Australia have been predicted to occur within the next 70 years (Whetton 1998). These changes involve a reduction in snow cover, increased temperatures and possible lower precipitation. The models indicate fairly substantial changes in the total area covered by snow, and a substantial change in the duration of snow cover for specific locations.

Such alterations to snow cover are likely to have significant effects on ski resorts and mountain tourism in Australia (Buckley et al. 2000). Poor snow seasons in the past have resulted in dramatic declines in income for resorts and their associated commercial activities. Surveys of people currently visiting resorts to ski or snowboard indicate that the majority would either give up skiing, ski overseas, or ski in Australia less often, if snow cover declines (Konig 1998). Non snow based tourism could act as a buffer for any such changes, as well as enhancing the economic viability of the industry in the current environment. Resorts and local regional centers need to start focusing more on year round tourism, including conference, educational and health tourism, as well as increasing educational and activity holidays and adventure sports (Konig 1998; Worboys and Pickering 2002).
These types of changes in tourism activities and in their timing and intensity result in changes in the economics, demography and environmental sustainability of the industry (Worboys and Pickering 2002; Mules 2002). Therefore a better understanding and monitoring of visitors to resorts and national parks, both in summer and winter, will assist with effective planning for all those involved in mountain tourism (AALC 1999; Triandos 2000; McMasters 2000). Effective use of visitor data can enhance the economic sustainability of the industry. It can also assist with effective planning for maintaining the environmental values that are a vital component of the attractiveness of the region to tourists.

The sustainability of mountain tourism in Australia requires effective management, based on accurate research, of all aspects of mountain tourism at the national, regional and local levels. This research is being provided by an innovative and interdisciplinary team that addresses the needs of: the tourism industry; regional economies that are dependent on mountain tourism; specific resorts and tour operators; the public; and national parks. That’s what the CRC ST Mountain Tourism Subprogram is here to do.

**The Mountain Tourism Subprogram at a glance**

**Objectives**

- Summarise patterns and trends in Australian mountain tourism.
- Review environmental management issues for mountain tourism in National Parks.
- Assess likely effects of climate change on mountain tourism.
- Establish economic importance of mountain tourism.
- Facilitate management of ski resorts in mountain tourism.
- Facilitate the development of sustainable backcountry and summer tourism in the mountains.

**Outcomes**

- Assistance to stakeholders in strategic planning for sustainable mountain tourism, in the light of tourism trends, climate change and environmental management issues.
- Diversification of mountain tourism, including environmentally sustainable summer tourism.
- Improved market and financial viability for mountain resorts and tour operators.
- Improved environmental sustainability of mountain tourism in protected areas.
- Integration of mountain tourism into regional tourism development.
- Implementation of policies, strategies, legislation and other institutional instruments to facilitate sustainable development of mountain tourism.
- Enhanced co-operation between natural resource managers and resorts and other tourism operators in the management of mountain tourism.

**Deliverables**

- CRC Research Reports in Mountain Tourism (four published, two under review).
- Papers in refereed international scientific journals (nine published or under review).
- Chapters in academic books (four published, two more in draft).
- Academic books (two published).
- Factsheets (four produced so far).
- Conference presentations (34-plus at international and national conferences).
- Workshops (four jointly with the Australian Institute of Alpine Studies, two with the Australian Alps Liaison Committee).
- Research theses (three current PhD students and three completed honours students).
- Sponsor of the International Year of the Mountains conference “Celebrating Mountains”.
- Contribution to new Kosciuszko National Park Plan of Management.
Figure 1 - Scope of subprogram research projects
<table>
<thead>
<tr>
<th>Title</th>
<th>Principle university researchers</th>
<th>Stakeholders involved</th>
</tr>
</thead>
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<tr>
<td>Mountain Tourism Subprogram</td>
<td>Dr C. Pickering, School of Environmental and Applied Sciences Griffith University</td>
<td>consultation with industry and government.</td>
</tr>
<tr>
<td>Tourism in Kosciuszko National Park: planning for change</td>
<td>Dr C. Pickering, P. Scherrer School of Environmental and Applied Sciences Griffith University</td>
<td>Griffith University New South Wales National Parks and Wildlife Service (NSW NPWS)</td>
</tr>
<tr>
<td>Visitor monitoring in mountain parks and resorts</td>
<td>Dr R. Russell, Formally Faculty of Law and Management School of Tourism and Hospitality La Trobe University</td>
<td>Parks Victoria Mt Buffalo Chalet Mt Hotham Resort Management Mt Buller Resort La Trobe University</td>
</tr>
<tr>
<td>Sustainability of mountain tourism</td>
<td>Dr C. Pickering, W. Hill, F. Johnston, and A. Growcock School of Environmental and Applied Sciences Griffith University</td>
<td>Australian Alps Liaison Committee NSW NPWS Griffith University Thredbo Chamber of Commerce University of Canberra</td>
</tr>
<tr>
<td>Events and festivals: ensuring economic sustainability in mountain areas</td>
<td>Prof. T. Mules, Tourism Program, University of Canberra</td>
<td>University of Canberra</td>
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<td>Visitor monitoring for regional areas: a case study of tourism in the Snowy Mountains region</td>
<td>Prof. T. Mules, Tourism Program, University of Canberra</td>
<td>Tourism Snowy Mountains University of Canberra</td>
</tr>
<tr>
<td>Characteristics and expectations of alpine backcountry bushwalkers in Tasmania</td>
<td>Lorne Kriwoken, Centre for Environmental Studies, University of Tasmania</td>
<td>University of Tasmania Parks and Wildlife Service of Tasmania</td>
</tr>
<tr>
<td>The economic value of tourism to the Australian Alps protected areas</td>
<td>Prof. T. Mules, Tourism Program, University of Canberra</td>
<td>University of Canberra Australian Alps Liaison Committee NSW NPWS Environment ACT Parks Victoria</td>
</tr>
<tr>
<td>International Year of the Mountains in 2002: promoting sustainable mountain tourism in Australia</td>
<td>Dr C. Pickering, W. Hill, School of Environmental and Applied Sciences Griffith University</td>
<td>Australian Alps Liaison Committee Australian Institute of Alpine Studies Griffith University University of Tasmania Parks and Wildlife Service of Tasmania</td>
</tr>
</tbody>
</table>
References

AALC See Australian Alps Liaison Committee.


Improving Planning For Sustainable Mountain Tourism – Consideration Of Cumulative Impacts

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Abstract

The acknowledgment of the relationship between tourism and cumulative impacts is not new, and is increasingly important considering the global concept of sustainability. This is further emphasized by the fact that tourism often occurs in environmentally sensitive environments, including many of the world's mountainous regions. The question of how effectively cumulative impacts are considered in mountain tourism in Australia and Canada forms the broad research context for this paper. Key literature identifies links between cumulative impacts and tourism (Wight 1994) with the view that it is in the interest of the tourism industry that cumulative environmental impacts be managed, since these impacts can destroy the industry's commercial viability very rapidly (Butler and Waldbrook 1991).

Research has involved investigation of a completed study process, incorporating cumulative impact assessment, in Banff National Park, Canada and application of a approach to cumulative impact assessment in consultation with Resort Management and Government Regulators in the Victorian Alps, Australia. This paper will consider some of the opportunities and limitations involved in translating cumulative impact assessment into improved planning for tourism in mountain regions.

Introduction

The primary thesis of this dissertation is that “planning for sustainable tourism regions can be improved through consideration of cumulative impacts”. Applying a theoretical model (incorporating research and planning) demonstrates how cumulative impacts could be considered and managed within current planning frameworks. This is explored with reference to the Banff Bow-Valley in Canada and the Victorian Alps, Australia.

According to the literature review, planning for tourism has principally been development based and hence has not been integrated with broader planning processes. Combined with the lack of consideration of cumulative impacts (as a result of limited research and planning) the achievement of sustainable tourism is limited. While tourism is an important activity it does operate within a system of other land uses, human needs and desires, ecological capacity etc. Various activities are inextricably linked, and ignoring the integrated nature of activities and impacts and their combined, synergistic and cumulative effects can result in negative consequences.
Literature

Cumulative impacts (CI) are the effects on valued environmental component(s) that are additive in time, space and/or interact together (Cameron 2000 and Hegmann et al. 1998). Cumulative impact assessment aims to take the longer and broader view to identify the possible total effect of decisions about a number of seemingly isolated projects (Thomas 1998).

A holistic or systems view of all elements (human and natural) is increasingly recognised as necessary for a sustainable approach to development generally (Odum 1982; Suzuki 1999), and in relation to tourism development (Carlson 1998; Getz 1983; Gunn 1979). Systems theory was adapted to urban and regional planning (Chadwick 1971), and has been used to inform various models in relation to tourism planning (Getz 1983).

Cumulative impacts have been recognised as an important issue in planning for sustainable tourism (Butler 2000; Buckley 1994; Court et al. 1994; Dowling 1993; Pearce et al. 1993; Wight 1994). Review of current practice reveals that there is considerable room for improvement in planning for tourism, the industry with perhaps the most to lose from inadequate consideration of sustainability issues (Butler and Waldbrook 1991; Dredge 1997; Ecologically Sustainable Working Groups 1991; Hall, Jenkins and Kearsley 1997; Hall and Lew 1998; Prosser 1991). The cumulative impacts of individual tourism developments frequently threaten the ecological, economic and social “carrying capacity” of tourism areas and undermine the natural and social values that attract tourists. In many cases the planning and impact assessment methods and processes currently in use are not effective in managing the cumulative impacts of all tourist enterprises to ensure the sustainability of the tourism resource (Buckley 1991; Butler 2000; Harvey 1998; Hunter and Green 1995; McDonald 1999; Orians 1995; Rees 1988; Theobald 1994). Many tourism/recreation impacts take place in uncontrolled settings, posing problems for the traditional scientific approach (of control population or site). Cause and effects can often only be surmised rather than proven. It is difficult or impossible to separate effects of tourism from those of other activities and processes of change (Butler 2000: 343).

Impacts research needs to be more frequently incorporated into the management of tourism and recreation areas to minimise adverse consequences (Butler, in Pearce and Butler (eds.) 1993 and Butler 2000). Literature indicated that there is limited acknowledgement of cumulative impacts as being particularly critical in tourism as well as very little research or method application in this area (Dredge 1998; Sun and Walsh 1998). Cumulative impact assessment (CIA) can play a role in management of current projects, allowing for future development, while also considering regional carrying capacity (Glasson, Therivel and Chadwick 1999; Rees 1988; Tollefson and Wipond 1999).

Research

Research aimed to consider the relationship between tourism regions and cumulative impacts, as well as how this knowledge can be included in planning so as to improve the sustainability of tourism development. Consideration of how cumulative impacts can be considered to achieve sustainable tourism was investigated, through review of international cases, the Banff-Bow Valley Study, Canada (Green et.al.1996) and application of a network approach to CIA in Mt Hotham Alpine Resort/Alpine National Park, Victoria, Australia. This involved information collation and investigation of research questions using a theoretical model framework (Getz 1986) and a combination of document analysis, case study, interviews, observations, and a questionnaire. This variety of methods was used to achieve reliability and validity of research results, in using qualitative methods (Leedy 1993; Minichiello et al. 1995).

Getz (1986) proposed the “Integrative systems model of tourism theory and planning” be applied to the assessment of an areas capacity to absorb tourism. Central to the model is that the planner or decision-maker should integrate understanding of the tourism system with control of the system. The incorporation of cumulative impacts in improving system understanding and planning is investigated through application and adaption of the model.
The Banff-Bow Valley Study (1996) was selected as a case study due to their being a substantial amount of research and writing on cumulative effects assessment in Canada, and the study was an application of CIA to a regional tourism situation, with sufficient time elapsed to enable analysis of whether this has informed planning. In Banff National Park (and region), it became clear that various projects over time were in combination detrimentally affecting the Banff Bow Valley ecosystem. The Task Force agreed that complete and naturally functioning ecosystems, a healthy environment upon which a viable, regional tourism industry depends, and a clean and abundant water supply for the large population centres along the Bow River were too valuable to risk (Page et al. 1996). The objective of the Cumulative Effects Assessment (CEA) was "to quantitatively assess the cumulative effects of land use, development, human presence and activities on aquatic and terrestrial ecosystems, the physical environment and socio-economic systems by evaluating the changes to key representative species or indicators in the past, present and the reasonably foreseeable future" (Page, et. al. 1996:367). This case demonstrates that the cumulative impacts of tourism and associated development became recognised as a threat to the values of the region and to future sustainable tourism development in the National Park.

The Australian Case Study research applied a network approach for cumulative impact assessment developed by Lane et al. (1988) from Canadian research (largely supported by CEARC), used conceptually in an Australian Commonwealth Review of CIA (Court et al. (1994)). This network represents causes, actions, primary impacts, secondary impacts and tertiary impacts. Networks have value as a means of identifying cumulative impacts and can be used to pinpoint cause and effect relationships and identify priority impact issues, tracing their base causes to enable effective management (Dixon and Montz 1995). Further, networks can be developed using expert judgement (Lane et al. 1988 and MacDonald 1998), in the absence of other data. The nature of cumulative impacts study, and the relative unavailability of quantitative data means that "…qualitative methods are used to a greater extent " (Cooper and Canter 1997: 26).

Document review was collated in combination with interviews to identify valued resource components, activities and impact issues. This information was used to construct the network diagrams in relation to tourism use of the Victorian Alps and more specifically in relation to the Horsehair Plain Airport development for Mt Hotham Alpine Resort. A questionnaire was distributed to consolidate the network, prioritise issues as well as to assess the usefulness of the network diagram in communicating cumulative impacts in a given area to decision makers. This presented one samples’ view and would require greater input and iterative workshopping to make the results more robust.

**Opportunities and Challenges in managing cumulative impacts for sustainable tourism**

Obstacles or challenges in this context can be identified for (a) cumulative impact assessment generally, (b) the Banff case, (c) the Australian Case Study CIA, and (d) the network analysis approach. This section will consider opportunities and obstacles with particular reference to the lessons from Banff and Victorian case studies.

**Opportunities**

The Banff study focused on the research component, with an ecological bias but did not adequately include the management component to successfully consider cumulative impacts. Planning has since been implemented (with varying success) and would appear to at least have increased knowledge of the affects of tourism in the natural ecosystems.

The Banff-Bow Valley Study and associated activity did create a reaction and increased awareness of cumulative impacts in a region of high visitor use (Ross pers.comm. 1999, Creasey 1999, Page pers.comm.1999, McDonald and Aumonier 1998). It has also prompted the development of formalised approaches to cumulative impact assessment in Parks Canada management. Cumulative effects/impacts are now explicitly considered in Parks planning, tourism operations have been changed (and in some cases limited) and a tourism strategy (appropriate to the nature of the setting and knowledge of cumulative impacts over time) has been developed and is being implemented.
There are still conflicts in relation to legislation requirements and the setting of limits in tourism development (although this provides some certainty in development planning). It has provided an important step in the application of cumulative impact assessment, but also points to the constraints in terms of resources.

Incremental growth in the Victorian alpine areas, was recognised. Combined with the fact that the environment is very sensitive to damage and there is a push for year round utilisation of resorts, better understanding of capacities and a longer-term view could allow Victorian Alpine resorts to remain competitive in changing circumstances over the longer term. Environmentally sensitive approaches to resort development, such as that used by Mount Hotham Resort Management in the Mary’s Slide/ The Orchard lift development (Arup 2000 and Keenan 2000) has the potential to reduce the individual impacts of various development projects while also making a contribution to reduction of future cumulative impacts.

Experts, in the Victorian case study indicated that the most important issues relating to development of alpine tourism infrastructure was topographic and environmental changes and their secondary and tertiary impacts. Identifying cumulative impacts can provide the policy maker with a clear indication of the area that may have to be more closely monitored in the future to manage impacts. This could also indicate which impacts should be subject to scientific quantitative analysis and evaluation (Hunter and Green 1995).

Priority issues can be identified from the network method allowing strategic planning and management efforts to focus on these. This also allows achievement targets to be set. There is the potential to apply significance weightings to issues and branches of the network to potentially address some of the acknowledged limitations of the network method. Hence, the results of the CIA exercise in the Victorian Alps could be used to inform the current strategic planning process, highlighting issues for management and flagging impacts on particular valued ecosystem components that may require monitoring.

It was found through the Victorian Case Study that the tourism industry and resource managers have a wealth of knowledge that can be used to define a qualitative regional context for assessment of cumulative impacts (without the need for complicated methods or quantitative analysis). The biases involved with using expert opinion should be kept in mind and minimized where possible. Where quantified data is available this can be used to inform decision-making.

**Challenges**

Some of the challenges inherent in cumulative impact management also apply to impact assessment and planning generally. These include limited jurisdictional authority, the role of public perceptions, multi-stakeholder requirements, issues of scale (spatial and temporal), availability of information, political will, ability to undertake assessment, uncertainty in prediction, a reluctance in tourism development to undertake impact assessment and the dilemma of financing additional analysis and management activities. There is limited administrative authority between jurisdictions, responsibility for different activities and lack of coordination between different levels and types of resource management (Ross and Duinker 2001). Jurisdiction is often unclear, and linked to the number of stakeholders involved. This is a challenge in the Victorian Alps, with various authorities involved in regional planning and management.

Public perceptions of a problem may or may not warrant funds for mitigation and management. The Banff process highlighted that the general public had little understanding of the seriousness of ecological degradation in the Banff-Bow Valley. Studies and research has demonstrated to policy makers and resource managers that there is a problem (Ritchie 1999a: 109). Similarly, "The problem is that while cumulative impacts are an issue, if they can't be seen then it is hard to justify resources to address these issues. Incremental damage and impacts is all about perceptions as much as it is anything else" (Rose pers. comm.1999). With environmental change taking some time to become evident, visitors will generally not notice the impacts they are causing, or that these require remedial management. It may be difficult to justify additional research and assessment required for CIA as well as management activities when the public do not see that there is a problem (or potential for adverse cumulative impacts). This was evident in both Case Studies, with incremental damage to alpine environments subject to public perceptions.
CIA and planning are multi-disciplinary tasks. Coordinating all interests in management of impacts will be challenging. Even when the impacts and interactions are identified and appropriate management outlined, there is still the problem of who will finance these measures. The Banff study clearly identified the fact that the financing of environmental protection in the National Parks System is going to be a major challenge. “Everyone said the right thing when it came to protecting the environment, but when it came to putting their money on the line, everyone (including the environmental movement) scurried for cover” (Ritchie 1999a). Parks Victoria and other government authorities in Victorian are limited by budgets, and have many issues to deal with. This is a major obstacle, however considering cumulative impacts in planning can result in a more holistic view of the situation, potentially avoiding cumulative impacts and hence the need for rehabilitation or management works.

The uncertainty of future activities is also one of the major challenges in CIA. Environmental change can take some time to emerge in some environments and many tourism impacts take place in uncontrolled settings, making it difficult to separate effects of tourism from those of other activities and processes of change. This poses problems for the traditional scientific approach. Cause and effects can often only be surmised rather than proven (Butler 2000).

The scale of a CIA is often a barrier to them being carried out. Some studies (particularly on a regional scale) have required teams of experts, financial support and lots of time. “The Banff-Bow Valley Study was one of the most comprehensive and most expensive studies of its type ever carried out in Canada” (Ritchie 1999a: 33).

The administrative situation can make access to best available information difficult, or information may simply not be in existence. Existing information may be biased (Stone pers.comm. 2001). Methodologies for CIA are available but not applied due to limited resources for comprehensive studies and data availability (Court et al. 1994).

The continuing fear of master planning and commitment to actions (Creasey 2001) makes CIA integration into planning processes more difficult as there is resistance to even the basic planning that occurs in many situations currently. Planning in the Australian Case Study has been limited and some stakeholders are reluctant to encourage the current planning process. There is some awareness of regional capacity and cumulative impacts in relation to tourism development but this needs to be applied in strategic planning.

The ecological focus taken in the Banff Bow Valley study, appears to have pleased some interests, but many others are not in agreement with the recommended actions as a result of this process. The Banff case could be seen as a step forwards in terms of recognition of cumulative impacts on the natural environment. While an improved understanding of cumulative impacts contributes to a theoretical model for sustainable tourism, there are many other factors that will require far more improvement for tourism to be sustainable in the Banff-Bow Valley, including greater integration of socio-economic interests and recognition of political/managerial realities. There has been some court action in relation to the limits on tourism activity as a result of the study and CIA (Christie pers. comm.1999). This may reflect a lack of socio-economic consideration in the process.

**Conclusions**

This paper has discussed some of the opportunities and challenges to including cumulative impact consideration in planning for sustainable tourism. There is nothing new, and many of these are characteristic of current planning and impact assessment. CIA can prompt investigation into understanding the system in which tourism operates beyond a project or strategic plan. The resultant information would improve and complement strategic planning. The difficulty or inability to predict in modelling systems (Jafari in Getz 1986: 32) should not prevent research and planning that attempts to improve our knowledge of the inputs and outputs of tourism. Systems are complex, and degrees of simplification are necessary for analysis and decision making, but the detail is integral to our understanding. Improved understanding of the system with continual evaluation and reassessment of goals will assist the planning process in being more adaptable as well as an improved ability (over time) to predict changes or consequences. Therefore, improving not only planning, but also the sustainability of tourism development.
Some of the challenges inherent in cumulative impact management have been presented, including issues of limited jurisdictional authority, the role of public perceptions, the multidisciplinary, multistakeholder requirements and the dilemma of financing additional analysis and management activities. Whether incorporation of cumulative impacts into planning of tourism regions results in improved sustainability outcomes, is difficult to determine, despite being possible theoretically.

Theoretically, it has been shown that CIs have relevance to tourism and can be included in planning. Controlling the tourism system through planning requires an understanding of the system. The region has been proposed as the best scale for this to occur. The in-depth examination of International examples, the Banff Case and Australian Case Study illustrated that cumulative impacts are an issue in tourism destinations and can be considered (with varying degrees of success). However, incorporating this knowledge in planning and implementation is the real challenge. Analysis and planning are subject to politics and the value-laden sphere of decision-making.

Analysis of the research using the theoretical model has shown that there is a general lack of understanding of the integrated tourism system (environmental, social and economic), including cumulative impacts. Cumulative impacts are often not considered in planning for tourism, despite being characteristic of much tourism activity and development. The ability of planning to successfully achieve sustainable tourism is complicated by the nature of sustainability, natural ecosystems, communities and political influence. Understanding of the nature of tourism and its impacts could improve planning and decision making for long term sustainable development.

References


Mount Hotham Skiing Company Pty Ltd 2000 Take Off 2000 Mt Hotham, CD of photos.


Day Three – Plenary Session
Mountains And Tourism: Meeting The Challenges Of Sustainability In A Messy World

Stephen F McCool

School of Forestry, The University of Montana, Missoula, Montana, USA

Abstract

The power of mountains to inspire, enhance our spiritual well-being, and excite and challenge serves as the foundation for a growing tourism industry worldwide. The decisions to develop and sustain this tourism industry—to say nothing of determining what it is that tourism should sustain—require multiple actors, acting in a variety of roles seeking somewhat overlapping, sometimes conflicting goals. Tourism management situations are increasingly confused and contentious, with not only multiple goals, but differing perceptions of sustainability, inequitable distributions of political power, structural distortions in access to information and changing paradigms of protected area planning. Traditional planning processes are not particularly well-suited for making decisions in this “messy” situation. Other approaches combining scientific and technical knowledge, learning, accommodation of interests and consensus building offer some optimism for those interested in managing mountain landscapes for tourism.

Escalating Challenges and Emerging Opportunities

The power of mountains to arouse our dreams, to enhance our spiritual well being, to stir our imaginations, to empower our passions, to excite our senses and challenge our capabilities serves as the foundation for a growing international tourism industry. Largely, the foundation for this industry is not just the overwhelming magnificence, beauty and serenity of mountain landscapes, the infinite combination of geology, topography, water and vegetation that are found in them, but also the meanings and symbols that people attach to mountain environments. An important set of those meanings and symbols deals with the attraction of mountains as places to sustain our lives through recreation.

Mountains, as we have heard from other speakers here, are the source of legends and myths, they are at the heart of unnumbered tales and fables, they are often the underpinning of spiritual traditions, but perhaps more significantly, these narratives enrich our experiences as tourists and expand our lives as residents. Mountains provide the perfect blend of spectacular topography, awesome beauty, and distinctive culture, a mélange that local communities can build upon as they seek to enhance economic opportunity, preserve their heritage, and advance their quality of life.

Against the background of increasing attention to the cultural wealth of mountain landscapes lies the traditional way in which contemporary society has viewed their physical attributes. The techniques we use to measure these attributes communicate how society views their value: cubic meters of timber, animal unit months of forage, tons of minerals and cubic meters per second of water. Yet, these measures
are now increasingly substituted by such terms as visitor-days, skier nights, user-days or recreational visits, terms that reflect the accelerating value of mountains for recreation and tourism development.

The collision of long-standing approaches to defining the utility of mountain landscapes with emerging values and changing meanings, largely symbolic in character, also suggests that we need to reflect on how we frame mountain landscape planning and decision-making processes. This is no small problem: significant institutional barriers exist to effective, equitable, and efficient resolutions to the planning challenges typifying contemporary landscape management. These processes are important in selecting futures and finding the means to achieve them.

And yet, development of tourism in mountain landscapes provides a number of opportunities, not only for visitors to experience the splendors these settings offer, but also for local communities to reap some economic benefit through employment, tax revenues, and infrastructure development, for residents to boost their quality of life, and for local people seeking respectable prospects for protecting their natural and cultural heritage. These opportunities emerge only with sensitive, skilled stewardship of mountain landscapes and communities.

In this paper, I examine a few of these developing challenges and opportunities and suggest several dilemmas in managing tourism. I initially discuss the attributes of mountains that make them attractive to tourism. These attributes serve as the context for understanding the more substantive nature of the challenges of managing tourism in mountain environments within contemporary society. The ensuing section contains a brief description of several dilemmas confronting society as it seeks to sustain the cherished values of mountain landscapes. The paper concludes with a discussion of opportunities presented by developing an ethic of sustainability as it applies to tourism development in mountains.

**Tourism and Mountains: An Attractive Mix**

We in this conference, of course, are not the only ones that understand the strength of mountains to shape our cultural essence, appreciate their ability to evoke our imaginations, recognize how they provide escape and refuge from the pressures, chaos and fast pace of urban areas and evade, at least temporarily, the warm, humid and often uncomfortable climates of coastal and subtropical regions. Tourists come in increasing numbers to mountains and their valleys with expectations of what they may encounter, with anticipations of what they may experience, and with illusions and beliefs about mountain landscapes. These visitors bring with them behaviors that may or may not be very desirable.

The extremities of climate, topography, and geology not only are the cause for much of this tourist activity, but also mean that mountain landscapes are sensitive to impacts.

Moreover, given the relatively short growing season in many mountainous regions, their ecosystems tend not to be resilient, thus exacerbating the impacts that come from human activity. Mountains are difficult environments for tourists, resorts, development, and day-to-day living. Their very nature means that they are challenging settings in which to survive, they are difficult topographies to traverse, and they can provide taxing experiences for us to endure. The vagaries of weather that occur within their boundaries require us to be ever alert, lest our survival be uncertain.

The attractions of mountains for recreation—as “pleasuring grounds”—have long been recognized institutionally. The first national parks in the US (Yellowstone), Canada (Banff National Park), New Zealand (Tongariro National Park) and Australia (Mt. Buffalo) embraced mountains, and the rivers, streams, lakes, forests, meadows and unique features they contain. To 19th western civilization, these wild and remote landscapes stood in stark contrast to the domesticated, cultivated and manicured ones of the European homeland. They provide opportunities for recreation that are not found elsewhere. Perhaps John Muir (Muir 1901) said it best:

Camp out among the grasses and gentians of glacial meadows, in craggy garden nooks full of nature’s darlings. Climb the mountains and get their good tidings, Natures peace flow into you as sunshine flows into trees. The winds will blow their own freshness into you and the storms their energy, while cares will drop off like autumn leaves. (p. 56)
It is these very characteristics that continue to make mountains attractive as vacation destinations, as settings for ever more extreme sports and recreational experiences, as locales for learning about how cultures interact with natural environments and as places to challenge our physical and mental capacities. As these demands accelerate within the context of other demands for the goods and services mountain landscapes provide, conflicts among competing uses and values themselves multiply.

**But ... A Recipe for Messiness**

These subjects cause us to take pause about the future of mountain landscapes. If they are so cherished, but are so sensitive to impacts and lacking in resiliency, how can we ensure that the values they provide will indeed be available for future generations? In the 19th century, those who asked these types of questions relied primarily on gazetting of national parks to sustain these values. However, we are now into the 21st century, with challenges much more complex, with problems more enduring, and with questions more tortuous than in the past.

It is not that the physical landscape will not exist: mountain ecosystems and geomorphologic processes occur on simply too large a scale for humans to impede significantly their evolution. However, there are doubts about mountain landscapes continuing to provide all the values, goods and services in the quantities that humans seek; to supply all the minerals, water, timber, forage and other physical substances that a growing world population demands; and to meet all of our expectations for tourism. Largely, our concern about mountains is generated by the apprehensions ensuing from such expectations that without serious, sustained and effective intervention, their ability to meet these growing and diversifying demands will be constrained; their role as sources of inspiration may be lost; and their capability to inspire and motivate may quickly evaporate. In addition, there is a sense of urgency surrounding these misgivings: with 4 billion more people being added to the world’s population over the next 40 years, the time to institutionalize sensitive, thoughtful stewardship is short.

In many ways, this concern is the moral principle of sustainability—the obligation we have to ensure that future generations have access to the same set of opportunities that we do today. Sustainability, and its kin, sustainable tourism, are indeed complex topics: while their source lies in moral philosophy, the principal practical value of these concepts lies in the how they transform the positioning and framing of the issues associated with stewardship of mountain landscapes. Three specific aspects of this transformation are important and salient to this conference.

First, stewardship of mountain landscapes has largely been dominated by the technical language of economic development specialists and environmental protection experts. This language excludes the knowledge locals hold about mountain landscapes, it marginalizes the public’s ability to participate in decisions about their future, and it makes constructing the public interest difficult. The concept of sustainability moves this discussion from one of the technically best means to achieve a goal to one of redistribution of political power and economic wealth, from a debate about efficiency to one of equity, and from an argument about technical expertise to appeals for public engagement.

Second, the planning processes we used in the past to make decisions about the future have implicitly assumed that a consensus among stakeholders exists about the desired future and that scientists agree about cause-effect relationships, two assumptions that most of us could easily challenge (see Thompson and Tuden 1987 for a discussion of decision-making contexts). Planning is the process we use to determine what future we want and how to get there. However, there are often many possible futures; sometimes these visions are competing; some of them may even be undesirable. Figure 1 shows that the future is very much a function of the pathways and choices we make today. From the range of potential futures, planning selects one that appears to be desirable. Once we select this desirable future, we implement policy (interventions) to ensure that it actually transpires. Thus, a sustainable tourism plan documents the chosen desired future, and the general policies selected to arrive there.

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1 See Williams and Matheny (1995) for an excellent discussion of the limitations of the "managerial" language in constructing the public interest in environmental issues.

2 I note here that the very purpose of planning is to respond to perceptions that the current course of events leads to a future that is unacceptable. We plan because we feel the need to change the ongoing unfolding of events to those that will lead to a desirable future.
Unfortunately, there is often little consensus on which future is the desirable one. In the pluralistic political systems with which most of us are familiar, there are a variety of such desirable futures. Conflict, contention, and controversy are as often over which future is favored as they are about what management actions are preferred. Society is highly fragmented about the roles mountains and the stewardship institutions that protect them should assume. Various stakeholders and interest groups may hold differing preferences for goals and values. Frequently, enabling legislation or decrees appear intrinsically conflicting (e.g., the mandate to preserve while providing enjoyment that is often stated for national parks). The interests of local communities and national governments may deviate. Preferences over different social scales (neighborhoods, communities, states) may diverge. Failure to agree on and accept specific objectives is a major reason why plans fail to be implemented.

The role of science and technical knowledge is limited in situations where goals are contested because conflict centers on different values rather than the “how to’s” needed to solve a particular problem. Thus, the issue of restoring predator populations in some American parks and protected areas, such as wolves in Yellowstone, deals more with the conflicting ideologies of the role of parks in society than the actual science of restoration. While science can inform planners of the consequences of alternatives in this type of conflict, its role is limited because the issue is one of disagreement over goals—a conflict that is properly within the domain of public policy.

Situations with varying amounts of agreement on goals and scientific uncertainty are depicted in Table 1. This table shows, simplistically, four planning situations in which we may find ourselves. Situations characterized by agreement on goals and agreement on cause-effect relationships may be termed tame problems. Tame problems occur when there is a consensus as to what future is desired and we know what actions will achieve that future. Planning processes for tame problems are well developed and form the backbone of how planners routinely tackle policy issues.

Situations where goals are not contested but cause-effect relationships are disputed may be termed mysteries. These mysteries require additional emphasis on science because it is unclear whether a particular management action will lead to an expected outcome. Science is as much about uncertainty as anything else, but we need ways to address this uncertainty in building our futures. For mysteries, science would play a very important role in providing planners with the information needed to select among specific alternative actions and policies.

Where there is disagreement about goals but scientists agree on cause-effect relationships, wicked problems result. Such problems generally represent the value conflicts mentioned earlier. Here, planning processes would emphasize identifying the values and ideologies in conflict and then negotiating resolution of the conflict through some type of accommodation of interests. Science is not involved, except perhaps in identifying and displaying the values in conflict.

Finally, messy situations occur when there are both disagreements about goals and cause-effect relationships. In this situation, there is a high level of uncertainty in the planning situation; it is likely to be fluid, dynamic and highly contentious. There are multiple, competing goals, power may be inequitably distributed, and scientific uncertainty exists. It is my contention that most significant decisions about tourism in mountain landscapes are messy problems (Friedmann 1973).

A third aspect related to how stewardship issues are transformed relate to how planning processes are applied. Traditional approaches to planning based on science and expert opinion are appropriate only for tame problems. The character of the planning challenge for messy situations is such that it is not so much a problem of information as it is of values, not so much an application of modeling as it is an application of learning, and not so much a test of expertise as it is a process of human interaction and deliberation. In messy situations, scientific and technical information may play a role, but one that informs not dictates; problems are dealt with successfully only through negotiation because they deal more with conflicting values not necessarily a lack of credible science . In such messy situations, planning processes emphasize dialogue, mutual learning, accommodation and consensus building over scientific expertise, technical information, and expert opinion.

Confusing a messy problem with a tame one has two fundamental consequences: (1) the problem is not resolved, perhaps only its symptoms are addressed but not the underlying causes; and (2) because of the resources committed to addressing an inappropriate casting of the problem, the capacity to resolve the
messy situation is reduced. Capacity to resolve the messy problem is reduced because the institution has lost its credibility as an effective agent of social policy; resources are no longer available to address the problem; or options for resolution have been eliminated or narrowed.

This transactive model of planning (Friedmann 1973) does not ignore the traditional approach to resolving socially significant issues. Rational-comprehensive planning has its place, but is inadequate for messy situations; it must be combined with interpersonal, collaborative efforts that effectively engage the public in a discussion about futures and means to them. In this sense, planning is a process owned by the public and the technical experts facilitate the discussion, not direct it.

**Pitfalls and Hazards**

These three aspects of sustainability in mountain landscapes lead to several pitfalls that can as easily trap the unwary sustainable tourism advocate as a pre-monsoonal storm on the flanks of Mt. Everest can snare an inattentive climber.

First, tourism development occurs primarily at the local level—the level where investment decisions are made, the point where government regulates many land use activities and the scale at which residents and tourists interact and experience impacts. Both government policies and private investments affect residents, but in different ways depending on whom you are. Thus, these activities have significant distributional effects in terms of income, quality of life, access to resources and political power. The sustainable tourism literature argues strongly and persuasively that community and citizen involvement in government decisions is a fundamental characteristic of sustainability. Indeed, constructing the public interest in mountain landscapes is as much a task for the citizen as it is a study for the scientist.

Yet, local governments are susceptible to excessive influence from the private business sector, primarily because of the threat of the flight of capital to other jurisdictions (Williams and Matheny 1995) “…state and local governments are not responsive to those segments of the population that control private investment. The mobility of capital across state and local political boundaries drives … interjurisdictional competition” (p. 72). This threat means that local governments are challenged in dealing with the distributional consequences of tourism policy, regulation, and investment, which are often the focus of citizen concern and doubts. This is a recipe for frustration for engaging the public in planning, particularly in capitalist societies where the private sector makes the principal investment decisions.

A second pitfall concerns how we frame the question of sustainability. There are potentially three ways of looking at sustainability in a tourism context (McCool, Moiesey et al. 2001). As with its larger context, the meanings attached to sustainable tourism have varied significantly, with little apparent consensus among authors and government institutions.

Sustaining Tourism: How to maintain tourism industry businesses over a long time frame. This view suggests that the primary task is to build and manage a set of tourism businesses that can maintain themselves over a long period. This view of sustainable tourism would emphasize maintaining promotional programs that ensure that the number of tourists visiting an area continues to rise. In this sense of sustainable tourism, the more tourists, the better.

This view is narrow in the sense that the objective of sustainable tourism is the tourism (and recreation) industry and included business firms. While maintaining the health of industries and individual businesses may be viewed as a worthy social goal, this perspective does not necessarily recognize tourism as a tool to enhance economic opportunity, protect a community’s cultural and natural heritage, and maintain a desired quality of life. This view neglects to see tourism as an input, as a method of enhancing social and economic welfare.

Sustainable Tourism: A kinder, gentler form of tourism that is generally small in scale, sensitive to cultural and environmental impact and respects the involvement of local people in policy decisions. This view comes from an argument that there are finite biophysical and social limits to tourism development. It recognizes that tourism, as any other economic activity, can overwhelm a community with negative social and environmental impacts. Thus, sustainable tourism in this sense is closely allied with the notion of eco-tourism it is small in scale, designed to benefit local peoples and communities, and protect
environmental attributes upon which the tourism and recreation industry is built. Within this view, there remains considerable divergence of opinion, with some authors suggesting that sustainable tourism represents the conduct of individual tourists, others maintaining that it is ethical behavior on the part of tourism and recreation based businesses, and still others suggesting it focuses on the amount of social and environmental impact.

What should tourism sustain? Tourism as a tool for development. This view sees tourism as a tool of social and economic development, as a method to enhance economic opportunity, not as an end itself. This question is similar to Gale and Cordray’s (Gale and Corday 1994) question of “what should be sustained?” in a natural resource management context, to which they replied nine different answers, primarily focusing on various ecosystem characteristics. In this sense, tourism is integrated in broader economic and social development (Hunter 1997); (McCool and Moisey 2001) programs and can be viewed as a method--similar to many definitions of eco-tourism--to protect the natural and social capital upon which the industry is built. By asking this question, we view tourism as a tool, which at times may be important to a community and other times not so important. In this sense, we are not speaking of protecting cultures for their value to the tourism industry, but because of their value to their peoples (Robinson 1999).

Another dilemma is related the above: there is little evidence that meanings of sustainability are widely shared. Sustainable tourism constitutes what is termed a "guiding fiction": guiding fictions serve socially valuable functions as long as definitions remain vague; they stimulate and organize social discourse around problematic issues, but when individuals seek the more specific definitions needed to guide action, this function breaks down as groups argue over the meaning of terms (Shumway 1991). The challenge here is to maintain the pathway to sustainable tourism while providing secure venues for public deliberation about meanings and actions.

Agreement on meanings is a necessary, but not sufficient condition, for making progress on socially problematic challenges. Action in society requires a variety of actors performing in concert (Friedmann 1973). In tourism development, this includes promotional agencies, governmental planning and zoning institutions, community development groups, local residents, transportation planners, private entrepreneurs, security agencies, health and safety services and others. This lack of consensus on meanings is becoming a significant pitfall in the search for sustainability, for the different meanings result from significantly different perceptions of tourism and its role in society. There are at least three different meanings that relate directly to the notion of sustainable tourism that are used in the literature.

Prospects and Opportunities

While the world is a messy one, it is this very messiness that is the source of enormous opportunities to provide skilled, informed stewardship of mountain landscapes. There are three specific such opportunities that I mention here. First, sustainability is about the distribution of political power, the sharing of economic wealth, and the application of environmental justice. In particular, the redistribution of power provides great opportunity to stronger, more environmentally literate citizens. Because a sustainability model reframes tourism development from the technical to the value arena, full engagement of informed citizens is needed for planning to achieve its potential. This opportunity can lead to stronger democracies, to enhance citizenship beyond voting to meaningful engagement and deliberation on complex, socially problematic issues. Through the debate about sustainability, we might advance the notion of governance to new levels and expectations.

Second, there are significant prospects for a tourism industry that does not make the mistakes of other industries dependent on natural resources and environments. Tourism has the advantage of the experience of other environmentally dependent industries; it should incorporate the lessons of dependency, diversity, stewardship, strategic planning, economic development, and sustainability in planning and decision-making processes.

Third, there is the prospect of real and positive change in people’s lives, through economic opportunity and through enhanced understanding of other cultures. Tourism is often criticized for offering only low wages to unskilled laborers, such as desk clerks, maids and dishwashers. While these jobs do exist in the tourism industry, there is a lot of opportunity for vertical advancement, and immense potential for entrepreneurship in the industry. There is also the prospect of public service for those with a more
altruistic outlook on life. Through interpersonal interaction, we can come to better understand the values, beliefs and viewpoints held by other cultures. Through sensitive, nature-based tourism we can also come to learn how different ecosystems function, and how cultures deal with those systems.

Table 1. Tourism planning may occur in one of four situations, depending on the amount of agreement on goals and cause-effect relationships. Each of the situations leads to a different type of planning problem, as indicated in the cells. Each type of problem requires a different approach to planning.

<table>
<thead>
<tr>
<th>Social Agreement on Goals</th>
<th>Scientific Agreement</th>
<th>On Cause-Effect Relationships</th>
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<tbody>
<tr>
<td>Agree</td>
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<td>Disagree</td>
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<td>Disagree</td>
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Figure 1. There are many possible futures for tourism in mountain landscapes. These futures are a function of the actions we take today and in the near future (arrows). Of the futures that are possible, only a few may be desirable. Those desirable futures may themselves represent competing visions. Planning is the process we use to develop socially acceptable futures and the means to attain them.

Messiness and the Future

When tourism is combined with mountains and overlaid with a sense of sustainability, we have the perfect recipe for a messy situation. Alternative, transactive oriented planning frameworks, using science and technology with an emphasis on learning, accommodation and consensus building provides positive prospects for resolving the troublesome issues found in many mountain landscapes.
Are our political and economic institutions up to task with respect to many of the messy questions that tourism in mountains confronts us? This question engenders a number of others that will continue to confront us: How does one conserve the environment, provide a more equitable distribution of income among those living at the present, and ensure that there is equality in access to quality of life? Can we optimize all three goals, or are there tradeoffs involved? If so, what are they? How does one provide for the needs of the present while preserving options for future generations? Who represents future generations and their needs in these decisions? What is the role of different economic sectors, non-governmental organizations, and government institutions in seeking sustainability? What is the role of ethics and science in sustainability policy? How can development be sustained? Can sustainability be achieved within existing institutional and political-economic frameworks and processes? How does one develop and apply a science of sustainability while promoting more public participation in government decision-making?

Those mountains are powerful: they are not only symbolic physical entities, they also represent the challenges before us as we seek to protect the important values they hold, enhance economic opportunity for the people that live within their valleys and on their slopes, and strengthen the quality of life for residents and tourists alike. As with hiking in mountains, our struggle with sustainability will be confronted with canyons and gulches, boulders and trenches, dense forests and open meadows. To the extent that each represents a barrier or an opportunity is a function of how we frame the challenge. For seeking sustainability through tourism, the questions that are before us are as much one as the other.

**Literature Cited**


Day Three – Mountains Of Meaning/Tourism
Introduction

The title of this paper is stolen from an autobiographical work by the great Arnold Lunn, the pioneer and founder of skiing as a sport, in the Swiss Alps. In his dedication of the book, he notes that its publication synchronises with his golden jubilee as a skier - he started at Chamonix in 1898. Well this conference almost coincides with my golden jubilee as a skier - my first serious ski trip was to Mt Feathertop, as a 9 year old in 1947, the year before Arnold Lunn’s book was published. Dad gave *Mountains of Memory* to Mother while she was in hospital in 1949, and I read it soon after she brought the new baby home. I was hooked on the mountains already.

The conference calls for, inter alia, papers to address the question ‘How do we identify heritage values in mountains?’. I would like to use the diverse experiences of this family, over more than 100 years and 5 generations, in ‘the experience of living, working and playing in mountain landscapes’ in Victoria, NSW and occasionally Austria, to illustrate some of the heritage values which are inherent in our mountain landscapes and ski resorts. These values, and their tangible physical expression in the mountain environment are often overlooked in the rush to preserve the natural world in its pristine, ‘untouched by human hand’ form.

Skiing is thought to have had its origins in Scandinavia over 4,000 years ago, to tend herds, hunt game and travel in winter. Organised, competitive skiing and recreational skiing didn’t begin until the 19th Century - specifically, around the 1850s to 1860s in Norway, among the goldminers of California and in Australia, at Kiandra in NSW and at Mt St Bernard, near Mt Hotham in Victoria.

The history of skiing and mountain recreation that I will present is a very personal one. It is a history of my family’s involvement with mountains in general, and skiing in particular. I have been able to use my family archives almost exclusively to illustrate it. My parent’s mountain memories permeate this essay, and have deeply affected all of us, down to the fifth generation, now experiencing club skiing with Grandpa and Grandma (my partner and me).

Those who are born and bred among the mountains accept with composure their heritage of beauty, and those who never see the hills do not realise all that they are missing. Some of those who are introduced to the mountains in their childhood or youth become passionate about the annual pilgrimage to the snows and at home live ….. with months of gnawing homesickness for the hills. The love of mountains is a strange disease, which strikes some members of a family, but leaves others untouched. The father of the great Arnold Lunn was struck in mid-life. He became a passionate aficionado of the Swiss Alps and, to ensure

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2 Lunn, Arnold, *The Mountains of Youth*, pub. OUP 1925
he could afford to spend the maximum time there, started a tourist bureau specialising in holidays in the Alps for clergymen and their families. Consequently, his son virtually grew up in Grindelwald, where he first put on skis as a child in 1898. Arnold Lunn became the father of ski racing in Europe, and his son, Peter, became a British champion downhill racer. My mother, travelling with her father D.B. Ferguson in 1933, met Arnold Lunn, I think in Murren, where he had organised the first world downhill ski championships two years before.

In my family, and my partner’s, the disease alights randomly, but in those afflicted it directs their lives. My mother, who first came to our present mountain home at age 82, and in the early stages of dementia, could not remember what day it was, but when I pointed out to her the Alpine peaks on our horizon, she could still tell me stories about her adventures on them in her youth and in her prime. Among her papers I found a small album of her most precious photographs. These included memoirs of her adventures with my Dad on the Bogong High Plains and elsewhere, but also photos of her other love, the Austrian ski instructor Franz Skardarasy, who worked at Mt Buffalo in the late 1930s. Franz later had a part in my life and in my daughter’s also and he has a significant place in the history of skiing in Australia.

It would have been impossible to produce this story without the hundreds of photographs, newspaper cuttings, letters, certificates, pamphlets, books, journals, diaries and ski club histories found among my family papers, an extraordinary archive taking up at least a hundred metres of shelf space at our farm. I am dedicating this memory of mountains to my parents, Joan (nee Ferguson) and Neville Haughton, who had the foresight to keep all their papers, even the ephemera.

**Mt Hotham 1899 - William Hamilton Ferguson**

My family’s interest in and involvement with mountains began more than 100 years ago. In going through family records, I discovered a print of a photograph of skiers at Mt Hotham taken by a great-uncle in 1899. William Hamilton Ferguson was a surveyor and geologist who worked on the geological survey of Victoria, producing beautiful maps of large areas of the State and discovering the first dinosaur fossil and the only black coal deposits found in Victoria. He loved the Victorian mountains and named several. Like many explorers, his glass plate camera and tripod went everywhere with him. Throughout 1899 he was working in East Gippsland and no doubt took his camera on a winter trip from the Omeo goldfields to Mt Hotham. Here he recorded people on skis, and probably tried them himself. Will’s photograph is the earliest recording I know of any recreational skiing on Mt Hotham itself. Mt St Bernard, north of the Divide, had been visited in the 1880s, but I have seen no photos earlier than 1911.

![Figure 1: Will Ferguson’s photo of friends skiing at Mt Hotham in 1899.](image-url)
Mt Aconcagua 1905 - David Buchan Ferguson

Just a few years later, Will’s young brother David (DB) Ferguson was employed as Sales Manager by H.V. McKay for his fledgling Sunshine Harvester Works in Ballarat. The family had barely settled in at Ballarat when they were uprooted in 1903 and sent off to Argentina to take on the development of a South American market for McKay’s harvesters. In March 1905, DB set off on a business trip to Chile, an epic journey by train and coach across the Andes. DB was no photographer like his brother, but his series of wonderful letters to Will and his two sisters at home have been carefully preserved, along with many others sent from around the world for the next 40 years.

His first Chilean letter, titled In this chapter David crosses the Andes describes the trip from Buenos Aires across the pampas to Mendoza, then by narrow gauge rack railway to the head of the River Mendoza. Near Puente del Inca, a man got on the train who had been trying to scale Mt Aconcagua [6960 metres] and nearly perished in the attempt. His hands and feet were frost bitten and his nose and ears ran blood. Then later - At noon we had the only view of Mt Aconcagua that is obtained on the trip. We were lucky to get a clear look. It is a terrible big mountain - with great glaciers on its sides and many sheer precipices of thousands of feet. It is about 21,000 feet high (sic) - but we were already 9,000 feet above sea level ourselves. At the head of the river the passengers changed to horse-drawn coaches for the trip over the Bermejo Pass to the Chilean railhead. Nearing the top we went between walls of solid ice or frozen snow. It was a beautiful day .... Am told it is rare to get such a passage. Right on top is El Christo de Los Andes’ an immense bronze statue of Jesus Christ, on the border line between Chile and Argentina. DB was mightily impressed by his first alpine experience and thereafter, in his many world trips, sought out mountains and alpine scenery. Although he never skied himself, he always encouraged his daughter Joan’s enthusiasm.

Snow Sports - 1920s And 1930s

My fathers family joined the Ski Club of Victoria (SCV) when it was founded in 1924. Its first annual report includes a full page ad. for SNOW SPORTS EQUIPMENT and FASHIONS -- at MYERS, with a charming drawing of a model wearing the latest ski gear for ladies. In another package I found a c1926 photo of my Grandma Jessie Haughton at Mt Buffalo, posed on a toboggan, and wearing a very similar outfit. The children were encouraged to take up skiing as a sport, and my father Neville's first substantial encounter with the snowfields was on a c1927 Ivanhoe Grammar School trip (escorted by their enlightened Headmaster Mr Buckley) to Charlotte Pass Chalet. In a postcard photo of himself on skis, sent to a friend (and returned by the friend to Mother after Neville’s death in 1989) Neville, on skis, is wearing his school blazer, tie and cap with the breeches and leggings he usually wore for horse riding. He was about 15 at the time.

Neville’s older sister Vera, already a trained nurse when he was still at school, was a strong and enthusiastic skier. We have a lovely photograph of her in 1930, teaching her little sister Jessie (the youngest, then 7) to ski. Vera wears 1930s high ski fashion woollen trousers, bum-freezer jacket and a tricot headband with an SCV badge. Jessie is on skis made for her by Neville, with a leather strap across the toe-iron bindings and leather straps that clamped around the heels. She wears a short overcoat and thick woollen gaiters, strapped under the boot soles and with buttons all up the sides.

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3 I have so far found only one photograph of DB in Chile, unrelated to his mountain crossings, but thought to have been taken at a high altitude. The Argentine Embassy provided illustrations of Mt Aconcagua and the Christ statue [erected in 1904, the year before DB’s trip, to commemorate a peace settlement between Argentina and Chile].
In 1930 Neville was in his first year at Melbourne University and organising a trip with friends to the new SCV Cope Hut on the Bogong High Plains. I found a file with letters, a typed list of the Standard Tin of stores to be sent up to the High Plains in April, an invoice from a Heidelberg grocery store with a list of additions to be sent up with the rather spartan SCV diet (note: 5 dozen eggs at 9 shillings and 7 pence and Keepeg at 1 shilling and 9 pence), a detailed travel itinerary from Melbourne via Bairnsdale, Omeo and Fitzgerald’s Hut, a budget and list of money outlaid, and an SCV test certificate for passing a First Class Jump Test at the Bogong High Plains, 20th August 1930.

Neville soon joined the Melbourne University Ski Club (MUSC), with childhood friends and new friends over the years, many of whom remained friends all their lives. Some of the best died in WW2, some became my mentors and friends as I grew up. In 1931 his friend Ivor Whittaker beat him in the club’s Osborn Trophy at the first MUSC races at Mt Hotham. Whittaker recorded their adventures in the pen-and-ink Hotham Herald, which was framed and hung in every house we lived in. Whittaker was one of those who died. Neville was more fortunate – as an Australian artillery officer, he managed to fit in a few months with the British Ski Troop in the Lebanon in c1941.

Keen skiers in those days searched for any way to improve their style out of season. The Haughton’s home on the steep hills of Eaglemont (a Melbourne suburb near Heidelberg) was then surrounded by open paddocks, and the SCV experimented with grass skiing there, with ski lessons for beginners. I only half believed this fable and often wondered how they got their skis to slide. I still don’t have that answer, but found an envelope with newspaper cuttings from a feature story, showing young Jessie on skis, Neville being towed by a man riding a motorcycle and Vera posing in a crouched racing position, with skis, stocks, boots and leggings but wearing a dress and pearls!

In 1932 Neville was back at Mt Hotham for the third MUSC championships and the first inter-varsity races, against a Sydney University team. Neville seems to have spent his time as an official for the inter-varsity races, but was highly successful in the MUSC championships, winning the 4-event Faul trophy for slalom, downhill, jump and langlauf (cross country). He was there to meet Vera when she arrived at Hotham to prepare for the first women-only winter crossing from Hotham to the Bogong High Plains with two friends. This was a notable achievement and was re-recorded in a newspaper feature in 1982, fifty years later.4

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Travelling To The Snow, 1930 To 1960

Just getting as far as the Mt Hotham Chalet could be a major ordeal in the days before snowploughs. It involved a train trip from Melbourne to Bright, a charabanc or car trip up to the snow line, which could be miles below the Mt St Bernard Hospice, then on foot or skis, carrying all your luggage on your back, for at least 6 miles up hill and down dale and around the steep and often icy face of Mt Blowhard and following the snow pole line over the summit of Mt Hotham. If you were lucky, the sky was blue and sunny, if not, there could be blizzard conditions and zero visibility, and you carried reels of string to find your way from snow pole to snow pole. A few years later, it was possible for a large party to by-pass the dangerous Blowhard crossing by riding horses from Harrietville, up the Bon Accord Spur to the snow line, along the Razorback, and thence over the summit again to the Chalet. One had to be tough and determined. It was possible to come in from the south, but this involved a longer train ride to Bairnsdale, a much longer and rougher car trip via Omeo to the snowline, and a very long, if less dangerous, walk in. This situation prevailed well into the 1950s, when I began skiing at Hotham with Dad.

Mt Buffalo Chalet Life

The Mt Hotham experience contrasted starkly with the fashionable Railways owned holiday resort at Mt Buffalo. My Grandma Jessie visited the Chalet there several times in the 1920s, with her beautiful and chic oldest daughter, Eugene, a notable horsewoman, but never a rough and tough mountain type like Neville or Vera. At Mt Buffalo, you dressed for dinner - long frocks for women and dinner suits for men. Skiing was just one of a number of outdoor recreational pursuits that included horse riding, tennis and gentle bush walks. My aunt Jessie remembers a trip to Buffalo in 1936 with Grandma Jessie, escorted by my mother - then still Miss Joan Ferguson, she having just announced her engagement to Neville. Young Jessie, aged 13, was very proud of her special pink evening dress, but mortified to be told by Joan that her dirty fingernails didn’t match the dress. Here the glamorous Austrian ski instructor, Franz Skardarasy, first entered our lives. Mother kept in touch with him throughout WW2 (he was in New Zealand) and visited him at his hotel in Zurs in 1957. I skied with him at Zurs in 1983, and our daughter, Little Jessie, skied with him in 1992 (he was then 84 and still a consummate charmer!).

Figure 3: Clockwise – The MUSC Osborn Trophy finish, the Hotham Herald, Neville and Joan on the Bogong High Plains in spring 1934.
Mt Buffalo, also, could on occasion cater to the rough and tough brigade. The University Ski Club (USC), morphed from MUSC in 1934, organised a club trip to the Horn Hut in 1939. Joan and Neville took young Jessie along and she remembers her dear Bruv carrying her pack when she struggled on the seven-mile walk on skis. The Railways ..... undertook provedoring and far exceeded expectations. Arriving at the Chalet, the advance guard was greeted with several enormous wicker hampers containing crisp, white table linen, china and cutlery as well as food. There was much weeding out as only the bare essentials ..... could be carried in rucksacks to the Hut.5 I was aged 18 months at the time and was left at home with a nanny.

**The Rest Of The Year In The Mountains**

Spring, summer and autumn could be a wonderful place at Mt Buffalo, with wild flowers and splendid scenery, formal dining and dances, but after WW2 the dress code was somewhat relaxed. I remember a family trip in 1946, when tweed jackets were OK for dinner, but there was still a fancy-dress ball (my 3 year old brother and I were dressed as an Arab and his donkey - I was the donkey!). The Bogong High Plains were a favourite place for camping in summer. Joan and Neville (both Agricultural Science students) and a friend spent the whole summer vacation in 1934/5 wandering around the Plains with a packhorse collecting botanical specimens for Joan’s thesis on the Flora of the High Plains. Joan and Neville even spent their December 1936 honeymoon on horseback, travelling from Merrijig, near Mt Buller, across the mountains to Mt Bogong. In the 1950s they did another horseback trip together, to explore Wonnangatta Station, in the southern reaches of the Alps, and several times the whole family (six of us by then) spent the holiday season on the Dargo High Plains, looking after Jack Treasure’s house and cattle.

Lodge building was an important summer occupation and was a great part of the huge popularity of club skiing after WW2. Dad helped build the USC Lodge at Mt Hotham (1949) and the first USC Cabin at Mt Buller (1950), and as a teen-ager in the 1950s I tagged along to USC Hotham with a male friend/club member, helping with painting, plumbing, installing the generator and, even then, cooking for the troops. Work parties continue to this day, and our son Simon (a third generation club member) recently built a much needed retaining wall outside the Hotham Lodge.

**Winter Again, And Skiing Unto The 5th Generation**

My initiation to the rough and tough school was a trip to Mt Feathertop on horseback from Harrietville in c1947 with Dad/Neville. We let the horses go at the snowline to find their own way home, camped in the Feathertop Hut until our food ran out, and walked back to Harrietville. In 1950 I stayed with Dad at the new Hotham Lodge in its first season. In later years I did the arduous trip into Hotham many times, in the days when if you wanted to ski downhill, you had to climb uphill. I was very glad when ski-tows were invented!

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I met my partner at Mt Buller in 1960. He joined USC then, and the club community became like an extended family to all of us. I finally joined the club in 1998, with two of our children (Simon and Little Jessie), and celebrated the 50th Anniversary of the USC Hotham Lodge (and my 50th Anniversary at Mt Hotham) by cooking (with Simon’s help) a special dinner for the full Lodge party, including two of our grandchidren. We presented a framed photograph of Joan and Neville, at Charlotte Pass as captains of the 1936 Melbourne University women’s and men’s intervarsity teams, to be hung in the Lodge.

My partner Carl Doring wrote a postscript to my paper. It goes:

*Mountains are not just big rocks, they are focal points for memories of people who lived, worked and played there. When you think about conserving mountain heritage, do not just think about the landscape, flora, fauna and man-made structures. Think also about collecting, conserving and commemorating those intangible and fragile memories that give mountains their cultural meaning.*

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Mount Franklin: Do-It-Yourself Skiing

Ian McLeod

Canberra Alpine Club

Mount Franklin is one of the peaks in the mountains west of Canberra, the northernmost part of the Australian Alps. The story of European activities there is one of persistence, ingenuity, hard work and government and community co-operation that created and has retained a place for recreation, initially skiing, but now a variety of pastimes. The Canberra Alpine Club has been associated with activities there for more than 65 years.

The mountains have been used for recreation such as horseback expeditions, brumby running and fishing almost since the beginning of European settlement. An early photograph shows members of the Franklin family, then living at Brindabella, at the summit of the mountain that now carries their name; and Terence Murray of Yarralumla records an expedition to Pabral Peak (now Mount Coree) in 1841 that was partly exploratory, but also recreational. Before the Europeans, the gathering of the tribes in the bogong moth season probably had an element of recreation also.

The establishment of Canberra created a population centre 20 km from the foot of the mountains, and groups such as rover scouts began to walk in them. They were not the first to do this - the old survey beacon on Mount Tidbinbilla had the names of four Royal Military College cadets and the date 6 April 1912 scratched on it.

For those early walkers, the effort of getting to the start of the walk sometimes was comparable to that of the walk itself. Few people had cars, so transport was usually in the back of a truck, over rough dirt roads. Some rode bicycles (doubtless ordinary roadsters with only one gear) extraordinary distances over those roads, did the walk, then cycled back to a railway station or to Canberra.

Some walkers were attracted by the snowy transformation of the mountains in winter. If people could walk there, surely they could also ski there instead of having to travel to Kosciuszko or Kiandra or even further to the Victorian snowfields. These people were the prime movers in founding the Canberra Alpine Club in 1934.

An early decision by the new club (indeed one of the reasons for forming it) was to establish ski-fields in the mountains close to Canberra. However, possible sites were many kilometres from the only road, the one from Canberra over the range to Brindabella. Undeterred, by emphasising the potential for tourism the club persuaded the government to build a road 20 km along the range to Mount Franklin. In return it offered to build skiing accommodation. Work on the road began a year after the club was formed. Australia was slowly emerging from the Great Depression and the government would have hoped that tourism would help the languishing economy of the national capital; and the road construction meant some work for otherwise unemployed men.

With the prospect of access to the snowfields, club members made exploratory trips south along the range in both summer and winter to find a suitable site for skiing and accommodation. With the equipment
available at the time, some of these journeys must have been quite arduous; a participant in a June one recalled that the uncooked breakfast eggs would not fall out of the shells when broken because they were frozen. The success of these exploratory trips was well reported in newspapers and the tourism potential of the “new ski-fields” extolled.

After much discussion about sites the club decided to develop skiing facilities on Mount Franklin and build accommodation on the mountain's southwest shoulder. At that time very few ski clubs had their own accommodation, so the decision to build, at a remote place, was an ambitious one for the new club, especially in the economic conditions of the time. As the club had very little capital, members set about raising funds through social functions, donations and loans.

Although funds were still short, a building contract was let in the autumn of 1937. The road was not completed, so the club arranged for the government to move materials to the building site on a tractor-drawn sledge. However, an early snowfall stopped this movement and the contract had to be cancelled. A member and Canberra contractor, Warren McDonald, came to the rescue by agreeing to build the chalet. Work began early in 1938 and the chalet, a two-story wooden building with bunk accommodation for 30, was opened in July 1938.

Meanwhile, members had been clearing ski runs on the wooded upper slopes of the mountain. This was done by hand, men and women cutting down trees, grubbing or blasting out the stumps, and crowbarring the timber into heaps to be burnt. Runs were extended and new runs cleared after World War II, again largely by hand, but with the occasional more-or-less official assistance of a government bulldozer - not always operated by the government driver.

An early club president, Charles Lane-Poole, was head of the Forestry School in Canberra. He was keen to develop uses for Australian timbers and organised ski-making classes. Many members, particularly the less-affluent ones, were willing pupils, encouraged by ski-making competitions with worthwhile prizes such as a week at the Hotel Kosciusko. Nearly 200 pairs of skis are known to have been made by members before and after World War II; some are still in existence.

The chalet was built and the runs cleared without the Canberra Alpine Club having any lease over the site. The survey was not done until November 1939 and the lease was not signed until May 1947, an indication of the informality of the arrangements between the government and the club. Indeed the relationship between the two seems to have been a defacto partnership to open up the mountains for recreation.

Despite its skiing activities, the club did not forsake its bushwalking roots. It continued to organise frequent walks of varying length and difficulty up to the early 1960s. After this period most people joined because of its skiing facilities; this and the advent of other, primarily bushwalking, clubs meant that bushwalking became a minor but still traditional part of the Canberra Alpine Club's activities which has continued to the present time.

The club went into recess during World War II, but the chalet (or clubhouse, as it was called until the mid 1950s) was used by a few individuals, and also for recreation by members of Netherlands air force squadrons stationed in Canberra.

Club members had always known about better snow on the higher parts of the range south of Mount Franklin. By the mid 1940s the road had been extended another 10 km south to Mount Gingera. The club decided to build a second clubhouse closer to this snow, but did not pursue this idea. Some members therefore decided to build their own accommodation. Half a dozen took out a lease and built a small hut on Mount Ginini, 5 km south of Mount Franklin. This was acquired a couple of years later and greatly enlarged by the cadets of the Royal Military college at Duntrone. The building was demolished in 1969 as the cadets were no longer using it and it was in the Cotter River catchment, Canberra's water supply. Another group built a rudimentary hut in a secluded part of Stockyard Gap, south of Mount Ginini; the frame was timber collected around the site, the walls pine offcuts, and the roof bituminous sheeting. A patch of debris still marks where it stood.

The emphasis on the tourism potential of snowfields close to Canberra and the club's offer to build accommodation suggests that both the club and the government envisaged the chalet being used frequently by non-members. After World War II the skiing facilities were advertised through tourist
agencies, but sadly for both the Canberra economy and the club's finances the optimistic hopes for numerous visitors were never realised. Some did stay in the chalet, but the steep ladder-like stairs to the upper floor, the small bunkrooms with hessian partitions and curtains instead of doors, a wash basin in an open cubicle, a bush shower, outside pit toilets and lack of electric light, together with the arduous journey in and unpredictable snow could not compete with the relative comfort of long-established places like the Hotel Kosciuszko or The Chalet at Charlotte Pass. Nevertheless, it was used for recreation and educational activities by other outdoor groups and schools until the early 1980s.

An unavoidable aspect of skiing at Mount Franklin was the effort involved getting there. Few people had their own cars, so the club arranged transport. This usually was on the back of a truck; it was not heated, but passengers could warm up by pushing the truck through the deeper snow drifts. Later, as members used private transport more, they tended to travel together so they could push one another when necessary. When the snow is good for skiing it is hard to get there, even now, because of snow on the road. Skiers often had to leave their cars by the road and ski to the chalet. They skied on the runs for what was left of the day, walking back up the slope after each run down; they did some more downhill'ing next morning then skied back to the cars and drove along the narrow, winding, muddy road to Canberra - and they looked forward to more skiing the following weekend! In contrast to expectations today, skiers spent only a small part of their time actually skiing downhill. They had to walk a kilometre and climb 100 metres at the start of the day to the top of the main ski run; and without a tow they had to climb laboriously back after each run down. Physical fitness for skiing was achieved quickly, if not painlessly!

The Canberra Alpine Club has always had a diverse membership with a wide range of skills and experience. Utilising these, members built a woodshed onto one end of the building using timber which had been left beside the road after a truck mishap (they had added a drying room to the other end before World War II). The hessian bunkroom partitions were replaced by wood and wooden ceilings added so sleepers were no longer covered by snow blown in under the eaves. An electrician member made a 12 volt wind generator from a car generator, carving the propeller himself, so adding the convenience of electric lighting; this replaced pressure lamps collected by an enterprising member from South Coast seaside townships after electricity reached there. Members added to the convenience of skiing by building a day shelter beside the main run, carrying all materials except the concrete piers to the site, and then linked it to the chalet by phone, using disposals army field telephones.

The club had considered buying a ski tow, but could not afford the cost. So some members designed and built a rope tow powered by a Harley Davidson motorbike. This Brumby Tow, as it came to be called, worked successfully for several years, saving skiers the arduous plod back up the run. With an eye to further improvement a car was bought, driven from Canberra to the top of the mountain, and put in place on the run. However, it was not a success. Even in low gear, the rear wheel driving the rope of the tow rotated too quickly (the Brumby Tow was geared down by an ingenious arrangement of chainwheels), and cranking a 4 cylinder engine was harder than kick-starting a motorbike engine. The remains are still at the top of the run.

The club's diversity was increased by European migrants who joined it after World War II and were again able to take up skiing as a recreation. Some were expert skiers, and their skiing and ski-jumping ability was a revelation to many members, most of them self-taught. The Europeans quickly became part of the club and through it the wider community. For years some gave lessons to other members in an attempt to pass on their own skills; and they introduced members to other arts, like making gluhwein.

From its beginnings, because of the isolated site and lack of money, the club has had a strong culture of self-help to get things done. Work parties to clear runs and keep them free of regrowth, to fill the woodshed for winter, and to maintain the chalet and its environs were a regular part of its activities. The work party weekends were hard work, but also recreation for people, most living in hostels, who spent their working week at a desk.

This attitude of doing things themselves, the need to make their own after-ski entertainment, the singing and talking to relieve the slow cold journeys in the back of a truck, and helping push cars through snowdrifts created a strong sense of camaraderie between members which helped mitigate the lack of facilities.
Mount Franklin is the northernmost site of organised skiing in Australia, and has always been recognised as marginal for skiing. The amount of snow and when it falls varies greatly and unpredictably from year to year. Several interclub competitions were held there in the 1940s and 1950s, but others had to be moved elsewhere because of lack of snow. The club organised weekend trips to the Kosciuszko area and these became more frequent as the snowfields there, with their more reliable and longer seasons, were developed. Recognising the changing circumstances, the club decided to build a lodge in Perisher Valley. It was built almost entirely by members over five months. Lack of finance again was overcome by various means, and the building was opened in June 1961 by Warren McDonald, whose generosity had made the Mount Franklin chalet possible.

The Canberra Alpine Club's leases at Mount Franklin expired in 1963 and were replaced by a tenancy-at-will. This was withdrawn when Namadgi National Park was declared in 1984, and the chalet and ski runs no longer belonged to the club.

The initial management proposal for the chalet was to leave it open but close off the upper floor. The club, with its experience of increasingly serious vandalism since the early 1960s, thought this would result in the eventual destruction of the building and objected strongly. Also, many members with fond memories of times spent at Mount Franklin were loath to lose all contact with it. After prolonged negotiations, the Canberra Alpine Club and the ACT Parks and Conservation Service (ACT PCS) signed a Memorandum of Understanding in October 1989. Through this MOU the Service recognised Canberra Alpine Club's links with the site and the club's former role in maintaining and managing it; and it "sought the support of CAC in providing expertise and information in the preparation of the maintenance and conservation plans". The club was to draft these plans in accordance with guidelines. The Service also suggested that the club might be able to assist it by providing expertise and labour during work days at the chalet. Public access to the chalet was to be restricted to day use and overnight camping would be discouraged; however club members engaged in work parties might be allowed to stay overnight.

Thus began a new era in the Canberra Alpine Club's connection with Mount Franklin, and a great change in the recreational use of the site. Club members have contributed about 300 person-days during work parties and at other times. Most participants have stayed overnight and have re-experienced or experienced for the first time the atmosphere of the place. The club has been able to hold a special function each year for junior members as an adjunct to a work party so they can get some idea of the club's early days. The chalet, which had received little attention for 10 years, has been completely repainted and much minor maintenance done to the building and site. Probably because the place no longer looks abandoned and the access road has been closed, vandalism has become only a minor problem. The heritage importance of the site has been recognised by listings on the Register of the National Estate and ACT Heritage Register and by the National Trust.

The club obtained funding through the ACT Heritage Grants Program in 1996 for tracking down and documenting photographs relating to skiing activities in the Mount Franklin area and preparing an album of selected photos; the album is now displayed in the chalet. Club members and friends have donated old skis (some hand-made before World War II) and other equipment which are now displayed in the ski room of the chalet. Visitors are intrigued by the kind of skis used 50 years ago and the development of ski technology since the 1940s illustrated by these skis.

During 1997 and 1998 ACT PCS and the club developed and implemented an extensive interpretation strategy for the site. This consisted of photographs selected from those identified by the 1996 project and interpretation signs in and around the chalet and along the track to the summit and top of the main ski run. The project is intended to encapsulate the history and human experiences of Mount Franklin as seen through the pioneering spirit of Canberra Alpine Club members. It helps visitors understand the determination and ingenuity of the people who developed skiing there and the great changes in skiing, expectations and social attitudes since then. It cost about $37 000, funding being provided by the club, a private trust, and national parks and heritage agencies.
People out for a day in the mountains who arrived at the site during work parties were delighted to find the chalet open and to be able to talk to members about the history of the place and life there in its heyday. Because of this interest by the public, ACT PCS and Canberra Alpine Club signed a second Memorandum of Understanding in June 1998. Its aim is "to build on the strong partnership arrangements between CAC and the Service in terms of the CAC hosting open days at Mount Franklin". The club's involvement is seen as an integral aspect of the overall strategy of enriching visitors' experiences. Open days with club members present are held roughly monthly except during winter. In winter the chalet is a popular destination after snowfalls for family groups if road conditions allow access. In those circumstances rangers endeavour to open it at weekends as shelter, and it is then that visitors can really experience the true atmosphere of the place.

The co-operative arrangements between the Canberra Alpine Club and ACT PCS (through Namadgi National Park) have been very successful. Through them the site, which was falling into disrepair, has been restored. The club has retained a tangible link with its early days and the source of the self-help attitude and camaraderie that are still part of its culture; and the public can get a glimpse of recreational and social activities as they were a couple of generations ago.

The Mount Franklin ski-field began as a means of recreation for the residents of early Canberra and a potential destination for tourism. It brought together people with a wide range of backgrounds who were willing to put a lot of effort into following a common interest. It is now the source of a different kind of recreation: a unique window on the past, a record of a time of different expectations and social attitudes, and a memorial to those who over the years have had the vision and persistence to create and look after a means of recreation for themselves and others.

In preparing this paper, I have drawn on information accumulated over the years during conversations with club members; the book Skis on the Brindabellas by Matthew Higgins also was a valuable source and memory check. My thanks to all of them.
History of the Australian Alps Walking Track – A Victorian Perspective

John Siseman

Victorian Tracks and Trails Coordinating Committee

The Australian Alps Walking Track has had a long and chequered career since its beginning many years ago. In that time it has grown to become, in my view, the premier long distance walking track in Australia. In many ways it can hold its own with long distance walking tracks throughout the world. What it may lack in spectacular scenery is more than adequately compensated by its isolation and wildness. Now I know that there will be people who would say that Tasmania’s Overland Track or South Coast Walk to be the best long distance walking track in Australia but, in my book, a 50 to 80km 4-5 day walk does not constitute long distance. We are talking about 4-6 weeks here – this is serious walking. Across its entire length there are but 3 or 4 ski resorts offering minimal services outside the ski season and road access to major supply centres is long and tortuous.

More importantly, the Australian Alps Walking Track is significant in that it connects three major National Parks in three States and Territories. Transcending artificial borders, it reinforces the notion that the Australian Alps must be viewed and managed as a single entity. The idea of long distance recreational walking tracks is certainly not a new one. Whereas many of the alpine walking tracks in use today were originally cut to serve cattlemen and miners, some were made for the use of recreational walkers. An early example in Australia’s alpine regions was the Baw Baw Track, opened in 1906 complete with three accommodation huts. This track, which traversed the Baw Baws along the route used today by the Australian Alps Walking Track, provided tourists with a walking track from Warburton to Walhalla.

It is a little uncertain as to the exact point in time that the idea for this long distance alpine walking track was born. Because the track we know today as the Australian Alps Walking Track had its beginnings in Victoria it is often thought to be a Victorian enterprise. But similar ideas were formulating in NSW. As early as 1954, Alan Strom reconnoitred a route through the high country from Mt Tidbinbilla near Canberra to Mt Erica in the Baw Baw Mountains along a route that was probably not too far removed from the Australian Alps Walking Track of today. Alan’s report, published in NSW, received little response there and none at all from Victoria and the idea lapsed back into obscurity. At that time bushwalkers, the people who could make the best informed case for such a track, did not want it. They viewed the wild un-roaded highlands as a rugged, untracked wilderness and wanted it to remain that way.

Although it had certainly been considered earlier it was Maurice Harkins of the Victorian Tourist Development Authority who expressed a desire to see a long distance walking track from Mt Wellington in Victoria to Mt Kosciuszko in NSW. In the 1930s, Harkins, then a senior officer of the Victorian Government Tourist Bureau, had promoted the Skyline Tours, a scheme whereby up to 25 men (only) would spend about 10 days over the Christmas Holidays walking and riding across the Victorian Alps. These all-male trips ran successfully for about 10 years prior to the start of the Second World War and covered some impressive routes. From these walking experiences, Harkins saw a potential for a long distance walking track and set the wheels in motion but the Second World War put an end to the idea.
In 1963 Maurice Harkins, now Director of the Victorian Tourist Development Authority, pushed for a walking track over the Viking and across the Barry Mountains to Mt St Bernard with two shelter huts at strategic points. A modern development of the Baw Baw Track, this first tentative idea was to develop into the Alpine Walking Track. Whilst there had been overtures for a long distance walking track from as early as the 1940s, the general feeling amongst the Victorian walking fraternity was still that wild areas were best left the way they were. However, since the end of the Second World War very little remained the way it was with bulldozers laying their trails into the most remote places. Harkins again raised the idea of a long distance track and in 1968 the Ministry of Tourism sent out a letter indicating its interest in a walking track through the alpine regions of north-east Victoria and requesting support. At this time there was no attempt to seek coordination with New South Wales authorities in establishing a track that would cross the State boundary and the issue was still a contentious one for Victorian bushwalkers. Eventually the Federation of Victorian Walking Clubs (FVWC) came round to the idea and in 1969 prepared a report and offered the Ministry of Tourism suggestions as to a proposed route.

Harkins, always enthusiastic towards the idea, drew in the Forests Commission of Victoria (FCV) with the promise of tourist funds if it would act as the construction authority. The FVWC consolidated their ideas and presented Maurice Harkins with two outlines, one starting at the southern end of the Baw Baw Mountains and the second along the Howqua River to meet the first route at Mt Howitt. The trail would then continue on through the Victorian Alps via Mt Hotham, Mt Misery and the Cobberas to end at Forest Hill, the source of the Murray River. By the spring of 1969 the report was in the hands of the Alpine Resorts Development Advisory Committee (ARDAC) and the project then began to gain impetus. Funding was granted for each stage of the route to cover signposting, snow poles, water supplies and track cutting.

Originally named the Alpine Walking Trail, its name was changed in 1970 to Alpine Walking Track in an attempt to keep the project as Australian as possible. At this time virtually none of the track passed through land with National Park status or anything like it and an ongoing battle commenced between the FVWC and the Forest Commission of Victoria (FCV). By now logging operations in the heart of the Alps was reaching its climax as seemingly every last stand of alpine ash was hunted down in a relentless search and destroy mission. The FVWC stipulated that logging be kept to a minimum of 20 chains from the Alpine Walking Track so that it could thread its way at least through a forest a shade over 750m in width. The FCV would not accept this limitation and insisted on a corridor only 10 chains (less than 400m) in width. For many years this unfortunate override left the Australian Alps Walking Track walker a thin strip of forest through which could be seen the depressing mess to which the rest of the country had been reduced. Only now, with much of the route of the Australian Alps Walking Track protected deep within National Parks, is the bush returning to something of its original majesty. Unfortunately there is still a substantial section of the track between the Baw Baw and Alpine National Parks that is still subject to the depredations of uncontrolled road and forestry activity.

Other problems had to be fought off by an ever vigilant FVWC. The construction of the Dartmouth Dam in NE Victoria sundered the Alpine Walking Track in two, forcing the track to be re-routed around the waters of Lake Dartmouth. Then the vast Thomson Water Storage created yet another problem. This time it wasn’t the track itself that was threatened, rather the question of access to the entire Thomson Catchment, including a large portion of Baw Baw National Park. Final agreement permitted walker access to the catchment but with a restriction to three overnight campsites. Unfortunately much of the Australian Alps Walking Track is constrained to following roads throughout the catchment and beyond until the boundary of the Alpine National Park is crossed.

Major streams, too, presented their own difficulties. The Thomson River near Walhalla was bridged in 1976 with the re-decking of an old timber tramway bridge, an historic structure that will soon be in need of further restoration. Further east the ford across the Mitta Mitta River at Taylors Crossing was often too deep for a safe crossing and with no other bridge close by, the only answer was to build a suspension bridge. The first two were destroyed by floods before a third bridge was built recently at a new site a little further downstream and hopefully above the floodwaters.

By the mid 1970s construction of the Alpine Walking Track had been essentially completed. The only major change from the original concept was to end the track on the Alpine Way at Tom Groggin since it was deemed inconceivable that it could end anywhere other than on a road and, at the time, interest in continuing the track into Kosciuszko National Park was at an all time low.
It was also about this time that I became more involved with the Alpine Walking Track. Over the previous 15 years I had gained a considerable knowledge from bushwalking in the alps and was now employed in a store selling walking gear to an ever-increasing number of walking enthusiasts. While working in the gear shop I was approached one day by a customer who required information about the Alpine Walking Track. On being told that not only were there no track notes in any form but that the track was not even marked on the maps of the day and that furthermore, in some cases there wasn’t even any decent topographical maps available, he stormed from the store uttering exclamations of disbelief. This opened my eyes to the need for some reasonable information and set me on the first of many excursions along the Alpine Walking Track and, finally, to the first edition of my guide to the Australian Alps Walking Track.

In the mid 1980s when I was again traversing the Alpine Walking Track for a major revision of my book I got to thinking of the original vision for an Alpine Walking Track as a tri-state trail linking the best of the alpine country of Victoria, New South Wales and the Australian Capital Territory. Unfortunately this vision had remained little more than a dream. The Alpine Walking Track was born, but only as a truncated shadow of what it should have been. Over ten years, in the process of writing the first edition of this book and during the revision of the second edition, I twice walked the Alpine Walking Track. Each time, as I approached the end of the track at Tom Groggin, my eyes were drawn across the immense valley of the Murray River to the Snowy Mountains, and in particular to Australia’s highest peak, Mt Kosciuszko. Instinctively I knew that the Alpine Walking Track could not be worthy of its name until it led through these magnificent ranges.

As I prepared to walk the track for this third and major revision, I decided that this time the Alpine Walking Track must be taken across the Snowy Mountains of New South Wales and into the Australian Capital Territory. I was further prompted to proceed with this rather daunting 700km walk by the thought that the Alpine Walking Track should be a link to further understanding of what each State and Territory has to offer. It should be an incentive to tempt the ardent bushwalker to explore further afield for it has been my experience that few Victorian bushwalkers are familiar with the mountains beyond Mt Jagungal in the Kosciuszko National Park and, similarly, few hardy souls from New South Wales and the Australian Capital Territory seem to venture south of the Victorian border. What better incentive than a track leading onward to new country.

Also by the mid 1980s much of the Alpine Walking Track was protected from unwanted development by three new Victorian National Parks – Wonnangatta Moroka, Bogong and Cobberas – Tingaringy with a strong movement to link these three into one contiguous National Park adjoining Kosciuszko National Park. This finally occurred with the formal declaration of the Alpine National Park in December 1989.

With the approach of the bicentennial year of 1988, the Bicentennial Authority funded the creation of a tri-state alpine walking trail from Victoria through New South Wales to the Australian Capital Territory. Incorporating much of the existing Victorian Alpine Walking Track from Walhalla, a new route was established through to the Cobberas in East Gippsland thenence northward to Mt Kosciuszko and through the Snowy Mountains to Tharwa an the outskirts of Canberra. Following fairly closely to the route I selected for my unofficial version a year or two earlier the Australian Alps Walking Track was born at last. But it still has a little more to grow before its story is finished. From Rawsons Pass beneath Mt Kosciuszko to Schlink Pass some 50km to the north the Australian Alps Walking Track presents the walker with a boring walk along a road heavily trafficked for part of its length. In so doing it takes him or her away from some of our finest alpine country, passing instead along hard, dusty roads through over-developed alpine ski resorts – the very things that walkers come to the mountains to avoid.

The Australian Alps Walking Track presents a challenge to bushwalkers to discover mountains that lie beyond the immediate horizon of their own knowledge. Along its length it climbs over the highest mountain in Australia as well as the highest peaks of Australian Capital Territory, New South Wales and Victoria. It traverses country covered by snow for much of the year, traces lonely ridges far from water or descends to rivers that can become impassible when in flood. It follows solitary roads, fire access tracks, foot tracks both well-defined and poorly marked and at times heads into bush without any track or sign at all. It can be a pleasant stroll under clear blue skies or a battle to survive as the elements seemingly vent their fury upon innocuous travelers. It can be a race to see how fast the entire distance can be covered or it
can be a leisurely trip undertaken in sections at different times of the year. For the Australian Alps Walking Track is alive, its character constantly changing with every visit, every season and through the eyes of every visitor.
Matthew Higgins

Matthew Higgins, an officer with the Australian Heritage Commission, is a Canberra historian and writer

When Clement Wragge established his weather station on the very summit of Mt Kosciuszko in December 1897, howling blizzards were only one of the many challenges facing him and his staff. Government parsimony, professional rivalry and personality conflicts were additional challenges for this most engaging of Australian meteorologists. Yet due to Wragge’s energy and imagination, and the enthusiasm and dedication of his station observers, the Kosciuszko observatory survived five years on the Australian mainland’s highest, coldest and windiest point.

The observatory’s story is a fascinating chapter in Australia’s meteorological history. It also represents what was probably the first detailed recording of an intimate relationship between a group of people and the very special environment of Australia’s high country. And elements of the story bear comparison with some of our Antarctic achievements.

Clement Lindley Wragge, dynamic, unconventional, to a degree eccentric yet respected by many of his scientific peers, was born in Stourbridge, England in 1852. Dropping out of law, he studied navigation, then sailed the world and worked as a surveyor in South Australia in 1876. Returning to England he became actively involved with meteorological stations in Staffordshire.

In 1881 the Scottish Meteorological Society decided to place an observatory on top of Britain’s highest peak, Ben Nevis (1343m), together with a correlative or comparative sea-level station at nearby Fort William. The principle here was that important ‘upper’ atmosphere studies could be made and compared (through simultaneous readings of instruments) with the findings of the sea-level station. All of this, it was believed, would significantly aid forecasts. Voluntarily Wragge established the summit observatory and daily for five months during 1881-82 he ascended the peak to take recordings. British scientists welcomed the results and Wragge was awarded a gold medal by the Society.

Financially aided by an inheritance, Wragge came back to Australia and in 1887 was appointed Queensland’s Government Meteorologist. He established an extensive network of weather stations in the colony and offshore, and soon started publishing Australia-wide forecasts. His weather reports were colourful, and it was Wragge who began the practice of naming cyclones. His public lectures were well received for their ‘rare combination of profundity and humour’, and some journalists dubbed him ‘the great weather profit’.

Unfortunately, Wragge’s zeal was combined with a lack of tact. He criticised the other colonies’ meteorologists (H.C.Russel in NSW, Charles Todd in South Australia, and R.L.Ellery in Victoria) for not always adhering to the methodology of the Royal Meteorological Society. He further inflamed inter-colonial sensitivities by calling his Queensland office the ‘Chief Weather Bureau’. Sometimes he named cyclones after politicians of the day, displaying a naïve grasp of political realities. This intemperate
element in Wragge’s character – some called him ‘Inclement Wragge’ – was ultimately to play a part in his downfall.

A vegetarian, interested in eastern religions, green in environmental views, Wragge was hardly the typical Victorian-era man. This lack of orthodoxy would not have helped his professional and political relationships either.

Wragge was not long in Australia when he started pursuing the principle of high level/sea level weather stations here, firstly in South Australia (with stations on Mt Lofty and near the Torrens River) then in Tasmania (where stations were erected on Mt Wellington and in Hobart). At the 1896 International Meteorological Conference in Paris Wragge was congratulated for his Tasmanian work. He then unveiled his *piece de resistance*, plans for a station on Australia’s highest point, Mt Kosciuszko. British, European and American scientists applauded Wragge’s vision. But his fellows in the other Australian colonies were sceptical.

It may seem slightly ridiculous to many of us today for Wragge to have believed that upper atmosphere studies could be carried out on a mountain as modest as Kosciuszko. For decades now meteorologists have used high altitude balloons in the course of their work, aircraft have been utilized for many years, and much use is made today of satellites way above the atmosphere. But we should not judge Wragge’s endeavours by today’s standards and practices, but rather by the context, knowledge and limitations of his time.

The Kosciuszko project involved a summit station on Kosciuszko and a comparative station at Merimbula on the NSW south coast. Recognising that the summit station would initially be temporary, Wragge hoped the NSW Government would come to support the work and fund a permanent structure, enabling his observers to stay on the peak year round.

With private sponsorship Wragge prepared the expedition. A Brisbane company manufactured an Arctic tent of hurricane canvas, sheepskin sleeping bags and other items. By November 1897, with instruments packed, Wragge and his companions were ready for Kosciuszko. Transport was arranged by Charles Kerry, well-known Sydney photographer and Snowy Mountains publicist. Only four months earlier Kerry had led the first ever recorded winter ascent of the peak. Guide for the Wragge trip was renowned mountain stockman James Spencer.

On 4 December Wragge and part of the expedition reached the summit. Toasts were drunk, the billy boiled and some tents were erected. Soon a gale was blowing and that night the temperature dropped below freezing – the word ‘summer’ can mean very little on Kosciuszko. Unfortunately the Arctic tent, sleeping bags and the instruments were delayed on the expedition dray which was bogged below the mountain. Before the dray arrived a few days later, one of the Queenslanders went to bed one night wearing no less than 29 items of clothing!

On 10 December the thermometers, barometers and other instruments were functioning, with regular readings being taken of pressure, temperature, humidity, wind, cloud mass, precipitation and surface ozone. According to the Sydney *Daily Telegraph* journalist who accompanied the party, despite the icy winds Wragge was ‘perfectly happy’, the inauguration of observations being ‘one of the proudest days in his life, marking as it did the accomplishment of something very dear to him’.

Wragge left the summit next day to establish the Merimbula observatory. For the next five years he rarely got back to the mountain top, but directed the stations from Queensland. At Kosciuszko the observatory was run by the series of generally young men (including Wragge’s sons at times) who pursued their science in one of the harshest environments in Australia. The weather that they had come to study was to shape almost every aspect of their secluded lives.

Initial observers Captain Charles Iliff, Bernard Ingleby and Basil de Burgh Newth settled into the routine of instrument reading and life under canvas. But the tent observatory stood unscathed for only two months. In February 1898 a terrific storm hit Kosciuszko and 160 kph winds shredded the tents. The three men abandoned the summit and, in an epic retreat graphically reported in the Sydney press, narrowly avoided drowning in the flooding upper Snowy River and got to Jindabyne.
When the weather cleared, the three returned and resurrected the station. Clearly, if the observatory was to continue, the NSW Government would have to fund a permanent building. Premier George Reid obliged and 336 pounds was voted for a hut. Wragge and the observers were elated.

Early snowfalls delayed construction but by April 1898 the hut was standing. Built by brothers Arthur and Herb Mawson, and their partner D.McArthur, all Cooma builders, the two-roomed hut measured eight metres by four metres. Described by the *Sydney Morning Herald* as ‘designed rather as a protection from the wind than from an architectural point of view’, the hut had a number of adaptations to the severe summit weather. The skillion roof offered less wind resistance than a steeply pitched one. Between the weatherboard outer cladding and the pine inner cladding, the 13 centimetre gap inside the walls was filled with loam for insulation. Windows were glazed with 2.5 centimetre thick storm glass. Outside, boulders were piled against the walls to prevent the place being blown away. And there was an all-important lightning conductor to save the building in case of direct strikes on the totally exposed summit.

Despite the fears of locals who deemed it utter madness to try to live on Kosciuszko in winter (one local wit actually presented Newth with a coffin catalogue!), observers Ingleby, Newth and H.I.Jensen saw out the season and proved the critics wrong. They did have to adapt the building though. During that first winter the hut’s door was often snowed under, so an ingenious enclosed stairway, with a hatch at the top, was built to provide roof-level access. Although the observatory is now long gone, this form of access can still be seen today at Cootapatambga Hut, built for the Snowy Mountains Hydro-electric Scheme in the 1950s, just a little south of the summit.

The routine of the observers’ lives was dictated by the twenty-four hour schedule of instrument readings that Wragge had ordered. An evocative description of a midnight winter reading was written by Wragge’s son C.Egerton Wragge. The rostered observer, wrote Egerton, was awoken by an alarm clock.

He left his sleeping bag and:

> Lighting a lamp and peering out through the window, it is seen to be a dirty night. The wind is blowing in a furious tempest from the north-west, shaking the hut to its very foundation, and making the lightning pole creak as it tries to tear it from position, and hurl it away over the side of the mountain. Occasionally great icicles [that have] formed on the pole are torn off, and fall with a crash upon the roof.

The observer dresses and places a lamp near the window; this will guide him back to the hut through the dense cloud outside. Meanwhile, the other two men ‘snug enough in their sleeping bags, remark that they are glad it is not their night’. Our man climbs the stairway and opens the hatch:

> which is no easy matter under the circumstances. Waiting for a slight lull in the fury of the tempest, he exerts all his strength to force it open, while the wind is trying to force it down on his head. After some moments he succeeds in getting out. As the fury of the blast strikes him, he is seen to stagger, and is almost blown to the ground... Breathing is difficult, and it is necessary to place the hand over the mouth in order to do so. Snow and sleet driving across the mountain at a furious rate almost blinds him, and cuts his face. The light from the lamp at the window is thrown in a great yellow streak out against the fog bank.

He reaches the thermometer screen and, breaking away ice from the door, opens it and reads the instruments. All the while he is trying to ignore the fine snow ‘that has found its way down his neck and over his gum boots’. Numb, gloved hands close the door and the observer hastens back to the hut:

> As he goes, the light from the lantern perhaps flashes on a [ski-] brake-pole stuck in the snow, now covered with long white icicles, standing like some ghastly spectre against the fog. The sudden sight of this chills his blood, and floods the mind with a dread of the supernatural, and he makes a bound for the hatch. In his hurry to get into the hut he slips on the steps covered with ice, and goes tumbling to he bottom, cursing meteorology and meteorological instruments in general. This performance must be repeated again at 4am, and although unpleasant at the time, is extremely fascinating.
When the weather was just too foul to venture out in, the weathermen relied on clockwork-powered graphs which made automatic recordings.

The psychological impact of being incarcerated in the hut by winter weather for long periods – with the wind shrieking and the hut groaning – would have been severe. The men turned to music and song at times like these.

In summer of course the work was easier. In summer too, tourists came to visit the observatory and were warmly welcomed by the society-starved observers. Horses could be used for transport in summer, enabling ready communication with the outside world. In winter, communication was very difficult, yet remarkably the observers did maintain the link to Jindabyne. Every few weeks one or a pair of weathermen would ski over the alpine plateau, descent from the Rams Head Range to the Thredbo River valley and ride to Jindabyne where they would post data to Wragge snr and purchase provisions. Newth was the first man ever to do this winter journey solo. In 1899 he and Rupert Wragge saved Egerton’s life when Egerton became hopelessly lost during a return trip from the town – the 19-year-old narrowly survived hypothermia.

For the observers, the hardships of life at the top were offset by their devotion to science. More particularly though, the beauty and wonder of nature at Kosciuszko more than made up for the privations. The views, whether of wildflower-strewn slopes in summer or almost endless snowscapes in winter, inspired all. Ingleby wrote of a fine winter’s day: ‘Away to the north-east and south-west…were mountains rising tier upon tier, clad from base to apex in a mantle of purest white…nothing but an interminable line of virgin snow as far as the eye could scan’. And when cloud descended into lower valleys, surrounding peaks rose like little islands. ‘To the westward the cloud ocean assumes the most gorgeous hues…’

Natural phenomena were many. Refraction turned the sun into weird shapes at dawn and dusk. Luminous electrical discharges (St Elmo’s Fire) were another curiosity; observers waved metal objects about in the highly charged fogs and watched the sparks jump. Jensen remembered seeing Newth take a crosscut saw outside and ‘each tooth of it became a living flame’. Then there was anhalia, known also as ‘Spectre of the Brocken’ or ‘Glories of Light’. Here the observers would stand outside and watch their shadows grow more distinct on a distant cloudbank. ‘As we stood up’, wrote one, ‘we noticed around each of our [shadow-] heads an aureole of the most beautiful colour, reminding one of those old mediaeval paintings of the blessed saints, fashioned, however, not like them by human hands, but by the great divine artist, Nature. The entire group was also encircled by an enormous arch, likewise glittering with prismatic colours, the red being external’.

Much of the men’s winter leisure time, when not reading, or cooking on the station’s primus stoves, was spent on skis (known as show-shoes at the time). Jensen wrote that as soon as a fine day arrived:

> We donned our snow-glasses, fur caps and snow-shoes and raced wildly down the mountain side like dogs let loose from the chain. Sometimes, when the moon was bright, we would indulge in this sport by night, and the element of danger incurred lent a special charm to the proceeding. We had many a terrible ‘buster’ before we became experts at the game.

Modelling their technique on that of Kiandra skiers of the time, the observers had races to Lake Cootapatamba and built jumps. They toured the Main Range, and made the first known ski tours to Mt Townsend (and thus the first winter ascent of Australia’s second highest peak) and to Blue Lake. The station’s two St Bernard dogs, Zoroaster and Buddha, bounded through the snow behind the men on some trips. The adventurous and inventive observers also mounted a sail on the station’s sled. Their winter activities at the station, meanwhile, were captured on film by energetic Wagga photographer Donald McRae, who climbed to the station during the 1899 winter with his heavy glass plate camera. He was only the second person to do the winter trip solo – the first having been the indefatigable Basil de Burgh Newth.

Although NSW had funded the construction of the hut, the worry about continued government assistance was a constant one for Wragge snr. He installed a donation book at the observatory to obtain supplementary funds from summer visitors. With the other colonial meteorologists remaining sceptical
about the whole endeavour, Wragge feared the government would cut off funding and by 1900 he was appealing publicly for finance. There was not even enough money to have Newth prepare data for publication, and two years later only one month of Kosciuszko readings had been published. Although some of the observatory information was supplied to British and German Antarctic expeditions, there was no telegraph or telephone link between Kosciuszko and Merimbula. So with no speedy transmission of data from the summit the station’s forecasting ability was crippled. Scepticism increased.

In June 1902 the NSW Government announced that its support for Wragge’s observatory would cease and demanded that the instruments and stores be brought down from the mountain. It was mid-winter. Egerton Wragge, observer Davies and a third man Harris loaded three hundredweight (about 150 kg) of gear onto the station sled and descended. At one point the sled lost control on ice and dragged Egerton and Davies some distance before Harris could slow it down. Eventually the job was done. Only thirteen years later, Egerton Wragge was killed at Quinns Post, Gallipoli. His name is on the Lone Pine Memorial, signifying he has no known grave.

Meanwhile the Queensland Government found it could no longer fund a weather bureau and Clement Wragge left his position in 1903. His belief in Federation left him disappointed. In 1906 when the Commonwealth set up a federal bureau, Wragge was beaten to the job of Commonwealth Meteorologist by H.A. Hunt, Russell’s NSW successor and a man no doubt more diplomatic than Wragge.

Wragge settled in New Zealand in 1910 and pursued long range forecasting. He also followed his other interests, particularly botany: his Waiata Tropical Gardens in Auckland were admired by many visitors. While giving a lecture in November 1922 he collapsed from a stroke. He died at his Birkenhead home on 10 December – precisely 25 years after that cold, windy day when the first instrument readings were taken on Kosciuszko’s summit.

The Kosciuszko hut was finally destroyed by lightning in 1914, following the loss of the lightning conductor. For the surviving observers, their experiences stayed with them for the rest of their lives. Newth, who spent a total of 27 months on the top of Australia, was still writing about it 50 years later, feeling he was ‘well repaid in interest, experience and adventure… One could write a book about it all’. There is no memorial on the summit today, but visitors still travel across signposted Wragge’s Creek (just below Smiggin Holes) on their way to Mt Kosciuszko.

Of what significance was Wragge’s Observatory? Given that little data was ever published, it is difficult to assess the station’s meteorological importance. As mentioned above, the endeavour should not be judged by the knowledge and methods of today’s meteorologists, but rather by the context of the time. Wragge’s work on Kosciuszko was well supported by his international peers. Importantly, Wragge’s work was one of a number of scientific thrusts into the Australian high country during the nineteenth and early twentieth centuries. Wragge was part of a long line of scientific endeavour starting with Dr John Lhotsky in 1834, followed by Count Sir Paul Edmund de Strzelecki in the 1840s, geologist Rev W.B. Clarke in the 1850s, botanists Baron Ferdinand Von Mueller and J.H. Maiden, geologists Richard Helms and Professor Edgeworth David and others. David and Maiden were contemporaries of Wragge, and Maiden in fact called in to the observatory during his Kosciuszko researches.

The observatory also played an important part in opening the summit area to tourism. The project helped to focus public attention on Kosciuszko, and although people had been making summer trips for some years prior to 1897, the observatory was a catalyst in increasing visitor numbers. There were soon calls for a railway and for hotel accommodation in the area. NSW Premier Joseph Carruthers took the initiative and by 1909 both the Kosciusko Road and the stately Hotel Kosciusko were open.

Another aspect of the weather station’s importance was in terms of the history of journeying and exploration in the high country. The observers made the first winter trips ever recorded to various points on the Main Range, and they pioneered ski and sled travel across large areas of the range. Newth in particular deserves mention here, especially for his solo trips during a period when the Main Range was incredibly isolated.
Perhaps the major achievement of all was the fact that the various observers survived in total for five years, winter and summer, on Australia’s highest point. Prior to the day that Clement Wragge set foot on the summit, few people in Australia would have thought such a thing possible.

Sources
Sources are contained in the footnotes to the author’s article on Wragge’s Observatory which appeared in the *Canberra Historical Journal*, September 1987. Some of this material was also used in the author’s article in the *Canberra Times* on World Meteorological Day 1997.
Day Three – Mountains For Tourism
Mountains Of Science – The Cultural Heritage of Scientific Research in the Alps

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Abstract

Scientific research is as much part of the cultural history of the Australian Alps as the well-recognised history of the gold miners, mountain cattlemen and the dam builders. We need to recognise the scientists’ historic contributions, protect their research sites, and tell their stories so that their history is valued in the community.

The objective of the report 'Mountains of Science' was to develop a thematic interpretation strategy for the scientific sites of cultural heritage in the Australian Alps.

Introduction - The Cultural Standing of Alps Science

Scientific research is as much part of the cultural history of the Australian Alps as the well-recognised history of the gold miners, mountain cattlemen and dam builders. These latter histories have received considerable attention in recent years with the ‘Man from Snowy River’ films and the Mountain Cattlemen’s rallies in downtown Melbourne, along with the 50th Anniversary celebrations of the Snowy Mountains Scheme and its published history. These activities have left historic relics in the AANP that are easily recognised and often interpreted onsite and in interpretive centres and published materials.

What of the scientists? Their commitment and activities have not been broadly recognised and their stories are left untold to Australians generally. Those who visit Mt Kosciuszko may be aware of Clement Wragge’s meteorological station but are unlikely to know of the work done by scientists to expand our knowledge of the very ecosystems they are passing through – the scientists who looked to discover the glaciation history of the high mountains, those who set up long-term monitoring of the vegetation changes once grazing was removed from the slopes of Kosciuszko, of the researchers who continue to look and experiment with ways to repair the extensive damage caused by roading, hydro development, grazing and contemporary visitor impacts.

These scientists and their research have their ‘stories’ and there is the romanticism of ‘the hard life against the elements’ while seeking knowledge of the mountains. In some cases there are even relics of their work. These relics are not as obvious as the structures from other human activities in the mountains. The scientists themselves do not wave a flag for their history. All these factors allow the scientists’ stories and places to blend into the background.

We don’t celebrate this important scientific history which will continue to inform our knowledge of the Alps. Unlike the dam builders, gold miners and the mountain graziers the work of scientists in the Alps is
a tradition that will continue long into the future. We need to recognise their historic contributions, protect their research sites, and tell their stories so that their history is valued in the community.

**Background of Study**

Recognition of the cultural heritage significance of Alps scientific research and its associated sites was raised early in the life of the Australian Alps Cooperative Management Program (The Scientific Heritage of the Australian Alps conference, 1988; The Cultural Heritage of the Australian Alps Symposium, 1991). In 1994 historians Tom Griffiths and Libby Ronin produced the report 'Science in High Places: the cultural significance of scientific sites in the Australian Alps'. The next step in recognising scientific cultural heritage is to promote it through interpretation. In 2001 this study was initiated to develop an interpretation strategy.

**Context of Study - Three Stages of Alps Science**

The life of science in the Alps has passed through three stages so far. The first stage was “the science of exploration, a traveller’s and discoverer’s science mostly done by individuals” and provided the foundation for the next stages. It is exemplified by internationally recognised scientists such as Meuller (botany), Lhotsky and Strezlecki (survey) and David (geology/geomorphology).

The next stage was that of the ecologists who established experimental science that was problem-oriented and sustained over repeated visits. It was institutional (i.e. government initiated) and required interdisciplinary teamwork, with fieldwork that was often tedious and repetitive. This research was charged with identifying any processes that might compromise human requirements from the Alps – particularly water for irrigation and power. Maisie (Fawcett) Carr and Alec Costin stand out as representatives of this stage in the history of Alps sciences.

The next and current stage is that of ‘conservation science’ which is informed by a conservation philosophy and recognition of the uniqueness of the Australian Alps. There is a recognised need to understand and to know the resource and how it works in order to conserve it. Such scientific studies seek to enhance our knowledge of species/systems so that there is adequate knowledge for making judgements concerning possible impacts on them.

These last two stages, and the science resulting from them, form the body of the interpretation strategy.

**Criteria for Assessing Cultural Heritage Significance of scientific sites**

Firstly, what do we mean by the cultural heritage of a scientific site? Griffiths and Robin (1994) used this definition:

> A culturally significant scientific site will have important historical associations with key individuals, events, debates or scientific findings.

We have taken this definition, with the relevant Criteria for the Register of the National Estate (AHC 1990), to arrive at a set of 8 criteria for assessing the cultural heritage of scientific sites. These criteria are:

1. **The site has important historical association with key individuals.**

   Places may be sites for collecting, survey, research or monitoring of the natural environment, including but not restricted to the following disciplines: paleoclimateology, geology, geomorphology, soil science, botany, zoology, ecology. In general, the association between person and place needs to be of long duration, or needs to be particularly significant in the person’s productive life. For a place to be eligible for its association with a prominent scientist the importance of the scientist must be established, scientifically or historically; and the place must have a clear, direct and important link to the work of that scientist – it cannot be simply a campsite or collecting locality. The scientist may be an amateur naturalist, providing that person does have a confirmed historical standing.

2. **The site is associated with important historical events.**
Places associated with the development of theories in geology, geomorphology, botany, zoology, ecology, archaeology, anthropology or other sciences associated with the understanding of the natural environment and human interaction with the environment. A place eligible for its association with a significant scientific theory must have a clear and important relationship to the development of that theory or its early application in Australia. A place eligible for its history of science associations must have a strong connection with the work of an historically significant figure or with an historically significant scientific exploration/undertaking or methodological development.

3. The research findings from a site were important in key scientific debates.

4. The site is associated with key scientific findings.

5. The site is associated with research that was of a pioneering nature.

6. The site is a long-term monitoring site that is likely to add to the knowledge of biological sciences.

7. The research site is a reference, benchmark or prime site for a particular field of research.

8. The site demonstrates a high degree of creative or technical achievement.

These criteria were applied to state-based lists of sites/projects. Sites that met two or more criteria were deemed to be culturally significant and were grouped into themes for purposes of interpretation. Sites that met only one criterion (often #6) were included if their claim was considered strong.

**Interpreting the Sites – How, What, When, Where, Why, and to Whom?**

Has interpretation of scientific heritage occurred on regional scales elsewhere in Australia? The answer is basically "no". Why is this so? A passage of time is usually necessary to gain perspective on cultural significance. Science, especially experimental science using objective methodology, is only just coming of age in Australia in terms of the impact of its findings. It is no surprise that the cultural heritage spotlight is shining first on Alps science due to its long history, volume, variety and importance in "one of the most studied biophysical regions in Australia" (Good 1992a). Kirkpatrick (1994) states that none of the World Heritage Areas in Australia has received as much scientific attention regarding ecosystem dynamics as has the Australian Alps, and none has been subject to such long term monitoring.

**What** need to be interpreted are the compelling stories embodied in the themes and the key scientific sites. **Why** they need to be interpreted is a function of the importance of science as a human activity in the Alps. And not just its scientific importance, but its romance, its hardships, its battles and its victories – in short, its cultural heritage. Griffiths and Robin (1994) point out that scientists have triumphed over cattle graziers when it comes to science, but have lost out on heritage. Interpreting culturally significant Alps science is a necessary step in raising its profile.

The **when** of site interpretation has much to do with having a good story to tell. It goes without saying that the site must be culturally significant, but the assessment of cultural heritage is a dynamic process. Even after a site has been identified as culturally significant, its value may lie in its potential, as with the recently established network of fire-specific monitoring sites. Where today there may not be much of a story to tell, there will inevitably come the time where significant changes to vegetation communities can be shown – all the better if photographs are available and if there are interesting or controversial management implications. Then is the time to interpret!

**How** we interpret the sites – or which media we use – is closely related to **where** we interpret and to **whom** (which audiences) we are trying to reach.

An audience of primary importance is the park visitor. At present visitors pass by (most) scientific sites without knowing of their existence. The most powerful interpretive experiences relating to a place are available when your audience is there in the flesh. And the most powerful form of delivery is person-to-person, face-to-face – for example ranger-guided activities. There are many face-to-face techniques available other than the basic ‘talk’. These include role plays, artistic expression, and hands-on sensory
investigations which provide experiential insights into the significant features/findings of a site. In the case of Latrobe University’s annual Alpine Ecology Course in Victoria participants have the opportunity to partake in active scientific research at culturally significant sites.

Face-to-face interpretation will of course only reach a small fraction of park visitors therefore there is a definite place for on-site signage. Many sites however are inappropriate for on-site signage for a range of reasons. Where signage is inappropriate (yet the site is still considered appropriate for visitation) a brochure may be considered. The brochure may be specific to a site, or the site information could be added to a more general brochure such as that for a walking track.

A brochure will provide the above mentioned on-site interpretive experience but only if the visitor has obtained it in advance. This drawback can be balanced against the fact that a brochure can function as off-site interpretation thereby reaching a wider audience such as visitors at information centres, potentially attracting them to the site. For those who do visit a site with a brochure, the brochure has added value as a take-home keepsake.

Some sites are managed so as to be off limits to visitors, usually by the expediency of no location-specific promotion. There may be an existing interpretive node (or one could be established) where the site (or indeed a group of sites) could be interpreted nearby. Where such a node is adjacent to a major road or at a place developed with substantial facilities, a ‘tourist’ audience can be reached as described below.

Other off-site possibilities include AANP agency visitor centres and regional visitor centres, and periodic AANP agency publications such as the seasonal Kosciuszko Today. Interpretation via these means will reach ‘tourist’ audiences often less informed about national park values than those who venture into the parks beyond developed areas. These audiences are important to reach if we are to elevate science in the general community’s cultural image of the Alps. There are several options for Alps science at visitor centres. Scientific sites in the area served by the centre could be interpreted by static and/or interactive means as part of a ‘permanent’ exhibition. A more Alps-wide approach would be a travelling AALC exhibition that could tour the various visitor centres and also be available for selected conferences and workshops.

A related recommendation to the one above would be to raise the profile of Alps science by inserting it into more general park planning processes.

The big picture of Alps science covering all themes and the key researchers could be presented in a book or booklet, on websites (AANP agency or AALC), or by other digital means. A hard copy publication or a downloadable website would act as both ‘armchair’ interpretation and as a field guide to appropriate sites. While this report was tasked with creating a framework for the interpretation of individual sites or ‘places’, the heritage of Alps science is also worthy of a single cohesive ‘big picture’ presentation. Given the importance of the Alps science story in its entirety, we recommend a higher priority be given to an overall production than to the interpretation of individual sites.

There will be opportunities to piggyback Alps science onto more general publications where appropriate. For instance a new edition of the Australian Alps Education Kit (AALC 1992) would be a prime medium for the treatment of culturally significant science. Reaching influential audiences like teachers can have a ripple effect in raising the profile of Alps science.

The options for interpretation outlined above are not mutually exclusive.
Themes For Interpreting Australian Alps Science

The major themes relating to Alps science revolve around:

- Grazing
- Fire
- Rehabilitation
- Geomorphology
- Hydrology
- Meteorology and Climate Change
- Palaeoecology
- Native Fauna
- Native Flora
- Arboreta
- Exotic Species

Some of these themes were not examined in full, due to time constraints. This does not indicate that those particular themes have any lesser importance than those that were more fully explored.

Each theme was presented with the following structure:

- An overview of the science relating to the theme.
- A section on interpreting the theme comprising:
  - constraints and considerations,
  - the thematic statement,
  - key messages for interpretation, and
  - key sites for interpretation.

The key messages for interpretation were drawn from the overview. Together they provide material which is useful for the generation of interpretive text, including references to other sources. The overview and key messages are important as they cover all the significant sites/projects, not just those that have been selected as key sites for interpretation. The key sites for interpretation are chosen for their potential and propriety for on-site or near-site interpretation – they are not necessarily the ‘best’ sites for interpretation, many of which are inaccessible, sensitive, or have other constraints. Therefore the overview and key points should be drawn upon in any non site-based forms of interpretation.

Example. Rehabilitation

Overview (Summary - full overview of Rehabilitation is in report on Mountains of Science)

Rehabilitation is one of the great stories of the Australian Alps. Engineering activities, fire, grazing, mining and forestry caused tremendous damage to soils and vegetation in the period before conservation-minded regulation was put in place. The need to repair the damage was already apparent in the 1930s prompting the establishment of soil conservation agencies in NSW and Victoria. The need was backed up by the great scientific investigations spearheaded by Fawcett and Costin.

Alps rehabilitation began in 1957 in the alpine area of Kosciuszko where grazing and fire had removed the fragile ‘skin’ of vegetation triggering massive erosion that carried away soil to a depth of 60cm and created gullies in drainage lines. The magnitude of the damage imparted urgency to the work.
The major broad scale rehabilitation works began at Carruthers Peak and moved on to Mt Twynam continuing into the 1980s. Many workers were involved and they faced great hardships due to the difficulty of the terrain, the harshness of the weather, and the challenges of transporting supplies and equipment. One violent storm destroyed the workers’ tent camp forcing a hazardous pre-dawn evacuation to the shelter of the Spencers Creek weather station.

The results are there to be seen on the Main Range. The results are so good that most people take what they see as a pristine natural area for granted. The research resulted in knowledge of fertiliser requirements, appropriate species and mixes (moving to entirely native species), mulching techniques and water spreading techniques for bogs. Returning former pine plantations to local native species has also been a significant area of rehabilitation research in the Alps.

More recent rehabilitation work in the Victorian Alps has featured the use of native species. The work has benefited from the lessons of 50+ years of grazing research, and from trials established (1993) and monitored under the leadership of Warwick Papst.

A current focus for rehabilitation in the Alps is the impact of recreational activities such as walking and horseriding – activities that boomed with increased leisure and mobility in the late 20th century.

**Interpreting Rehabilitation**

The thematic statement for rehabilitation is:

*Healing the Wounds: scientific rehabilitation of the Australian Alps.*

Key messages for interpretation are:

- The Main Range was not a pristine natural area at the end of the grazing era.
- Massive erosion was halted and vegetation restored by large scale decades-long heroic effort.
- The rehabilitation was supported by scientific trials and experiments.
- Today applied research is returning native species to damaged areas.
- Australia’s largest pine plantation rehabilitation projects are taking place in the AANP.
- Rehabilitation is increasingly focusing on the impacts of recreation (walking, horseriding, etc) as the historical impacts (construction, mining, grazing, etc) are controlled.

**Key Sites For Interpretation: Rehabilitation**

**Rocky Valley Alpine Rehabilitation Project.**

**Cultural Significance (as per criteria):** 1 - Papst; 4 - Identification of native species and techniques for alpine rehabilitation; 5 - Pioneering applied research into the use of native species in alpine rehabilitation; 6 - Monitored since 1993; 7 - Reference site for alpine rehabilitation.

This site is located in the narrow strip between the Bogong High Plains Road and the northeastern arm of Rocky Valley Dam (Plates 2 and 3). There is already a sign with some interpretation but it could be improved upon. This accessible and interesting site, well worth interpreting in its own right, can act as a central point for interpreting the various rehabilitation trials and works around the High Plains, details of which are largely unpublished but are available from Warwick Papst. A sign is vital here regardless of any other treatment, however rehabilitation should be included in any ‘Science on the Bogong High Plains’ brochure.
Twynam/Carruthers Soil Con Works, Other Rehabilitation Trial/Investigations, Native Species Rehabilitation Investigations.

Cultural Significance 1 - Roger Good; Walter Bryant; 2 - Alpine grazing in the Snowy Mountains. - its damage and repair; 4 - Alpine/subalpine soil conservation/rehabilitation techniques; 5 - Pioneering research in alpine soil conservation/rehabilitation techniques; First ecological assessment of the potential of native species for alpine rehabilitation 6 - Monitored long term (63-74) and Roger Good continues to photo monitor these sites annually; 8 - Successful application of research over a large fragile area; Development of a fertiliser mix for alpine/subalpine rehabilitation.

This research centres on Mounts Carruthers and Twynam on the Main Range of the Snowy Mountains. The area is accessible via the Lakes Walk from Charlotte Pass. While rehabilitation is covered on one quarter of one of the many interpretation panels at Charlotte Pass, the science of rehabilitation is not mentioned.

Rehabilitation science should be flagged on updated panels at Charlotte Pass and then interpreted fully on a sign at the old Soil Con Hut site on the Lakes Walk several hundred metres west of the Blue Lake turnoff. This site, as well as having been the base for much of the rehabilitation work, looks across to still-visible contour banks on the flank of Carruthers Spur. Dramatic before and after photos are held by the NSW Soil Conservation Service. Any interpretation in the Main Range area should remind people to stay on the track. Any sign must be constructed with snow load in mind (the snows of 2001 destroyed the sign at the Blue Lake lookout).

Jounama Pine Plantation Rehabilitation

Cultural Significance 4 - Optimal techniques for native rehabilitation of pine plantations; 5 - Research associated with first project in Australia to rehabilitate a large pine plantation to native vegetation; 6 - Various plots monitored in the 1980s with potential for revisiting; 7 - Benchmark sites for pine plantation rehabilitation

The plantation area stretches along the north side of the Snowy Mountains Highway directly across the road from the Yarrangobilly Village site, now a picnic and camping area but still featuring the historic Cotterill’s Cottage. The existing interpretation bay at Yarrangobilly Village mentions Jounama but not in the context of science. The Tumut office of NPWS is planning to develop (over the next few years) interpretation of the historical aspects of Jounama in text and photos (Mick Pettitt, pers comm). An update of the interpretation bay at Yarrangobilly Village would provide the ideal opportunity to present the science and history of Jounama.

Summary Of Interpretation Recommendations

- Consider as a priority the production of a book or an electronic version of the entire Alps science story which could act as a field guide to appropriate sites.
- Include training in the cultural heritage of Alps science as part of cultural heritage training programs for Alps staff.
- Fund onsite/trail head interpretation of identified culturally significant scientific sites.
- Encourage the treatment of Alps science in visitor centres and in AANP periodic publications.
- Identify forthcoming publications appropriate for the inclusion of an Alps science component.
- Encourage AANP agencies to take account of scientific heritage in forthcoming management plans, interpretation plans, and recreation plans.
- Nominate key sites for State and national heritage listing.

References: Please see original report: Macdonald, P and Haiblen J (2001) 'Mountains of Science: a thematic interpretation strategy for the scientific sites of cultural heritage in the Australian alps. Vol 1.' (Australian Alps Liaison Committee: Canberra). Copies may be obtained through the Alps Coordinator.
Mountains – Changing Educational Perspectives

Helen Rhodes

Snowy Mountains Grammar School

Our view of mountains has changed. Once it was simply a scholastic exploration of a curious landscape. Today mountains are recognised for the myriad of values they hold and the need for careful management. In a nation as urbanised as Australia, the first encounter of a mountain for many young people is in the context of a classroom. Curiosity is aroused and subsequent studies build on knowledge and understanding.

Learning about mountains today goes beyond the acquisition of information. Education has a crucial role to play in increasing community awareness of the importance of mountains. It is this opportunity to arouse an appreciation of mountains that will foster more responsible visitation.

The approach taken by educators in investigating mountains has shifted. In many ways, this has mirrored changes that have occurred in the community in the perception of the value of the mountains and subsequent responses in management. Each decade has been characterised by a certain approach to the study of mountains.

Lessons in the 1950's:

Courses were formulated to give students an appreciation of the ‘varied aspects of the face of the earth’. Scholastic exercises were aimed to satisfy the curiosity people felt about ‘foreign places’ or ‘what lies over the hill’. Students were encouraged to explore the structure of landscapes. It was anticipated that this training would last into and through adult life and greatly enrich post-school experiences in reading and travel.

In studying the distinctive landscapes of the world, the emphasis was on landforms. In studying a specific region consideration was also given to climate, soil, vegetation, wild life, human landuse, population distribution and density. It was emphasised that that it was not the separate elements that was important, but rather their association in typical landscapes and on the altitudinal and latitudinal differences between them. From the list of suitable regions given, there should be selected for study one plain, one plateau, one hill, one mountain area in each of the climate groups: equatorial; tropical; temperate and cold temperate or polar.
As most students were studying mountains from a distance, they were dependent on recorded information in the form of literary and photographic material and maps. One of the skills taught was the visualisation of mountains through such material by imagining accurately what the area would look like and what it would feel like to be there.

**Evaluation:**

*Geographic education was aimed at making people aware of the diversity of landscapes in the world and thereby enhancing their life experiences. A study of regions provided the framework.***

**Lessons in the 1960's:**

The study of distinctive landscapes of the world dominated the 1960's. This introduced students to different parts of the earth’s surface, in each of which the character of the landscape was due to the dominance of a particular element, or a combination of closely related elements. Mountain landscapes were easily recognisable because of their obvious landforms.

A ‘landscape’ was characterised by dominant types of vegetation, landforms or occupancy. Each landscape was divided into geographical regions for more detailed study. As each landscape was studied, the emphasis was placed not only its most outstanding visible feature, but also on the combination and interrelationships of features which gave it a distinctive character and were responsible for the unique nature of each geographic region.

Studies of mountains concentrated on the special assemblages of physical features. Building an understanding of the processes responsible for the characteristic features of such areas was fundamental, while consideration of human occupancy focused on the adaptations made to the set physical conditions. The focus for study was essentially one of ‘Physical Geography’.

The study of the Mountain Landscape was set out very specifically in the syllabus. With landforms being the dominant feature of this landscape, it was considered necessary to introduce systematic material relating to the description and analysis of landforms and other elements of the environment, and in particular, the relationships between landforms and man’s occupancy. In the study of mountain landscapes, the following aspects were treated.

**Introduction:** the description of landform; landform classification by appearance and origin; the identification of landform on topographic maps.

**Systematic Geography:** major types of rocks; deformation of the earth’s crust by tectonic forces; gradational forces affecting the appearance of mountains; the geographical significance of altitude, aspect and slope; the representation of surface features on formline and contour maps; vertical differentiation of climate, vegetation and occupancy in mountain areas; limits to settlement; contrast between mountain areas in low and middle latitudes; isolation of mountain communities; transport and communication; problems of economic development of mountain areas.

**Regional Geography:** a selection was made from

- The Central Highlands of New Guinea
- The New Zealand Alps
- The Hawaiian Islands
- The Himalayas
- The Andes of Peru and Ecuador
- The Highlands of Japan
- The Canadian Rockies
- The Sierra Nevada Mountains.
Evaluation:
The pursuit of knowledge of the physical world was paramount. Mountains were seen as a distinctive landscape and were systematically studied as such. It is significant that all of the mountain regions stated in the syllabus are overseas, indicative of the perception that Australian mountains were considered less spectacular.

Lessons in the 1970’s:
The 1970’s witnessed a ‘scientific’ approach to mountains, clinically studying them as a system with inputs, process and outputs. This systems approach was applied universally to both natural and built environments. It was essentially a cause and effect view of the world, a study of process. Humans were seen as an input and consequences of their actions as an output.

The systems approach was seen as a valuable innovation that provided a more structured framework for students to observe the interdependence of geographic phenomena. This was the basis for the operating forces and interacting processes.

The syllabus specified the study of three themes: the water cycle, human organisation systems (consisting of agricultural, manufacturing and urban systems) and the synthesis of interacting systems.

Mountains were studied as a natural system as part of the terrestrial aspects of the water cycle. Specifically it was an investigation of the development and character of landform systems in humid and glacial terrains.

By adopting the systems approach and its associated terminology in the study of Geography, a framework was presented to organise all thinking. There was an increased emphasis on the need to integrate the various sections of the course to develop an overall appreciation of man/land systems and of the varied pattern that the operation of these systems produced on the surface of the earth. In other words, all topics of study were considered not only as functioning systems, but also as parts of a wider and more complex man/land system.

The deliberate implementation of a systems approach involved the appreciation of four distinguishing features of systems:

- The manner in which a system is a combination or complex of elements which are usually termed variables (components), since the degree to which each element may affect the system can alter.
- The manner in which the interdependent, interacting variables of the system are held together by linkage mechanisms or flow processes. Changes in one variable can have repercussions throughout the system.
- The manner in which most systems are self-regulating, whereby changes to input set in train changes through the system which tend to restore the original balance.
- The manner in which any system can be considered as a complex of subsystems – the greater the complexity of the system, the greater the number of subsystems that might be identified and studies within it. This generally means that the linked components of a system and its subsystems generally exhibit a definite structure or framework which is commonly hierarchic.

Evaluation:
There seems to be more concern with neatly fitting everything into the systems framework and examining it’s functioning rather than the subject matter being studied.

Lessons in the 1980’s:
With the growing wave of environmental concern, the focus shifted in the late 1980’s to mountains as ‘fragile environments’. This approach persisted for over a decade. Student’s emotions were stirred by the images of global threats to the environment: ozone depletion; deforestation; desertification and the extinction of species. Mountains were another environment that humans were presumably spoiling. Educators felt a responsibility to increase peoples’ awareness of such issues and the thrust of study tended
to be a fairly negative one. There had been real shift in the focus, with the actions of humans now receiving attention and the underlying physical environment being largely ignored in detailed study or taken as assumed knowledge.

Senior Geography was an holistic study of Australian and global environments with a focus on people. It emphasised the interdependence of people and the biophysical elements of their environment over the face of the earth. It also required an understanding of the significance of interrelationships at different scales including local, regional, national, and global.

Really the only opportunity for studying mountain in this course was at the higher 3 Unit level in the option of ‘The Fragile Planet’. It could have been chosen as a sample study of a fragile environment subject to severe natural stress or widespread change as result of human activities.

**Evaluation:**

*Many teachers felt that this course did not provide students with adequate knowledge of the biophysical environment that was necessary for them to understand the impact of human induced change and the fundamentals of sustainable management.*

**Lessons into the New Millennium:**

The current perspective in Geographical education seeks an understanding of the interactions within the biophysical environment and how humans can impact on these. Fundamental to such studies is the importance of management in terms of ecological sustainability.

There are many places for the studies of mountains, in particular studies of the Australian Alps. The aim of senior Geography is to study the spatial and ecological dimensions of biophysical and human phenomena in a changing world. In the Preliminary Course (Form 11) topic ‘Biophysical Interactions’, students investigate biophysical processes and how an understanding of these processes contributes to sustainable management.

Students are able to learn about the nature and functioning of the various components of the biophysical environment of the Australian Alps. They also study the interactions between, and the human impacts on, the functioning of the atmosphere, hydrosphere, cryosphere, lithosphere and biosphere. A case study investigates how an understanding of biophysical processes contributes to sustainable management.

Students are presented with the view of mountains as ‘ecosystems at risk’ and mountains for cold destination tourism in the Higher School Certificate Course.

The focus for the topic ‘Ecosystems at Risk’ is the study of the functioning of ecosystems at risk, their management and protection. This entails recognition of factors that place mountains at risk and the importance of management. Students examine the biophysical interactions within alpine ecosystems and assess their vulnerability. The importance of ecosystem management and protection considers the maintenance of genetic diversity, utility values, intrinsic values, heritage values and the need to allow natural change to continue in the mountains.

The mountains are most important in the regional economy of NSW as they support cold destination tourism. Students also undertake a geographical study of an economic enterprise operating at a local scale. The case study of one of the ski resorts explores both its ecological dimensions and sustainability. It is important for students to appreciate the significant role these resorts play in environmental protection. Perisher Blue Pty Ltd is an excellent example of responsible environmental citizenship in its efforts to save endangered species.
Monitoring at Mount Blue Cow since the mid 80’s has shown that the activities in this area have not had a detrimental impact on the Burramys parvus. In fact Perisher Blue Pty Ltd is committed to saving this species by undertaking:

- to prohibit disturbance in prime habitat by excluding skiing as vibrations cause distress.
- to construct ‘love tunnels’ (small mammal crossings) under ski runs so that compaction doesn’t occur and the Burramys can move about freely.
- to push snow over critical habitat areas in the boulder fields when the cover thins in a poor season. PB is able to do this by ‘snow farming’ (the passive collection of snow by strategically placing snow fences to catch drifts which can subsequently be moved to areas of thinning cover). Maintaining this snow cover is of paramount importance to the Burramys so that it maintains a constant temperature in the habitat whilst they are hibernating. Otherwise they start to wake up each time the cover thins, which chews into their reserves of body fat and when springtime comes they have no reserves and fail to breed, or at worst, die.

Perisher Blue believes that it is not doomsday for the Burramys and they may be able to provide a window for its survival. So long as they are able to continue to make snow, and they can keep it on the mountains, it may give the Burramys a chance to come back.

If we are globally able to turn greenhouse around in two generations and keep the snow, then it gives the threatened species a chance to come back. So it is important to keep the boulder fields, pools and bogs safe. Perisher Blue is so big that this is not a constraint, and they are able to work around such areas.

**Evaluation:**

*The current syllabus provides a more balanced approach in the study of mountains by recognising that an understanding of the underlying ecological processes is necessary for sustainable management.*

**Support for education in the mountains:**

The Kosciuszko Education Centre, which is operated by the NSW National Parks and Wildlife Service at Sawpit Creek, has developed a number of programs for Senior Geography.

1. **Kosciuszko – A Special Place:**
   This slide/lecture presentation highlights the unique natural and cultural features of the area, interaction of the four spheres, human impact and park management. Students have the opportunity to have their questions answered by National Parks and Wildlife Service staff.

2. **Going Up the Mountain:**
   A field trip featuring the soil, weather, flora and fauna in montane, sub-alpine and alpine zones, the impact of grazing and ski resort development, park planning and management strategies.

3. **Strategic Planning Meeting:**
   This is a role play activity in which students work in teams of ‘expert’ soil scientists, geomorphologists, climatologists, botanists, historians, pest species officers, park planners and legal advisers. Their task is to gather information from a variety of sources, including audio tapes, centre displays, books and scientific papers, and report back to the group on the unique features of the alpine area and the impact of a hypothetical ski resort on the alpine area. Student presentations are video taped and all research notes are taken back to school.

Snowy Hydro, in conjunction with the NSW National Parks and Wildlife Service (NPWS) and Thredbo Alpine Village also offer a two/three day educational package titled ‘Learning With Altitude’. This incorporates visits to the Kosciuszko Education Centre (NPWS), the Snowy Region Visitors Centre (NPWS) at Jindabyne and the Snowy Mountains Scheme Information and Education Centre at Cooma. Students also have an Alpine Ecology Day Excursion (Kosciuszko Walk) departing from Thredbo.

Snowy Hydro is very committed to education. They have produced many resource and teaching kits and provided them free of charge to schools throughout NSW. The Snowy Region Waters kit is particularly
useful for the Preliminary Course as it examines the interactions within the biophysical environment of the alpine area the importance of understanding ecological processes in the sustainable management of the mountains.

Snowy Hydro and NPWS are also working together to save the Burramys. Snowy Hydro is committed to helping the NPWS through corporate sponsorship and environmental initiatives. All the proceeds of the combined sales of soft toys of the pygmy possum and the corroboree frog (which are very popular with visiting students) are given to the NPWS. Thus far $30,000 has been provided, which will significantly contribute to the preservation of these species.

Evaluation:
Such involvement in education by the NPWS and Snowy Hydro is to be applauded as it enables students who live great distances from the mountains to study them under the guidance of experts. The emphasis on understanding ecological processes and sustainable management of the mountains is appropriate.

A fundamental shift:
Geography has moved beyond curiosity. Today it aims to develop student’s knowledge, understanding, skills, values and attitudes. This is essential for an appreciation of geographical phenomenon and also to prepare students for informed and active citizenship in a changing world.

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A Short Walk to the Top

Meredith Walker

This talk is about getting to the top of mountains and small hills. It asks the question, *How important is it to provide the experience of getting to the top for visitors to national parks, state recreation areas, accessible state forests etc?*

**Introduction**

From the carpark at the Torrington Nature Reserve, north of Glen Innes, signs direct the visitor to Thunderbolt’s rock. The walk is about 15 minutes to the base of the hills and then there is a short walk, followed by a climb on specially constructed steel ladders – to a platform that covers part of the top rock and provides a prospect of the surrounding country, especially to the south.

The prospect is very appealing, but a similar view (not quite so splendid) could be had from lower down. The presence of the steel ladders, and their contrast with the granite boulders, made me question (not for the first time) – *How important is it to get to the top?*

I asked my companions their opinions about the ladders and the experience – was getting to the top worth the constructions and their impact on the rock? The discussion was lively!

From a park management point of view the track already existed before the NSW National parks and Wildlife Service became the custodians. It was logical to use the funds provided when the land was gazetted to The Service to upgrade the track and to provide a safe route to the top. If the path didn’t go to the top, or stopped short of it, people would scramble up to the top anyway, with the resultant risks public liability issues.

In general, my companions, the management Planning sub-Committee of the National Parks and wildlife Advisory Council, would have preferred to avoid the metal ladder solution, and to see other methods of managing the people such as a different track and signs.

Issues about public access and the management of people are not easy, especially if the route involves a degree of difficulty.

The visit to Torrington State Recreation Area was one of more than seventy excursions to national parks and nature reserves made by the author whilst a member of the National Parks and Wildlife Service Advisory Council from 1991-1999. The visits were part of a process for considering submissions made to exhibited plans of management. The Advisory Council provided recommendations to the minister about the submissions and the finalisation of the plan of management. Each park was visited so that the issues could be understood. This also provided the opportunity to learn about the area and its values, and to meet with local people. [These excursions were a wonderful experience, which I thoroughly enjoyed.]
On many occasions I was conscious of the difference in approach between the draft Plan of Management –with its technical language and its emphasis on natural values – and the experience of visiting the place itself – where we traveled along roads - invariably built for prior uses (such as logging), we walked along tracks many of which predated the gazettal of the park, and we spent a lot of time visiting lookouts and walking to the top of hills to look at the view.

The walk to the top is a major component of the experience at many parks and nature reserves. In park brochures the height of mountains and the view are often the first things mentioned.

In ‘walking to the top’, people (usually in groups) follow close on the heels of one another, looking at the path and travelling quickly. Often, the experience is more an exercise in exercise, than an interpretation experience! But at the top, people stand and experience the reward, surveying the prospect.

But what are the benefits of walking to the top and why do we do it?

Why is it such an ingrained part of our (Australian) culture?

For places where there is no established track to the top, should a track be established when the area becomes a national park?

Gundabooka

A case in point is Gundabooka National Park, gazetted in 1997 with recent major additions. The land was formerly part of several pastoral holdings.

The visit to Gundabooka was a great experience, particularly because of the opportunity to hear about its significance to Aboriginal people and to visit some of the important cave painting sites and hear about the experiences and disruptions caused by European people from traditional owners.

The Gundabooka range is a major feature in the flat to undulating landscape south west of Bourke. The range is very important to many Indigenous people – in a similar way that Uluru is to the people in The Centre. There are many important sites in and around the base of the Gundabooka range, including art sites.

The significance of the park to Indigenous people is a major part of its significance – if not the major significance.

The NPWS land includes most of the Gunderbooka Range, the nearby Little Mountain and surrounding pastoral land. Pastoral use commenced in 1850s.

There is no established walk to the top of the range and the existing road system would need to be extended to provide access to an area from which a walk could begin.

There are other interesting places to visit in the park including the walk to Little Mountain which provides a fine view of the range itself.

NPWS research and oral histories with Indigenous people shows that the two major groups used the land in this area in different ways:

- The Paakantji people were associated with the Darling River and its tributaries – they lived in and around the river;
- The Ngiyambaa people (closely associated with Gundabooka) are ‘the stone people or ‘the people who stay out back and don’t camp on rivers’.

The significance of the land to local Indigenous people means that they are actively involved in planning the management of the major areas with important sites and there are plans for a continuing Aboriginal presence nearby using one of the former homesteads.
NPWS has discussed other proposals for the park with local Aboriginal people and there are no objections to the proposed walk to the top.

*But how will this walk fit in with other experiences of the Gundabooka National Park?*

*If the walk is constructed, with its necessary road and carpark, will it become the main experience of the park for visitors?*

*Are there other opportunities for interpretation that might have a higher priority?*

*Could the cultural history of the area, Indigenous and non-Indigenous, and their relationships with the land, be the focus of interpretation?*

*Could a walk along the creek be a possible feature of the park?*

It is useful to examine how the emphasis on walking to the top of mountains developed as background to considering these matters.

Walking to the top is a practice developed in the 18th and 19th centuries, encouraged by the enthusiasm for scientific enquiry and discovery.

The ‘walk to the top’ could be described as an ‘explorer’ mode of interpretation, or an appreciation of ‘the sublime’.

Research over the past ten years or so about historical art work in Australia has shown that paintings by many of our most famous artists such as Eugene von Guerard were not art for arts sake, but art in the cause of science and conservation. Von Guerard’s famous paintings of Kosciuszko were undertaken when he was part of a scientific expedition in 1863. The detail in his paintings was to depict the nature of the place.

Lots more could be said of this.

**Suggestions and predictions**

I mentioned earlier that interpretation should have regard to timely interests and issues.

I suggest (or predict) that the interpretation of hills and mountains will:

- more actively involve Indigenous people – not merely for consultation but as determinants of the course of action;
- consider the changing knowledge and perceptions through art and other documents, with art being a prompt for scientific data- for example, visitors to Kosciuszko (or other mountains) may be given a post card of a painting (such as a von Guerard) with details of the mountains on the reverse side;
- mountains and hills may be interpreted more from the human use and experience (rather than their geological or biodiversity characteristics). The way they were used and lived in by Indigenous people;
- in some place, the walk to the top will not be promoted: possible, but not the major experience. The feel and smell of the place may become the primary experience rather than the view.
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The Mountain Festival - Community celebrating sense of place
...developing links between artists, scientists, community, cultural history and environment

Chris Cooper
Mt Wellington Festival Committee

The Mountain Festival was a regional sense of place festival centred around Mt. Wellington in southern Tasmania. The festival, held in March 2002 celebrating International Year of Mountains, created links between arts, science, community, environment and cultural history. Important considerations in development of the festival were the role of arts and celebration in environmental education, and the contribution that Mt. Wellington makes in the SE Tasmanian region to a sense of place. The Mountain festival may be perceived as a model for community based sense of place celebration.

The relationship of the people of Hobart to Mt Wellington, often unstated, is an intrinsic part of their physical and cultural milieu. The mountain creates a physical connection between the southwest wilderness and the city of Hobart and as such forms a powerful link between the urban and the wilderness. The mountain vista is a major landmark for the southeastern area of Tasmania marking a region through both its topographic power and cultural value. This cultural significance cannot be understated. It creates a sense of place, which pervades the understandings of community identity and cultural richness. With regard to environmental education the work of nurturing a community environmental ethic is fundamental to all aspects of environmental management. What we have learned to love and appreciate we will protect. Attitudes towards species conservation, habitat protection and indeed environmental management are derived from the valid experiences of individuals within the community.

The Mountain Festival was conceived and organised over a period of three years by a voluntary community committee. Committee members included some of the most significant Tasmanian artists and community based professionals working in various environment and arts fields. The inaugural mountain festival attracted over $80,000 in cash sponsorship. The diversity of support for the festival was outstanding ranging through major sponsorship from the Hobart City Council, Australia Council for the Arts, Wellington Park Management Trust, Arts Tasmania, Hobart Water and WIN TV through to in-kind support from small business. Attendance at events was in some cases unprecedented with capacity participation at many events.

Important developmental processes which, led to production of the festival included development of the initial proposal, partnership formation, community consultation and the forum process, identification of community resources, and a call for community expressions of interest.

Partnership Development

Partnership development was a key aspect of the festival’s development occurring at both a committee and event level. Partnerships were formed with environmental, community and arts organisations.
Organisations represented at a committee level were the Wellington Park Management Trust, Tasmanian Regional Arts, Tasmanian Environment Centre, Fern Tree Community Association and United Nations Association (Tasmanian branch). Each organisation provided important expertise and support for the festival.

The Wellington Park Management Trust (http://www.wellingtonpark.tas.gov.au) is the regional management authority for the Wellington Park. “The Trust aims to provide sustainable opportunities for recreation, tourism and education, whilst conserving the environmental, cultural and water catchment values of the Park”.

WildCare Inc is the volunteer partnership organisation which co-ordinates people volunteering in Tasmania’s Parks and Reserves. WildCare Inc works closely with the Tasmanian Parks and Wildlife Service, but also co-ordinates volunteers caring for Reserves managed by other agencies such as Forestry Tasmania, and volunteers for agencies which have more general conservation responsibilities, such as the Tasmanian Heritage Office. Thousands of Tasmanians are registered with WildCare as volunteers and many tens of thousands of hours are donated each year to undertake conservation works and provide visitor facilities.

Tasmanian Regional Arts (www.tasregionalarts.asn.au) is a network of regional arts organisations that are involved in arts making throughout Tasmania. They support regional communities in the development of arts and cultural practise by running a number of funding programs. They also tour visual and performing arts, provide training for volunteers in the cultural sector, and facilitate arts and cultural networking throughout regional Tasmania.

The Tasmanian Environment Centre Inc. is a community-based, not-for-profit organisation, which promotes and encourages education within the community for the appreciation, enhancement and protection of the environment. It runs an environmental resource centre and coordinates community education activities such as the Tasmanian Environmental Home Expo.

The Fern Tree Community Association represents a community of about 250 households on the southern slopes of Mt Wellington, within the boundary of the City of Hobart. Fern Tree is somewhat separated from Hobart, by altitude, climate and forest, and retains a village atmosphere in spite of being only 12 km from the CBD. All adult residents are members of the Association, which owns and operates a Community Centre. They have a long history of active involvement in environmental and planning issues to do with Mt Wellington.

The United Nations Association in Tasmania promotes the values and policies of the UN through hosting events and public forums. The Tasmanian branch has strongly supported past UN international years. In 2002 they facilitated the important links to the International Year of Mountains and were part of the development and support for festival projects and events.

**Community Consultation**

The community consultation process was an essential part of the festival’s development. A public forum brought together scientists, historians, composers, writers and other community leaders with expert knowledge about Mt. Wellington. The forum included a mechanism for ideas input from the public. Other consultation process included public meetings and direct consultation with individuals, local community groups and arts organisations.

**The Festival**

Key values and strategies of the festival included a thematic approach to programming, development of a science consultancy, schools involvement, and the development of projects with longevity beyond the life of the festival. Mountain festival events were selected on the basis of relating to 1. sense of place 2. relevance to Mt. Wellington including the relationship between mountain and urban space and 3. the innovative, creative and collaborative nature of the projects. Events were categorised into three main types. Meet the Mountain talks, walks and tours were unique formulations that provided opportunities to present information directly to the public. The exhibitions program included a photographic competition organised by the Wellington Park Management Trust and a school’s exhibition. The arts events program
was imaginative and bold allowing the development of some international links and participation by all levels of the community. The festival opened with a welcome to country and healing ceremony conducted by members of the Tasmanian Indigenous community. This was held at the female factory historic site in South Hobart under the gaze of Mt. Wellington.

**Exhibitions**

The exhibition program was intended to provide the public with an opportunity to view inspirational images of the mountain environment. The photographic competition Perspectives…, presented by the Wellington Park Management Trust, in addition to an open section had a number of entry categories to encourage participation by children. The Schools Exhibition was also designed to allow children and schools an opportunity to participate in the festival. The exhibition inspired new poetry and artworks from schools throughout the Hobart region. “The Other side of the Mountain” presented by the State Library of Tasmania included contemporary photographs plus images and stories from the heritage collection.

**Meet the Mountain**

A series of environmental walks, tours and talks held over the ten day period of the festival focussed on providing opportunities for the community to learn about their local mountain environment. Walks covered a diverse range of subject matters including marsupials, birds, fungi, Australian bush food and Aboriginal culture. The Earthwalks were designed specifically to provide children with an opportunity for environmental interpretation. The seminar presentations included Elements of the Mountain in which leading scientists gave inspiring presentations relating to earth, air, fire and water on the mountain. The presentation relating to water examined the Mountain as a habitat for different species by following a watercourse from its source to the foothills. Collinsvale, a small mountain community ran a mountain market and science expo. Local scientists presented information on species and habitat conservation.

**Arts Events**

The events in this category were designed to provide uniquely creative and inspirational arts events. The major community arts / environment event was **Alive on the Mountain** held as the festival Grand Finale and designed to maximise community involvement. Major sponsors for this event were the Community Cultural Development fund of the Australia Council for the Arts, WildCare, Arts Tasmania and Tasmanian Regional Arts through East Derwent Regional Arts. A key feature of this project was the integration of scientific and cultural knowledge into the arts process. Community artists met initially with the volunteer Science Consultancy whose members had expert knowledge about rare and endemic species and the overall ecology of the mountain environs. The science consultancy was available to the artists for consultation, one on one meetings, and field trips during the project’s development. The depth of the available information provided unique opportunities for the community to learn about the ecology of place through arts. Artists also had available a collection of taped oral histories some of which was incorporated into the performance.

Community artists worked with diverse community groups to build artworks in the form of giant puppets, shrines, banners, silk flags, masks and other processional art. These artworks were directly related to the botany, zoology, geology, natural elements and cultural heritage of Mt. Wellington. Giant puppets created for the performance included the Tasmanian Mountain Shrimp, plants, Southern Snow Skink, Swift Parrots, Black Currawong, Blue Wren, Forest Raven, Eastern Spinebill, Beautiful Firetail, Golden Whistler, and Tasmanian Cave Spiders. Images of other animals and plants were presented on over 60 silk flags, banners and artworks associated with the shrines and masks. Participating community groups included the Tasmanian Field Naturalists Club, Fern Tree Community Association, Women Tasmania, several local Primary and High Schools, COSMOS (a support organisation for disabled people), Migrant Resource Centre, Phoenix Centre, and Bellerive Community Arts Centre.

The Alive on the Mountain performance included the **Mountain Orchestra**. This is an ongoing community project where the participants have built their own instruments, many of which are large and sculptural. There is a horn section with pipes up to six metres long, a carillon of bells made from old gas cylinders and log drum sculpted from a 1.8 metre piece of Tasmanian blackwood. The orchestra has a
permanent professional conductor, engages professional composers and is involved in ongoing performances and composition of music about Mt. Wellington.

**Sirocco and Luminate**, involving an event partnership with the Tasmanian Museum and Art Gallery, was an image and sound spectacular which combined performance of a musical composition commissioned by the festival committee inter-woven with a presentation of environmental images. The music was composed by Sirocco and Ron Nagorcka who works with natural sounds. The images, including the Mt. Wellington collection of the world-renowned photographer Peter Dombrovskis, historic photographs and contemporary images by Greg Lehman exploring the mountain urban interface, were presented on a giant screen. Greg included a spoken word and image presentation expressing an Indigenous perspective. **Poets and Scientists** involved a partnership with the Tasmanian Writer’s Centre where eight of Hobart’s best poets were commissioned to write new poems in collaboration with eight of Hobart’s leading environmental scientists.

**The Mount Wellington Sculpture Trail** explored the urban wilderness interface through the presentation of site specific and environmentally low impact ephemeral sculptures. This event had major curatorial and management input from Contemporary Arts Service Tasmania. Locations were chosen to provide a sense of movement from the city to the summit. Many of the sculptors chose to use water as a theme in locations along the South Hobart Rivulet which runs off Mt. Wellington. Sculptors were also given an opportunity through a consultative meeting to dialogue with scientists and cultural heritage experts.

**Science Consultancy**

The science consultancy was formed to provide expert environmental knowledge to artists and community groups participating in the festival. The consultancy included experts from the University of Tasmania, Department of Primary Industries, Water and Environment, and the Tasmanian Museum and Art Gallery. Key members of the consultancy included Professor Jamie Kirkpatrick (Geography and Environmental Studies, University of Tasmania) and Professor Roy Swain (Zoology Department, University of Tasmania).

**Community Impacts and Benefit**

The Mountain Festival provided people with opportunities to be involved in both arts and the environment through a community celebration. The Alive on the Mountain project gave participants a broader contextual understanding of species diversity in the region. A group from Geilston Bay High School classified as “Girls at Risk” joined the Alive on the Mountain project and performed on the mountain having contributed to the conceptual development of their own performance. The festival inspired further development of International Year of Mountains projects. Children involved in various events had ongoing opportunities to expand on their involvement and the Teacher’s Seminar led to the development of projects in schools. The festival initiated international links through 1. Poetry on the Peaks (http://www.dialoguepoetry.org/mountain_mt_wellington.htm), and 2. with Hobart’s sister city Yaizu by making giant puppets of insects found on Mt. Fuji. The images were provided by staff from the Yaizu local council.

**The Future**

Long-term aims of the Mountain Festival include presentation on a biennial basis, broadening of schools involvement, further development of international links, continuation of the community consultation process and partnership building, and development of a broader regional base for the festival. The committee is committed to the development of projects, which will directly involve community members and additionally benefit the broader community through innovative arts projects.
Day Three – Mountains Of Meaning, Managing Values And Places
Abstract

In April 2001, Namadgi National Park became the first of Australia’s alpine national parks to be subject to joint management arrangements, following the endorsement of an agreement between the ACT Government and a number of local Aboriginal groups. The agreement provides for the granting of a Namadgi Special Aboriginal Lease and for the participation of the Ngunnawal community in the management of the park.

The paper considers the progress that has been made to date in the implementation of joint management and considers the prospects for effective joint management in the future.

Joint Management Arrangements for Namadgi National Park

Aboriginal Australians have had an association over many thousands of years with the region around and including what is now known as the Australian Capital Territory. Since colonisation of the region, this association has been constrained, to the detriment of Aboriginal people.

In the spirit of reconciliation between Aboriginal and non-Aboriginal Australians, the Australian Capital Territory Government has entered into an Agreement with members of the Ngunnawal Aboriginal community that provides for joint management of Namadgi National Park by the parties to the Agreement.

The Agreement was signed on 30 April 2001.

Under the Agreement, the Ngunnawal community has been offered a Special Aboriginal Lease over Namadgi National Park. The term of the Special Aboriginal Lease will be 99 years with an option for renewal at the end of that term.

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1 Namadgi National Park is the Australian Capital Territory’s largest protected area. With an area of 106,000 hectares, it represents 46% of the Territory’s land area.

Negotiations on the detailed terms and conditions and the grant of the Special Aboriginal Lease are dependent on the resolution of a native title claim over the Territory that is currently before the Federal Court. The claim is by a group that has declined an invitation to be a party to the Agreement.

The parties to the Agreement have agreed on interim arrangements that apply until the native title claim is withdrawn or determined. Under these interim arrangements, the Aboriginal parties to the Agreement:

- have been acknowledged as people with an historical association with the area that is now Namadgi National Park;
- have the right to participate in the management of Namadgi;
- have the right to be consulted on specific regional cultural issues; and
- have the right to be consulted on the development of any legislation that will impact on Namadgi National Park.

**Interim Namadgi Advisory Board**

The most important element of the interim arrangements has been the setting up of the Interim Namadgi Advisory Board. The Board consists of five Aboriginal and five non-Aboriginal members. The Aboriginal members represent the interests of the parties to the Agreement. The non-Aboriginal members are appointed in an individual capacity because of their specific expertise. Initial appointments to the Board were made in August 2001.

The role of the board is to provide advice to the Conservator of Flora and Fauna:

- in the preparation of a new draft Plan of Management for Namadgi National Park
- in relation to consent decisions by the Conservator made in accordance with the provisions of the Nature Conservation Act 1980
- at the request of the Conservator, in relation to emerging and current issues related to the management and protection of Namadgi National Park.

The board also provides a forum for its Aboriginal members to raise issues of interest and concern to the Ngunnawal community that they believe may be able to be addressed through joint management.

The board’s terms of reference require it to meet at least six times each year. The board is able to form working groups with membership drawn, in part, from outside the board.

In preparing advice for the Conservator, board members are expected to achieve consensus on the issues being addressed. In the event that the board cannot reach agreement, the views of each member would be set out separately. To date, consensus has been reached on all issues addressed by the board.

**Participation in the Draft Plan of Management for Namadgi National Park**

The board’s primary task is to work with Environment ACT on the preparation of a new plan of management for Namadgi National Park. The plan will replace the existing 1986 Plan of Management.

In April 2002, the board released a discussion paper that addressed the park’s values and sought community views on the relative importance of these values and on key issues that need to be addressed in the new plan. Some seventy community submissions were received in response to the discussion.

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3 At November 2002, members of the Interim Namadgi Advisory Board were: Matilda House (Aboriginal Joint Chair); Geoff Butler (non-Aboriginal Joint Chair); Roslyn Brown (Aboriginal member); Valda Connors (Aboriginal member); Fred Monaghan (Aboriginal member); Agnes Shea (Aboriginal member); Dr Sue Briggs (NSW NPWS Senior Research Scientist); Dr Michael Pearson (Heritage Consultant); Dianne Thompson (representing Conservation Group interests); and Geoff Wells (representing the interests of the ACT Conservator of Flora and Fauna).

4 The position of Conservator of Flora and Fauna, established under the provisions of the Nature Conservation Act 1980, is currently held by the Executive Director, Environment ACT.

5 Environment ACT is the ACT Government’s environment and cultural heritage management agency.
paper. The board has subsequently considered issues raised in the submissions with a view to facilitating public workshops on issues identified in the submissions as being of most interest or most likely to lead to conflict between park users. The board is expecting to release a draft plan for community comment in mid-2003.

**Ngunnawal culture – acknowledgment, respect and celebration**

Environment ACT has taken the view that for joint management to be successful, it must not only involve the exercise by the parties of rights set down in the Agreement but also acknowledgment, respect and celebration of Ngunnawal culture.

Non-Aboriginal board members and Environment ACT staff who work with the board have all undertaken intensive Cross Cultural Awareness Training that gives them a better understanding of Aboriginal history and heritage, including issues of identity, racism, cultural difference and protocol and communication. The training is designed to be emotionally challenging rather than intellectually comfortable.

Environment ACT has replaced all of Namadgi’s entry and interpretative signage with new signage that properly acknowledges the long association of Aboriginal people with the area that is now national park. The signs include statements of welcome from the Ngunnawal community and introduce Ngunnawal language to visitors to the park. They also introduce Ngunnawal elders and their families to the park’s visitors with brief statements by elders and others about what Namadgi means to them.

The project has involved close consultation with the Ngunnawal community, the Ngunnawal Language Centre and local Ngunnawal artists.

Joint management has also resulted in an increased emphasis on Aboriginal culture in Environment ACT’s activity programs. Aboriginal musicians, dancers, artists, crafts practitioners and story tellers actively participate in regular public events held at Namadgi National Park and Tidbinbilla Nature Reserve and in one off celebrations such as the Festival of the Bogong and the ACT Mountain Challenge. Ngunnawal presenters regularly run ranger guided activities and school holiday programs based around aspects of their culture and heritage.

**Economic benefits of joint management**

The grant of the Namadgi Special Aboriginal Lease will not confer or create any lease or licence within the meaning of the Land (Planning and Environment) Act 1991 and there will be no payment of rent to the leaseholders.

However, the ACT Government is committed to provide opportunities for the Ngunnawal community to gain economic benefit from joint management.

Aboriginal members of the Interim Namadgi Advisory Board receive sitting fees at a level determined by the ACT Remuneration Tribunal.

An Aboriginal cultural heritage specialist has been recruited to take responsibility for Environment ACT’s interpretation and education programs, for the proper integration of cultural heritage and land management practices and for developing initiatives for employment and work experience for Aboriginal people.

A number of young Aboriginal people have been recruited to work as Trainee Rangers or Park Workers or in Environment ACT's Visitor Information Centres.

Environment ACT has also provided part time employment to local Aboriginal people to assist with the running of ranger guided and schools activities. These activities are in great demand from the broader community, keen to receive information about Aboriginal culture presented to them by Aboriginal people.
To allow Environment ACT to expand these activities, a program has been developed that will provide young Aboriginal people with cultural interpretation training to allow them to be employed on a seasonal basis to assist with ranger guided activities. The program will commence in early 2003.

Environment ACT has also set up a volunteer program that will allow young Aboriginal people to gain work experience through participation in park care activities. The program’s first project is the upgrade of a walking track to an Aboriginal rock shelter in Tidbinbilla Nature Reserve with similar projects to follow in Namadgi National Park. The projects are being funded through an ACT Government Community Development Program.

Aboriginal board members are also keen to assist the local Aboriginal community to gain economic benefit in ways other than through permanent or contract employment within Environment ACT.

Companies bidding for contract work in Namadgi National Park are now required to include with their tenders details of the extent to which they employ Aboriginal people.

Aboriginal consultancy firms with the necessary skills are invited to submit proposals for available consultancy work. Ngangaana Wiradjuri has successfully bid for work under these arrangements and Environment ACT is currently finalising the appointment of an Aboriginal facilitator to conduct public workshops on recreation, pest plants and animals and fire management as part of the development of the new Namadgi draft Plan of Management.

Aboriginal board members and Environment ACT are currently looking at the merits of providing assistance to the Ngunnawal community to set up a small business that could tender for some of the contract work in Namadgi that is available on an annual basis, such as weed and feral animal control.

Tentative steps have been taken to determine whether or not there might be financially viable opportunities for the community to become more actively involved in Aboriginal cultural tourism, nature based tourism and food tourism.

**Implementation of joint management arrangements**

Joint management is working for Namadgi National Park and some significant achievements have been made during the eighteen months since the Agreement was signed. It will, however, take a number of years for joint management to be fully effective.

Namadgi differs from many other jointly managed national parks in that the association of the Aboriginal community with the area that is now the park has been so constrained since colonisation that much of the community’s traditional knowledge of this area has been fragmented. As a result, there is much to be done to restore ‘connection to country’ and to transfer to the community information held by Environment ACT about the community’s sites and places.

There are still tensions between the preoccupation of non-Aboriginal land managers with decision making, project schedules and output reporting and the desire of the Aboriginal board members to take the time needed to consult with their community so that decisions made are properly informed. At times, the Ngunnawal community rightly complains about feeling excluded because of the use by non-Aboriginal people of technical language, jargon and acronyms.

The inability to progress negotiations on the permanent joint management arrangements because of the unresolved native title claim over Namadgi is of concern to the Ngunnawal community as is the lack of a statutory basis for these arrangements.

At a philosophical level, cultural differences can give rise to conflicting viewpoints that are not always easy to reconcile. For example, the Board is currently debating options for either removing or redefining the term ‘wilderness’ in the new Namadgi draft plan of management. Many local Aboriginal people take offence at the use of a term that makes invisible the occupation and settlement of Namadgi by their ancestors. The difficulty for the Board is how best to address this issue whilst giving proper recognition to the energy invested by conservation groups in lobbying for declaration of wilderness areas over a long period of time.
The understandable focus of the Aboriginal board members on improving social and economic outcomes for their community means that they are not always able to devote as much attention to cultural aspects of joint management as they would like. Their available energies are, at times, diverted to addressing Aboriginal disadvantage in the fields of health, housing, education and justice. As leaders of their community, they are in great demand for service on other ACT Government representative bodies.

The success of joint management to date is founded on the high level of trust and goodwill that has been built up between the parties to the Agreement. With a number of key projects completed or underway, the Aboriginal board members have begun to take a more strategic view of what they would like to achieve from joint management in the longer term.

Their goal remains to use joint management as a mechanism for improving social and economic outcomes for their community in a way that does not conflict with the values for which Namadgi National Park is treasured. They believe that economic security is critical to the future of their community and that, without this, the community will be less inclined to engage fully with Environment ACT on the joint management of Namadgi National Park.

The first steps taken in support of this goal have been modest but significant. The view of the Aboriginal board members is that joint management can be a strong unifying force for their community. They believe that it is now appropriate for joint management to be put in place in throughout all of the Australian Alps National Parks.

For Environment ACT, joint management has forced its land managers to rethink the way in which they do business but has resulted in a richer understanding of Namadgi National Park for them at both a professional and personal level. The reaction to joint management by visitors to the park and the broader Canberra community has been overwhelmingly supportive. This positive experience suggests that it might now be timely for other jurisdictions to consider the implementation of joint management arrangements for their alpine national parks.
Sharing the Mountains
Joint Management of Australia’s Alpine Region with Aboriginal People

Warwick Baird, Rachel Lenehan and Brian Egloff

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Abstract

Mountain peaks throughout the world are charged with special significance. In Australia this is evidenced in two national parks that are in the process of being transferred to Local Aboriginal Land Councils and then leased back to the NSW Minister for the Environment. The initial step in the process leading to the return of Biamanga National Park, marked by the summit of Mumbulla Mountain, and Gulaga National Park, dominated by Gulaga Mountain, has established a particularly positive precedence. Recognising that these parks have a special significance for members of the south coast Aboriginal community, a detailed and inclusive process was set in train to define the parameters of Aboriginal ownership as is required under the Aboriginal Land Rights Act 1983 (NSW). The notion of Aboriginal ownership is meant to be inclusive and contribute to community building as well as reinforce an individual’s sense of belonging to the greater south coast Aboriginal community. Both mountains are the focus of the identity of local Aboriginal communities, or ‘sense of place,’ and have in the ethnographic past been the loci of ceremonial activity that continues in to the present.

There is potential for Aboriginal ownership and joint management of the Australian Alpine region under the same process that is being undertaken for Biamanga National Park and Gulaga National Park. NSW legislation provides for Aboriginal ownership of lands that are of cultural significance to Aboriginal people throughout the State.

In this paper the structure of this legislative scheme is reviewed and the capacity of the legislation to provide a foundation for meaningful Aboriginal involvement in the management of lands of cultural significance to Aboriginal people and of high conservation value is discussed. The positive experience of the process being undertaken on the south coast of NSW is reviewed and the potential for the Australian Alps to be brought within the legislative scheme is considered.

In this year of the mountains, where to now in Australia for the sharing of the High Country, the Australian Alps with the Aboriginal peoples? What are the possibilities, the pitfalls and the lessons to be learnt from the experience of joint management of other mountain regions in Australia?
Biamanga National Park and Gulaga National Park

Mountain peaks throughout the world are charged with special significance. This is evidenced in many places in Australia, particularly for indigenous people who have known this continental landscape for more than 50,000 years with their intimate association continuing into the present. For south-eastern Australia, a region where the life-ways of Aboriginal people have been disrupted by over two hundred years of British colonial suppression, the association with sacred mountains is remarkably intact. Mountains feature prominently in the stories of indigenous gods and deities that reside in the sky. At Coolangatta Mountain, south of Sydney, R. H. Mathews wrote in 1898:

It is believed that it was to this mountain that the dead went after burial in midden sands. The spirits of the recently buried had to ascend from a rock on the mountain’s eastern side, to a world of the spirits.

Baiame is one of the god-like figures of southeastern Australia said to reside in the sky. Tom Knight (2001), considers in detail the Aboriginal spiritual nature of mountain peaks and their association with the god-like figure of Baiame (see also Howitt 1904: 501-503) and has aptly titled his thesis Stepping Stones to the Sky. He asserts that Aboriginal clever men and spiritual leaders sought out peaks to be near to, and to thus facilitate communication with Baiame.

In 1995, Isabel McBryde brought forward a thoughtful (prescient) article “Dream the Impossible Dream? Shared heritage, shared values, or shared understanding of disparate values?” Isabel, from her intimate perspective of the sharing through joint management of that powerful Australian icon of Uluru, explores the values that are so much a part of Aboriginal society and deeply rooted in the Australian landscape, and considers how they could be shared and ‘sustained or accommodated in management’. Ten years later the dream is becoming a reality in New South Wales.

The National Parks and Wildlife (Aboriginal Ownership) Act 1996 (NSW) amended the Aboriginal Land Rights Act 1983 (NSW) (‘the ALR Act’) and the National Parks and Wildlife Act 1974 (NSW) (‘the NPW Act’) to enable lands of cultural significance to Aboriginal people to become Aboriginal owned and jointly managed by Aboriginal owners and the NSW National Parks and Wildlife Service. This process commenced with the joint management of the highly significant rock engraved national park of Mutawintji, 130 km north east of Broken Hill, and now other lands in New South Wales, including the landscapes of the sacred mountains of Gulaga and Mumbulla, are moving towards agreements where local Aboriginal people will be a majority on boards of management established for these areas of land under the joint management scheme.

Gulaga was the first place in Australia to be named by British explorers when Captain Cook called it Dromedary Mountain. Gulaga has received considerable attention in the early anthropological writing of the region as a sacred place. Howitt (1904: 494-95) recorded the Yuin creation myth:

Long ago Daramulun lived on the earth with his mother Ngalalbal. Originally the earth was bare and like the sky, as hard as a stone, and the land extended far out to where the sea is now. There were no men or women, but only animals, birds and reptiles. He placed trees on the earth. After Kaboka, the thrush, had caused a great flood on the earth, which covered all of the east coast country, there were no people left, except for some who crawled out of the water on to Mount Dromedary. Then Daramulun went up to the sky, where he lived and watched the actions of men. It was he who first made the Kuringal and the bull-roarer, the sound of which represents his voice. He told the Yuin what to do, and he gave them the laws which the old people have handed down from father to son to this time. He gives the Gommeras their power to use the Jolas, and other magic. When a man dies and his

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7 With respect to the Yuin of the south coast of New South Wales, Howitt (1904:518) states that 'Biamban is the name for the "great master", whose true but secret name of Daramulun it is not lawful to utter.'
It was not until 1976 when Mumbulla Mountain was under threat from logging that the Aboriginal significance of the place was in part revealed to Europeans. The assertion by the Aboriginal Elder Ted Thomas that Mumbulla Mountain was highly significant to the Yuin people of the south coast was found to be supported by historical documentation (Egloff 1979). That study has been summarised a decade later by John Mulvaney in *Encounters in Place: Outsiders and Aboriginal Australians 1606 - 1985*. Considerably earlier, Mulvaney (1970) had written a well researched article on the role that A.W. Howitt played in the initiation ceremony of 1883 that took place in part on Mumbulla Mountain. Eileen Morgan (1994), the sister of Ted Thomas, eloquently expressed the spirituality of the mountains in her *The Calling of the Spirits*. Sue Feary, Sue and Gregg Borschmann (1999) in an article titled ‘The first foresters’ in *The People’s Forest: A living history of the Australian Bush* have placed the Mumbulla Mountain controversy within a broader context.

Throughout the 1980s there was a renewal of spirituality on both Mumbulla and Gulaga, with the activity being more public on the latter. Although known to have featured in the initiation of young males, it was not until relatively recently that the importance of the place to Aboriginal women was asserted (Australian Heritage Commission 1988). Deborah Bird Rose (1990) elaborated upon the overpowering significance of Gulaga stating that:

*the significance of the mountain can be analysed along several dimensions. These include the significance: as the place of origin for local Aboriginal people, as a living presence which is reciprocally related to the Yuin people; as the abode of local ancestors; as teaching site for women, as a repository of women’s secret information and other matters; as a teaching site for men; as the home of a variety of living beings . . .*

As one can imagine, the conservation and management of living sacred places of cultural significance has an added dimension requiring considerable sensitivity to the requirements of the people for whom the place is culturally significant. The need to be particularly sensitive has been discussed in various publications and placed within the context of the ‘visitor experience’ by Myra Shackley in *Managing Sacred Sites*. From an European-centric position, Shackley assumes that the sacredness of the place will be revealed to the visitor and that this in turn will lead to a spiritual experience. In Australia, sacred is often prefixed by ‘secret’ indicating that the sacredness will have to be taken as given by the visitor and most certainly will not be revealed. This hurdle has been overcome, with many visitors to secret-sacred places accepting that a special behaviour is required. This is evidenced by the willingness of visitors to Uluru to forgo the much heralded climb to the top.

**The Register of Aboriginal Owners**

Returning, managing and sharing lands of high cultural significance and conservation value requires not only sensitivity but also a considerable amount of information. Both Mumbulla-Biamanga and Gulaga had been the focus of many years of research, but that information had to be refocussed to meet with the requirements of the Registrar of the *Aboriginal Land Rights Act 1983* (NSW). Under the ALR Act the Registrar is required to establish and maintain a Register of Aboriginal Owners of land in NSW. It is a role that was provided to the Register due to the political impartiality of the position and Office towards the management of the lands. Once lands of cultural significance to Aboriginal people have been listed on Schedule 14 to the NPW Act and transferred to Aboriginal ownership and leased back to the National Parks and Wildlife Service pursuant to Part 4A of the NPW Act, boards of management for the lands are

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8 NSW, Legislative Assembly, 20 November 1996, Second Reading Speech, Hansard p. 6275 ‘The register will be administered by the Register of the Aboriginal Land Rights Act, and therefore will be separate from any political or other party having a direct interest in the management of the lands.’

9 There are currently 7 areas of land listed on Schedule 14: Jervis Bay National Park, Mungo National Park, Mootwingee National Park, Mount Grenfell Historic Site, Mount Yarrowyck Nature Reserve, Biamanga National Park and Gulaga National Park.
established. The primary purpose of the Register is to provide a group of Aboriginal owners who are appointed by the Minister for the Environment to sit as a majority on those boards.\footnote{10}

Under the Act entry on the Register of Aboriginal Owners requires that an individual:

(a) is directly descended from the original Aboriginal inhabitants of the cultural area in which the land is situated,
(b) has a cultural association with the land that derives from the traditions, observances, customs, beliefs or history of the original Aboriginal inhabitants of the land, and
(c) has consented to the entry of the Aboriginal persons name in the Register.

With respect to the joint management process for Gulaga and Biamanga National Parks, it was decided that the best way to obtain the information required to support requests for entry in the Register was to commission extensive research. Entering the names of Aboriginal people in the Register of Aboriginal Owners was a process that was undertaken by the Office of the Registrar with much caution. The Office was aware of the social and political history of the far south coast and of the custodianship towards these mountains held by the south coast Aboriginal community.

The legislative requirement of the Registrar to use his best endeavours to enter in the Register the name of every Aboriginal person with a cultural association with land in NSW was interpreted by the Registrar in a liberal manner. The Registrar placed emphasis on the Office assisting Aboriginal people to register through supporting research, rather than requiring individuals to provide extensive information to support their request to enter the Register. This approach resulted in thorough and considered research by the team with equal weighting given to consultation about the registration process as to the research itself.

The Office of the Registrar put together a team that had experience with the sacred mountains (Brian Egloff), had knowledge of the local geography and Aboriginal families (Sue Wesson) and had experience with various land rights process (Nicolas Peterson). Certainly the research leading up to the ongoing registration of the Aboriginal owners of Gulaga and Biamanga National Parks would not have had the authority that it has if it were not for the willingness of Aboriginal family members to share their associations with the cultural area and the sacred places.\footnote{11}

The research and consultation occurred over a 12 month period. A final report was provided to the Registrar in December 2001 and the entry of names in the Register of Aboriginal Owners for Biamanga and Gulaga National Parks commenced in March 2002. Based on the work conducted during this time requests to enter the Register continue to be received and determined by the Registrar.

The research conducted for the purposes of entering the names of Aboriginal people on the Register has had numerous results. The report itself has consolidated, albeit, for the purpose of the Register of Aboriginal Owners, the vast amount of research that has been conducted on the Aboriginal cultural significance and association with the far south coast of NSW. Apart from the report providing detailed information as to the history and cultural association of Aboriginal people with the country, 25 ancestors were identified, based on oral, historical and ethnographical records, who are considered to be descendants of the original Aboriginal inhabitants of the cultural area in which Biamanga-Mumbulla and Gulaga mountains are situated. Although not considered to be a complete nor comprehensive list of the only families descended from the original Aboriginal inhabitants of the region, it has provided a foundation from which individuals are able to assert their involvement in the management of the lands. Furthermore, the research has provided a level of confidence for individuals involved in the process. Their assertions to be involved in the management of lands are now supported by factual information and are free from political pressures exerted by dominant factions in the community that may otherwise impede their involvement.

The report has been used as a reference tool by the Registrar to assist him in entering the names of Aboriginal people in the Register for Biamanga and Gulaga National Parks. A process that has contributed to moving the joint management of the lands closer to actuality, with the Aboriginal...
negotiating panel for these lands appointed within 5 months of Aboriginal owners being entered in the Register.

The approach of consultation and research to support people in seeking entry in the Register has resulted in the emergence of a group of people who have expressed interest in being involved in the management of the mountains and the surrounding country of the national park. This has provided a foundation for Aboriginal involvement in the future management of these lands. The people listed in the Register are male and female, young, middle aged and elders, some are known for political activism and strident contributions at meetings, while others are not the faces generally seen, or the voices heard at meetings. It has laid the foundation for equitable involvement amongst Aboriginal people in the management of the land and has assisted in endeavours to avoid the domination of the processes by minority interests.

Sharing the Mountains

The process being followed to provide for joint management of the sacred landscapes of Biamanga and Gulaga under Part 4A of the NPW Act is a process that may be followed in the alpine regions of NSW. As the management of the Australian Alps enters a period in which increased Aboriginal involvement in management is a possibility, consideration must be given to the nature and extent of that involvement and the foundations upon which it may rest: ethical, moral and legal. The experience gained at Mutawintji National Park, Biamanga National Park and Gulaga National Park suggest that there are two major challenges that must be faced when establishing a framework for the inclusion of Aboriginal people in the management of lands of cultural significance to them.

The first is establishing the rightful people who belong to country and may speak for it. Experience to date suggests this requires gathering information by extensive, inclusive and accurate research. The second challenge is to broaden Aboriginal involvement beyond the scope of consultation and cultural heritage to all areas of management of the land. While at the same time ensuring that management of the land remains joint management and does not come to be sole management and ownership by Aboriginal people. If this were to occur it would not accord with the underlying rationale of joint management nor with the legislative intent of establishing partnerships in the management of lands of cultural and conservation value.

Meeting the first challenge in sharing the mountains is made greater in the Australian Alps by the minimal amount of information currently available about Aboriginal cultural association and values, as well as of the people, of this country. This paucity of information will hopefully be addressed by the Kosciuszko National Park Aboriginal Heritage Survey currently being undertaken by the NPWS. This is the first time an extensive survey and assessment of the Aboriginal history and heritage within Kosciuszko National Park has been done.

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12 Power identifies one of the main hurdles to increasing Aboriginal involvement in Uluru-Kata Tjuta National Park is lack of training and skills available to Ngurarrayi to allow them to effectively participate in the Park and the related issue of individuals from outside the region, but who may live on Park in the Mutitjulu community exerting undue influence over the community and Park issues. T. Power, ‘Joint Management at Uluru-Kata Tjuta National Park’, in (2002) 19 EPLJ 284.

13 The joint management process undertaken at Mutawintji National Park initially resulted in a prominent member of Paakantji people, Badger Bates, being excluded from the Register of Aboriginal Owners and the board of management for the Park. This was the result of a consensus amongst a group of Wiimpatji (Paakantji for Aboriginal person) as to whom the original Aboriginal inhabitants of the cultural area in which the Park existed were. Badger Bates did not trace his descendancy back to these families. Recent information from the current Aboriginal owners registered suggests that a further Aboriginal ancestor has been identified that may enable Badger to be registered if he wished. Detailed and inclusive research is currently being undertaken by the Office of the Registrar to assist in identifying individuals who may wish to request entry in the Register. Some confusion exists in the literature as to the extent and nature of the research undertaken at the time the Park was transferred. See S. Feary, ‘Moving towards joint management in New South Wales, a Jervis Bay Case Study’, in ‘Working on Country, Contemporary Indigenous Management of Australia’s Lands and Coastal Regions’, eds R. Baker, J. Davies, and E. Young, Oxford University Press, Melbourne, 2001, pp. 276 to 293.

14 The tendency to move in the direction of sole management and control may be seen in statements in the Booderee National Park Management Plan. In the Wreck Bay Aboriginal Community Council Vision Statement its goals include ‘sole ownership of all lands and waters within the Jervis Bay Territory, (and) sole management of its freehold land and waters, allowing for Community responsibility, empowerment and self determination.’ Wreck Bay Aboriginal Community Council hold legal title to the land within Booderee National Park and have leased the land back to the Director of National Parks and Wildlife (Cth) as a national park and botanic gardens. A board of management comprising a majority of Aboriginal traditional owners manages the park. Booderee National Park Board of Management and Director of National Parks, Booderee National Park Management Plan, Commonwealth of Australia, March 2002.

The experience to date with establishing and maintaining the Register of Aboriginal Owners suggest that a process that allows people who might not other wise speak up about their association with country to do so is essential. Widespread consultation, established and respectful relationships between the Aboriginal communities and researchers and an awareness on the part of the commissioning agency and the researchers of the political and social reality of Aboriginal communities on the south coast were central in obtaining the results at Biamanga National Park and Gulaga National Park. A significant number of Aboriginal people across a broad section of the Aboriginal community and representing numerous family groups and factions contributed to the research.

The approach to the research and consultation has been critical to the integrity of the report and its validity. The outcome has been an acceptance of the process and of the Register.

The understanding of the cultural significance of land and waters within Kosciuszko National Park to Aboriginal people may offer the opportunity for some or all of the land within the Park to be brought within the statutory joint management scheme set up under Part 4A of the NPW Act. This is one way to meaningful involvement by Aboriginal people in the management and protection of land with which Aboriginal owners and custodians have an inseparable cultural link. This has the potential to meet the second challenge, that of broadening Aboriginal involvement beyond the scope of consultation and cultural heritage to all areas of management of the land.

The Schedule 14 path to joint management requires that an Act of Parliament be passed that lists land found to be culturally significant to Aboriginal people on the Schedule. It also requires the registration of Aboriginal people who meet the statutory requirements on the Register of Aboriginal Owners so that a board of management may be constituted. It is a process that has its philosophical and moral bases in the recognition of prior ownership of lands by Aboriginal people and the centrality of land in Aboriginal culture.

The joint management scheme under Part 4A of the NPW Act has many characteristics that are generic to other statutory joint management schemes across Australia. It is not possible in a paper of this length to review in detail the characteristics of all such schemes in operation in Australia. However a number of key elements may be discerned either in the establishing legislation and the compulsory requirements for the terms of the lease agreement or in the leases as negotiated. These elements have been provided in endeavours to ensure meaningful, equitable and empowering involvement by Aboriginal people beyond consultation and purely cultural heritage matters. While the various schemes have attracted criticism in their implementation these elements form a useful list of matters to be dealt with when considering joint management arrangements for the alpine region. They include:

- transfer of legal title to Aboriginal people and a compulsory lease back,
- payment of rent in return for the lease,
- Aboriginal training and employment,
- majority Aboriginal representation on the board of management,
- cultural awareness training,
- Aboriginal designated positions,
- transfer of Aboriginal cultural objects to the Aboriginal owners,
- reservation of certain rights to use and occupy to particular Aboriginal groups, including hunting, fishing, and gathering rights in accordance with tradition and culture.

In considering each of these elements the long-term aims of joint management must be kept in mind. Is it to be a medium term structural change leading to eventual sole ownership and sole management of lands by Aboriginal people or a continued partnership in the management of lands for the whole Australian community? If there is to be an equitable balance of ownership and control between different groups each of whom values the land for different yet connected reasons then the structure that is set in place at the

Statutory joint management arrangements exist for Uluru-Kata Tjuta National Park, Kakadu National Park, and Booderre National Park under Commonwealth legislation. In the Northern Territory joint management of national parks on Aboriginal land occurs at Ntimilulk (Katherine Gorge) and Gurig National Park. In NSW Mutawintji National Park is the only National Park currently under statutory joint management. For an outline of the various joint management models in Australia see http://www.nrrsm.uq.edu.au/lucn/pages/chap15/ch15frm.htm at Weblink 15.6.
start needs careful thought and the people who are involved must be appropriate. This then allows for a sound basis for implementation, the success of which is dependant on the relationships between the parties and the intent of all involved.\footnote{For comment on the workings of joint management at Uluru-Kata Tjuta National Park see Power, pp. 284-301.}

Aboriginal people may be involved in the management of mountain landscapes through arrangements other than those under Part 4A of the NPW Act. Such arrangements include memorandums of understanding (i.e. Mungo National Park) and Indigenous Land Use Agreements arising out of native title claims (i.e. the Arakawal ILUA). Memorandums of understanding drawn up between government agencies and Aboriginal groups provide some benefits yet they may rely upon assertions of rights allegedly in accordance with Aboriginal tradition which may not be substantiated by research. Further they are often entered into as a trade off where rights are being claimed under other land rights legislation or where common law native title rights and interests are being asserted. Each of the different approaches makes use of and is founded upon different legal regimes and the assertions of different rights. These in turn have different underlying philosophical and moral bases. In each case it is the relationship between Aboriginal and non-Aboriginal rights in and claims to country that is being worked out. In every instance both the basis upon which claims for joint management in certain lands rests and the long-term aims of joint management in those lands must remain clearly in mind.

It is an area in which great sensitivity is required. It involves non-Aboriginal concerns regarding 'doing the right thing' by the Aboriginal spokespersons and concerns regarding the authenticity of claims of rights to speak for country and of traditional ownership. It also involves Aboriginal peoples concerns about being asked to prove what they already know: who belongs to the land and who has rights in country, for the sole purpose of complying, once again, with an imposed legal process. Yet the benefits are many.

**Conclusion**

Within NSW, the processes involved in land claims and with obtaining common law recognition of native title rights and interests have involved much division, fracturing, and creation of conflict within Aboriginal communities. Moves toward joint management need to work away from increasing this division and conflict toward rebuilding relationships between Aboriginal and non-Aboriginal people and country, including the mountains that are so special and valuable to so many.

Meaningful involvement of Aboriginal people in the management and protection of lands of cultural significance to them is central to any involvement of Aboriginal people in land from which they have been dispossessed. The impossible dream of Isabel McBryde of a sharing of values and a sustaining and accommodating of them in management is a distinct possibility for the mountain regions of the Australian Alps. The special place that the Australian Alps occupy for so many Australians and visitors, the highest country in this vast, dry, ancient continent offers the perfect opportunity for management that promotes shared understanding, respect for and participation in protecting the disparate values held by both Aboriginal and non-Aboriginal people in country.

**References**

Australian Heritage Commission. 1988. Sites We Want to Keep, video production.


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17 For comment on the workings of joint management at Uluru-Kata Tjuta National Park see Power, pp. 284-301.


Preserving Historic Trails

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Abstract

Trail maintenance requires work in remote areas, typically with simple tools and extensive hand labor. Understanding how trails have evolved and their historic, natural, and cultural context are critical to guide maintenance and management decisions. Using the methodology of a “Cultural Landscape Report,” a forthcoming publication, “Landscape Line: Historic Trails” will describe an approach to historical research, existing conditions documentation, analysis of significance, evaluation of historic features, and treatment of historic trails. Recent work at Acadia National Park has culminated in a thirteen million-dollar endowment for rehabilitation of the hiking trail system. A publication in draft, “Treatment and Maintenance Guidelines” provides specifications for constructed features in Acadia’s alpine environments, sign standards, and cost-effective methods for rehabilitating historic stone and wood steps and bridges. Similarly, trail preservation projects underway in other National Parks recognize the importance of historic features and construction techniques, as well as the challenges faced by increased use and natural resource protection. Research and planning builds a constituency, justifies the physical work needed, provides guidance to seasonal trail crews, and helps preserve the historical character of trails.

Identification and preservation of cultural landscapes is increasingly recognized as an integral component of the management and maintenance of National Parks in the United States. Broadly defined, a cultural landscape is a geographic area, including both cultural and natural resources and the wildlife or domesticated animals therein, associated with a historic event, activity, or person, or that exhibits other cultural or aesthetic values. A “Cultural Landscape Inventory” is underway to document all significant cultural landscapes within National Park Service-owned properties, with the information compiled into a database.¹ The National Park Service recognizes four general types of cultural landscapes, not mutually exclusive: historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes. In this respect, the traditional use of an area, the delineation of boundaries, or designation of a natural for protection, can all be viewed as cultural phenomena that influence the landscape. This paper, will describe a methodology for the documentation and treatment of historic trails, a case study of historic trail preservation efforts at Acadia National Park in Maine, and examples of historic trail work across the United States. The paper emphasizes working cooperatively with communities and field staff, and the importance of preserving the design, intent, workmanship, and materials of historic trails.

¹ The Cultural Landscape Inventory is a baseline survey and database that identifies and evaluates the location, historical development, existing conditions and management of cultural landscapes in the National Park System. It can also be used to determine National Register eligibility for previously undocumented cultural landscapes.
The projects relate to my work at the Olmsted Center for Landscape Preservation. Established in 1992, the Olmsted Center strengthens the capacity of parks to manage cultural landscapes as part of our national heritage. Serving as a center for cultural landscape preservation, training, and technology development; the Olmsted Center works in partnership with national parks, universities, government agencies, and private non-profit organizations. The Olmsted Center offers expertise in horticulture, landscape architecture, and history. Based at the Frederick Law Olmsted National Historic Site, the Olmsted Center perpetuates the traditions of the Olmsted offices and Frederick Law Olmsted, Sr.’s lifelong commitment to people, parks, and public spaces.2

**Methodology: Cultural Landscape Report and Treatment Guidelines**

When the United States National Park Service was established in 1916, the emphasis was clearly on the protection of natural and scenic values. More recently, a broadened perspective that incorporates cultural landscape values requires a multi-faceted approach. To ensure that efforts are constructive, the National Park Service has developed a methodology, which is described in “A Guide to Cultural Landscape Reports: Contents, Process, and Techniques.”3 Published with the guide are a series of technical references, collectively known as “Landscape Lines,” on specific types of landscape features and characteristics. This paper focuses on a “Landscape Line” in progress on the treatment of historic trails. Understanding the methodology for a cultural landscape report lays the groundwork for the second and third portions of the paper.

Historic trails are those that were built or in use during a significant event or historic period; associated with heritage themes, such as those associated with indigenous uses, commerce, communications, community planning and development, conservation, recreation, landscape architecture, military, religion, or transportation.4 Historic trails may be eligible or already listed on the National Register of Historic Places. Some of the issues facing historic trails include:

- need for recognition and documentation
- potential for loss due to neglect, heavy use, or misguided improvements
- demand for new types of uses
- limited management and maintenance staff
- limited funds and potential cost savings by using new techniques and materials

With an awareness of issues such as these, the Cultural Landscape Report methodology includes four major components: research, existing conditions documentation, analysis, and treatment.

**Research**

Historical research of a trail provides an understanding of the resource and lays the foundation for subsequent analysis and treatment. Research should begin by placing the development of the trail within the broader trends and events in regional history. The political, social, economic, and environmental context, can offer insights into the purpose of the historic alignment or method of construction. Trail-specific research should then clarify the intent with respect to the origin, destination, and other trail or landscape. For trails that are highly crafted, understanding features such as drainage systems and intended trail grade is useful. Tracing the changes in appearance of trail characteristics through successive historic periods may reveal a correlation to the number and type of users, impacts associated with insufficient maintenance, a change in the trail’s starting point and destination, or alterations caused by automobile circulation systems.

Sources for historical information on trails include old maps, trail guides, hiking club annual reports, travel logs, diaries, journals, maintenance logs, paintings, sketches, photographs, aerial photographs,

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2 [www.nps.gov/frlna/olclp.htm](http://www.nps.gov/frlna/olclp.htm)
postcards, newspaper articles, and oral histories. In some cases, trail archeology may be appropriate to either understand how the trail was built or determine if the trail is associated with a historic or prehistoric use. Topics to address are summarized below:

**Themes or associated events that influenced trail development or use**

- Designers and builders of the trail, design intent, width, grade, origin, route or alignment, destination, views, natural features, cultural sites
- Adherence to local, regional, or national design standards
- Materials used and sources, local or imported
- Tools and equipment used for construction and maintenance, crew size and professional skills of builders
- Types and extent of built features such as drainage systems, steps, retaining walls, ladders, railings, tread preparation, and bridges
- Location and frequency of repairs for trail sections
- Rationale for trail closures and reroutes
- Successes and failures of maintenance solutions, particularly in high use areas
- Changes in origin, destination, tread materials, width, or use
- Documentation on the location of features that may be difficult to find in the field, such as closed trails, drainage systems above the trail, closed culverts, iron work, or retaining walls that may be obscured or in poor condition

**Existing Conditions**

Documentation of a trail system requires a geographical survey and field verification to locate and assess the current condition of extant landscape characteristics and features associated with each trail. Ideally, Geographical Information and Global Positioning Systems (GIS and GPS) computer technology can be used to develop an electronic map with links to a GIS database. This information can then be manipulated to produce plans that illustrate past periods of development, existing conditions, as well as proposed future management actions.

Contemporary photographs are useful for documenting the current condition of trail features, particularly when paired with historic photographs taken from the same vantage-point. A video of a trail is also useful for remote sections that are difficult to visit. With all visual documentation it is important to maintain a concise record of the trail name, number, and location within the trail. For highly crafted trail features, sketches, measured sections, and plans are useful for subsequent phases of analysis and treatment. Types of features are listed below:

- Crossings: bridges, causeways, stepping stones, bogwalks
- Drainage: culverts, side drains, water bars, water dips
- Guidance: fences, safety rails, signs, blazes, cairns, scree, plaques
- Retaining Structures: coping stones, walls, checks, iron pins
- Steps, Rungs, and Ladders: set-behind, slab-laid, cribbing, foot and hand rungs, ladders
- Tread: gravel, soil, ledge, stone pavement, concrete, bituminous, turnpike
- Associated Structures: benches, shelters, towers, restrooms, parking lots, assembly areas
- Associated Cultural Features: archeological sites, historic sites
- Associated Natural Features: water features, views, notable vegetation, wildlife populations, geological formations

**Analysis**
Many trails are historically significant and listed on the National Register of Historic Places. As defined by the National Register, seven aspects of integrity can be used to evaluate the degree to which the trail retains its historical appearance (see table). A trail may be closed or no longer maintained, yet still retain its historic integrity. However, if the origin, destination, or trail corridor have been substantially altered, integrity may be lost. Only a portion of a trail may be significant. In other cases, an individual trail may not be noteworthy, but a network of trails may be significant as part of a larger circulation system. Studying the resource holistically is recommended, such as an integrated circulation system of roads, bridle paths, trails, and associated developed areas within a protected area.

Analysis and evaluation is necessary to identify the physical characteristics and features that contribute or do not contribute to the historic character of the trail. Landscape characteristics, including processes and physical forms, are the tangible evidence of the activities of people who shaped the landscape, or trail. The evaluation includes a brief description of the historic and existing condition, as well as a determination of whether a particular characteristic or feature of the trail contributes to its significance as a whole. Characteristics or features defined as “contributing” are those that were present on the historic trail that survive or are replacements in-kind of historic features. The analysis and evaluation section identifies features that should be preserved and those that should be removed or mitigated.

<table>
<thead>
<tr>
<th>Aspect of Integrity</th>
<th>Retains Integrity</th>
<th>Does Not Retain Integrity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Continued use of the historic route or the presence of the historic route that is abandoned but not obliterated.</td>
<td>Substantial reroutes and obliteration of the historic route</td>
</tr>
<tr>
<td>Design</td>
<td>Evidence of the design style or design standards from the period of significance.</td>
<td>Redesign, realignment, or obliteration of design from the period of significance.</td>
</tr>
<tr>
<td>Setting</td>
<td>The presence of the setting or views from the period of significance.</td>
<td>Loss of the trail corridor setting, important sites, destinations and views due to subsequent development</td>
</tr>
<tr>
<td>Materials</td>
<td>The repair of tread, crossings, and drainage features in the same style as the period of significance.</td>
<td>Loss or replacement of materials from the period of significance.</td>
</tr>
<tr>
<td>Workmanship</td>
<td>The presence of trail features, such as walls and steps, that date to the period of significance.</td>
<td>Loss of workmanship from the period of significance.</td>
</tr>
<tr>
<td>Feeling</td>
<td>The presence of a trail corridor or setting, views, and materials from the period of significance.</td>
<td>Dramatic change in use, setting, views, or destinations.</td>
</tr>
<tr>
<td>Association</td>
<td>Physical evidence of associated sites, uses or cultural traditions.</td>
<td>Loss of associated sites, uses, or cultural traditions</td>
</tr>
</tbody>
</table>

**Treatment**

After documenting the trail’s historical development, determining its significance, and evaluating its integrity, a treatment approach should be chosen for long-term management and maintenance. The development of a treatment plan is a collaborative process, involving managers, field staff, multidisciplinary expertise, and associated communities and organizations. Goals for treatment are defined and a range of alternatives may be developed. In the United States, the *Secretary of the Interior’s Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Properties* are a guide to the treatment of such resources.

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6 Landscape characteristics defined in *A Guide to Cultural Landscape Reports: Contents, Process, and Technique* include: natural systems and features, spatial organization, land use, cultural traditions, cluster arrangement, circulation, topography, vegetation, buildings and structures, views and vistas, constructed water features, small-scale features, and archaeological sites.
Landscapes identifies four types of treatment: preservation, rehabilitation, restoration, and reconstruction.  

When selecting a treatment alternative, issues to consider for trails include: safety and accessibility; topography; signs; natural features and systems; natural resource management; trail corridor protection; multiple users; traditional use patterns and archaeological resources; associated buildings, structures and monuments; interface with other circulation systems, reroutes, and parallel routes; vandalism; opening abandoned trails; vegetation and viewshed management; drainage and water features; small scale features, walls and steps; surface materials and resource extraction.

The format of a treatment plan should convey three levels of information: the overall treatment philosophy and principles, guidelines for types of features common to many trails or trail segments, and specific guidelines for individual trails or trail segments. For common features and individual trails, a brief recap of related history, historical characteristics, and pertinent issues provides the necessary foundation for treatment specifications and recommendations for routine maintenance. These treatment specifications should be as concise and graphically oriented as possible. Since many trail features are rustic and assembled with local wood and stone, specifications can be phrased as parameters, e.g., bridge railings consist of logs between 4 and 6 inches in diameter or stone steps are between 16 and 24 inches wide. Historic and contemporary photographs, diagrams, and text should convey the guidelines or parameters for trail work. A historic photograph may be paired with a contemporary photograph to illustrate compatible yet distinguishable differences in construction style. New details can show concealed features that aid in preserving historic character by improving durability, such as perforated pipe or checks.

Preserving a historic trail requires careful planning. This planning requires a substantial amount of time and the involvement of a multidisciplinary team, including affiliated groups and specialists. The project team should strive to develop clear goals and guiding principles that are based on a thorough understanding and analysis of the physical history and existing conditions of the trail. Many aspects of trail documentation and treatment are labor intensive, underscoring the need to build a project team. The next section describes successful implementation of this team approach.

**Case Study: Acadia National Park**

Acadia National Park is located along the coast of Maine on Mount Desert Island. The park covers 47,000 acres and contains just over 100 miles (160 km) of marked, maintained trails. Until recently the park had limited cultural resource management staff and relied on outside assistance, such as the services provided by the Olmsted Center. The park knew that the trail system was old and special, but its history had only been partially documented by a local citizen. With the assistance of this individual, the Olmsted Center staff conducted exhaustive primary research, including correspondence, maps, annual reports, photographs, newspaper articles, archeological reports, and interviews.

**Trail System History**

Research revealed that there were four historic trail systems overlaid on the island that preceeded the National Park. The first network, which predates the early 1600s, was associated with Native American carry paths. Generally, these were straight paths between lakes and streams, which allowed Native Americans to portage their canoes across the island or inland to hunting and fishing areas. Typically, these routes were narrow and unmarked to discourage use by others. Since the trails were neither constructed nor maintained, they either disappeared without use or were subsequently widened during later periods. European settlers developed the second trail system when they cut cart paths and logging

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8 www.nps.gov/acad/
trails across the island. Most of these routes are now roads. The third trail system was built during the late 1800s and early 1900s by island tourists who came to the island for the summer, often staying in large hotels in four of the communities on the island. With a month or two of leisure time, the summer visitors formed “Village Improvement Societies” to enhance the livability and aesthetic qualities of the island. The societies included path committees who were responsible for mapping, marking and maintaining the island’s walking paths. They loved to build paths and constructed over 250 miles (400 km) of trails, including commemorative trails in memory of family members, which were endowed in the 1910s and 1920s with construction and maintenance funds ranging from 500 to 1,000 dollars (US). Several of the trails began in the community centers and led to the mountainous interior of the island. The trails themselves were often winding in character and leading through interesting rock formations, as they were in no hurry to reach the summit. The Village Improvement Society path committee members were also active in promoting the idea of a National Park to protect the island’s scenic areas from private development. Ironically, community involvement in path marking and maintenance diminished with the arrival of the federal government when the park was established in 1916.

The fourth trail system evolved during the Great Depression of the 1930s, prior to World War II. Hundreds of young men, employed through the Civilian Conservation Corps, built roads, parking lots, picnic areas, camping areas, and trail heads within the federally designated park area. The park did not maintain many preexisting trails, including those that led outside of the park onto non-federal land, resulting in the abandonment of over one hundred miles of trails on the island.

**Community Involvement**

Most of the abandoned trails are still evident and used by local residents. Many of the three million visitors that come to the park each year use the marked trails with park boundaries. In the mid-1990s, the park’s non-profit support group, Friends of Acadia, initiated a fundraising campaign for the trail system entitled, “Acadia Trails Forever.” A first and symbolic initiative was to work with locals to reopen the community connectors, the paths that led from the villages into the mountains. This was successfully carried out in Bar Harbor, the island’s largest community, and a free propane-powered public bus can also bring walkers back to town.

The largest initiative was to establish an endowment, or trust fund, for the rehabilitation of the island's trails system. Although the fundraising campaign initially focussed on the reopening of abandoned trails, concerns about the poor condition of the existing trails, caused a shift in emphasis to the complete rehabilitation of the island’s most popular trails. What is amazing is the amount of funds raised. A thirteen million dollar endowment (about 23 million Australian dollars) makes the Acadia Trail system the first endowed trail system in the National Park Service. A lead gift of five million dollars was matched with many smaller donations from ten dollars on up. The federal government was also able to contribute funds through its Fee Demonstration Program, where park admission fees are spent on park improvements rather than placed in a central fund. Additional contributions were received to rehabilitate trails to meet accessibility codes. In short, people that live around the park and visit the park love the trail system. They were eager to contribute to its long-term care. Their appreciation of the system was strengthened with an appreciation of the long history of trail use, the tradition of philanthropy, and an understanding of the physical resources that require a high level of care.

**Treatment and Maintenance Guidelines**

In addition to a site history for the trail system, we developed treatment and maintenance guidelines. As described in the previous section of this paper, the format of these treatment guidelines included a description of the most significant historical attributes for the trails and recommendations for construction methods and materials to be used. While the topics addressed are similar to those in generic trail maintenance manuals, the techniques are specific to the park’s historic trail system, including bridge styles, stone and step construction methods, ironwork, and signs.

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Most of the specifications were prepared by the park’s trails crew, as were the diagrams. The role of the Olmsted Center was to define the format of the guidelines, and edit and compile the text, diagrams and photographs. The trails crew completed the diagrams in the “off-season,” the winter months when the mountains are inaccessible due to snow and ice. This collaborative approach has produced excellent and practical guidelines, as well as improved the ability of the trail crew leaders to supervise and train seasonal workers and volunteers.

**Historic Trail Work Across The Country**

To ensure that we were doing the right thing at Acadia National Park and gain some professional advice, we organized a conference on preserving historic trails and invited trails professionals from across the country, as well as local community members and Native American councils in Maine. Proceedings from the conference highlight the Acadia project as well as trail preservation projects across the country. For example, at Rainier National Park in Washington State, the trails foreman has also developed a site-specific trail maintenance guide. This ensures that the rustic style of construction is preserved, particularly the many rustic bridges found on the Wonderland Trail. At Yosemite National Park in California, the trail crew uses native stone and gravel to harden paths through alpine meadow areas, rather than introducing cut planks, recycled plastic, or other non-native materials. Materials are brought to the work site by mules or helicopters. The resulting well-built trail encourages hikers to stay on the path rather than trample the alpine meadow. At Big Bend National Park in Texas, a group led by the Dry Stone Conservancy rebuilt long sections of a dry laid stone wall that had been built by the CCC in the 1930s and subsequently collapsed. The exterior face of the rough, rustic wall was rebuilt, however the interior backfill was tightly laid improve the structural strength of the wall. At Chiricahua National Monument in Arizona, existing stone work done by the Civilian Conservation Corps in the 1930s has been carefully documented in order to develop specifications for rebuilding damaged sections of trail.

Along the Appalachian Trail that runs from Georgia to Maine, historic fabric remains from the Appalachian residents that were displaced when the land was taken by eminent domain for the creation of the national park. Efforts are now underway to protect rather than obliterate the remaining associated cultural sites and document, through oral histories, the lifestyle of these mountain people. The Appalachian Trail itself is now also being recognized as a significant early example of regional planning. At Tsankawi, a unit of Bandelier National Monument, the park worked with the affiliated Native American tribe, the Pueblos, to identify sacred sites within a highly visited area. The existing system of poorly defined paths allowed visitors to roam all over the sacred sites. A clearly defined system of hardened paths, educational wayside signs, and vegetation barriers were installed. Eroded paths were improved by adding steps cut from a similar stone that was brought from another location.

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15 Ibid.
Figure 1: Stone steps on the Emery Path, an endowed memorial path in Acadia National Park, Maine, circa 1922. Courtesy of Acadia National Park archives.

Figure 2: Log steps on the abandoned South Bubble Path in Acadia National Park, 1930s. Courtesy of the Bar Harbor Historical Society, Maine.
Conclusion

In conclusion there is much work to be done to preserve historic trails and associated sites. Using a well-defined methodology, such as a Cultural Landscape Report, can streamline this work. Documenting the history of the trail system is an important first step to garnering community and financial support. Raising enough funds to establish an endowment for trail maintenance ensures long-term viability. Involvement of communities, displaced traditional landowners, trail users, and trail maintenance crews is essential. The development of treatment and maintenance guidelines requires a team approach and ensures that the character, workmanship, and materials for trail construction are preserved.
Science and Romance – Images of the Australian Alps

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Abstract

Land managers wishing to protect ‘wild’ or endangered places face a particular cultural problem: the widespread belief that restriction on access is an affront to traditional rights. We examine the idea of right of access, and draw attention to another idea present in our culture: that some places are best experienced if we refrain from visiting them. We relate the idea of access to that of dominance, and show that this can obscure our vision of nature, and make it harder to appreciate important features of the natural world, like biodiversity. We consider an important influence, The Man from Snowy River: can such stories be developed to support an attitude to nature characterised more by restraint than conquest? We suggest ways educators and park managers could support a process of cultural change to highlight the work of scientists and others as role models for a different approach to wilderness.

The Problem

This paper aims to reflect on the problem of imposing restrictions on access to ‘wild’ or environmentally fragile places. To put it crudely, it is now widely acknowledged that the demand for a ‘wilderness experience’ can overwhelm places where that experience might be had. Consequently, land managers have to limit access to these places, and in doing so, they have to confront an important difficulty: the fact that in our culture it is commonly held that as long as you are careful (and no one admits to not being careful) you have a right to go just about anywhere on public land which has not been designated for a particular use. Attempts to zone areas as ‘wilderness’ and to limit vehicle access, for example, are fraught with potential controversy. The recent debate over whether sections of Victoria’s Box-Ironbark country should be declared National Park aroused again the question whether any restriction is an affront to our democratic and traditional rights, and National Party candidates in that region are currently campaigning on this very issue (Castlemaine Mail 2002).

Bernbaum’s response to the problem of overcrowding is to propose the idea of sacredness. He cites the Chinese Mount T’ai Shan, whose slopes are covered with inscriptions, temples and tea stalls, and which, he maintains, still evokes for the Chinese as powerful a sense of awe as any wild peak might for a westerner (Bernbaum 1996). This idea deserves respect. What we would like to explore, however, is those strands in our own and other cultures which propose as positive, desirable and most fulfilling that we withdraw from wild places, and experience them best from a distance. We would like to see if there is a practical overlap between the protective, essentially science based ideas of zoning practised by park managements, and the ideas of respect and awe in the face of nature expressed by some artists and thinkers over the centuries. If there is, then it might be possible to work towards a situation where culture and tradition are allies in the preservation of wild areas, not impediments to be overcome.
Dominance And Restraint

We’ll begin by looking at the history of the idea of ‘right of access,’ and considering two attitudes to this as expressed in one way in our culture.

The first idea is of dominance.

In The Bureaucrat’s Domain Ray Wright discusses the question of access to land as it affected early administrators’ attempts to control the exploitation of Victoria’s public lands by applying zoning principles. ‘Viewed through European eyes the land truly was “blank space”…Yet, even as they looked at bush and mountain and endless vistas, immigrant settlers mentally ordered and partitioned the landscape’ for their own private exploitation (Wright 1989 4). Discussing the efforts of Crown Commissioners to control relentless illegal felling of trees and protect access to water he notes the difficulty faced by the commissioners in dealing with the public’s belief that:

‘It was not the place of the government to interfere with the individual’s right to gather the ‘produce of the land’, be it the collection of firewood or the removal of stone from unoccupied, unused and therefore by definition ‘waste’ Crown land. Any restriction in that regard was an infringement of individual rights, of the ancient right to “basic needs”’. (Wright 1989 48)

The feeling for the ‘ancient right to basic needs’ is still a major player in debates about land management, although the meaning of ‘basic needs’ has changed in the last 150 years. It now encompasses recreation: the right to collect wood, or graze cattle, has been joined by the right to build resorts, and to walk, ski and mountain bike freely over the mountains.

The right to ‘basic needs’ is of course a right to exploit. Even expressed most moderately in the ‘wise use’ vision of nineteenth century planners, it can merge very easily into the idea of dominance. A spectacular example of this idea is the Snowy Mountains scheme, built on the premise that nature was there for us to bend to our will, and for our needs.

Other apparently more reasonable positions also have a lot in common with the dominance position. Take the harmless practice of peak bagging: at its extreme it becomes the notion that any millionaire can buy access to the peak of Mount Everest. What this comes down to is the same set of assumptions and logical slips: we want to, we need to, we have a right to: to climb the mountain, carve it up, punch a hole in it. The idea has adherents in most activities: for example, bushwalkers often resent attempts to limit their right to go anywhere their feet can take them.

Restraint

The second idea is in some respects the opposite of the first. It’s restraint.

In her poem Before Kosciusko (1946) the Jindyworobak writer Minnie Agnes Filson (‘Rickety Kate’) argues that the best way to experience the splendour of the mountain is to resist the urge to conquer it. After evoking the approach to the ‘dazzling slopes’ of the ‘immaculate mountain’ she tries to impress the reader with what should be the deepest response to it:

\[
\begin{align*}
I \text{ would have then turned back,} \\
\text{Remembering the dark} \\
\text{In the secret chasms of the mind,} \\
\text{And I would not have defiled} \\
\text{That high white country} \\
\text{With the sign of my ascending.} \\
\text{I would have been content} \\
\text{That my eyes had seen it.}
\end{align*}
\]
Filson’s view is not new even in the culture of white Australia: certain nineteenth century writers wanting to emphasise the mystical power of great mountains suggested that to want to scale them was vulgar and insensitive. Here’s James Cuthbertson in the 1890s, evoking a European alpine scene and proclaiming

*And holy reverence their passage bars*
*To meaner souls who seek to enter there.*

*Cuthbertson in Hansen/McLachlan 1924*

This view and variations on it have a long pedigree as well, though not principally in the Western tradition.

Simon Schama refers to the Taoist tradition in China as being ‘hostile to the idea of mountains as a site of human triumph and possession,’ and notes that it was held that only the ‘true adepts of Tao, solitary shamans, could climb or descend the peaks, and then only in the mystical trance that came from exercises of ascetic self abnegation.’ Schama suggests on the whole a difference between eastern and western traditions here, though even in the Christian tradition there are examples of reverence for mountains as sites of spiritual, not physical attainment (Schama 1995:407ff). Passing over the many complexities of this history, what is striking about it is the many variations on the theme of restraint which characterise it.

Schama, for example, refers to ‘respectful annihilation of the human self’ which was the Lakota Sioux Indian shaman’s precondition for experiencing the true spirit of Mount Rushmore (Schama 1995:399). At its most modest this is an ethic of ‘self restraint’, a phrase with which John Haines tried to sum up the entire environmental ethic (Haines 1996:224). Its intention is not to deprive the practitioner of an experience, but to enrich that experience. Barry Lopez suggests that to get a true appreciation of a place, you should ‘look away from what you want to scrutinize in order to get a sense of its scale and proportion.’ (Hay 2002:154).

A well known example of what we are talking about is the request by the Anangu people for visitors to respect Uluru by not climbing it. This is not a restriction: it’s left to the visitor to decide what to do, and some visitors to Uluru disregard the request. They feel that without the ascent they will not have had the full experience of the monolith.

When the Anangu did close the Rock last year for eleven days as a mark of respect for a member of the community who had died, the furore was extraordinary, and shows how the ‘right of access’ idea in some respects seems to transcend even respect for the dead. We could argue negatively here as follows: the idea that abstention from the ascent is the deepest form of appreciation of the Rock (or any other mountain) is up for consideration; it is abundantly clear, however, that those who clamoured against the restriction in this case showed no interest in the Rock: it existed for them only as a source of tourism dollars.

The Anangu vision is not, of course, the same as the idea practised world wide in National Parks of reference areas and exclusion zones. Nevertheless, there are overlaps in the two positions.

Williams (2002) has drawn attention to the way that ‘cultural expectations of beauty’ can affect our very ability to see, and has produced research to show how we can seriously undervalue certain valuable landscapes—like grasslands, or casuarina woodlands—because they don’t seem beautiful. These findings confirm and extend the intuitions of common sense, that we may miss things if we approach them too fixated on one dimension of what they might offer. Our argument is that this is what may have happened with our obsession with wanting to go everywhere: and that by endowing certain chosen landscapes with the mystique of inaccessibility we might even enhance our appreciation of them.

The Man From Snowy River

We’d like now to focus on a particular example of a major cultural influence on Australians’ attitudes to mountains, and to nature generally: The Man From Snowy River.

In the Bulletin debate of the 1890s Henry Lawson criticised Banjo Paterson for his romantic portrayal of bush life, arguing that he was ‘blinded to the Real’. Lawson won this argument, and lost the audience. A
weakness of Lawson’s attitude lay in his failure to recognise, or at least to admit, that literary nationalism, with its idealisation of the outback life...had made a significant contribution to the development of a national pride, a fact made evident by the staggering sales of Paterson’s The Man from Snowy River and Other Verses.’ (Wilde et al 1985:124) This volume sold out in two weeks. It sold 100,000 copies and has continued to outsell any other Australian poetry since: the vision presented by Paterson is arguably still expressive of the way we want to see ourselves in relation to nature.

What is that vision?

The story of the riders ‘who could go wherever horse and man could go’ can still raise the hairs on the back of the neck in its evocation of the Man, who conquered not only the mob, but the mountain too: and his ride has been used as a stirring battle cry for some of the mountain cattlemen struggling to maintain their grazing rights in the Victorian Alps. So Lazy Harry, a Wangaratta singer, in support of the mountain cattlemen’s ‘right’ to graze cattle in the Alpine National Park is able to sing

...the legend of the Man from Snowy River
Is riding close beside us as we fight
(Lazy Harry 1989)

Lazy Harry is right to see Paterson’s vision as consistent with that of the cattlemen. The Man could also be used to support any use of the mountains which involved action and romance: anything which involved seeing the land as a backdrop, a context within which human affairs could unfold, without too much attention to fine details. If Australian literature in the nineteenth century revealed a struggle in writers ‘between perception and memory, between what the poets saw and what they thought they saw, or wanted to see’ (Elliot and Mitchell 1970), Paterson’s work, for all its brilliance, falls into the wishful thinking side of the conflict.

Paterson’s bush is an ‘idealised land that never was...He did not, in effect, write about the Australian bush; he re-created Arcadia “down under”…eternally and usefully available as the dreamland of the Australian fancy… a land where all that is potentially disturbing is tamed by the settled air of Arcadian inconsequentiality.’ (Heseltine 1962) In other words, Paterson replaced the fake Europe which earlier writers and artists had tried to see in Australia, and created instead a sort of fake Australia, a land which, though tough, was to the measure of the heroic, resourceful people who came to colonise it, and was ready for their sheep and cattle.

As such, it encourages its readers to misread the land it is set in. This was understandable in the nineteenth century, even in the era of Lawson’s brutal realism: it is one we should be more wary of now. One hundred and ten years later Judith Wright, Les Murray and numerous others have produced work closely attentive to the landscape and what it means, yet the views expressed in Paterson still hold popular sway. The Man needs, not an antidote, but perhaps an update, and maybe it has one.

In 1996 Mark O’Connor published Tilting at Snowgums, a book of poetry on a variety of themes about the Australian Alps. The collection concluded with a longish poem entitled A New Ballad of the Man from Snowy River.

This offers an intriguing reading of the poem and the tradition of which it is a part. Although it ends after the colt returns voluntarily to the Man because he’s sick of the hard life in the mountains, and yearns for the mollycoddled life of the thoroughbred racehorse, O’Connor’s version is not a parody of Paterson. He claims rather to be mixing a tart 1990’s realism into the romance of the old ballad. (O’Connor 1995:76). His version seeks to complete Paterson’s by inserting material which our different understanding of nature has made more important, and which has made us want to see the Alps as more than just a backdrop to an action story. Here’s an example:

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Celebrating Mountains – An International Year of Mountains Conference
Jindabyne, New South Wales, Australia

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‘Their horses rose through endless groves of box and cypress-pine,
Climbed frozen creeks to frosted heaths where sallees hold the line,
Where fox scats stud the byways with their freeze-dried scale and fur,
And the cawing soaring ravens speak of thoughts most folk defer.
The slope was like a house wall, and they walked up it like flies,
Sneaking round behind the mob in hopes of a surprise;
Vast flowerbeds that elsewhere would denote a stately home
Soon lay vibrantly beneath them, untended and unsown,
Day lilies, gentian violets, eye-brights of deep-sea blue,
Though there wasn’t too much colour once the troops had trotted through.’
(O’Connor 1995:71)

In the supply of detail and the sardonic humour of the last line O’Connor is trying to make us look beyond the adventure: he emphasises the idea that the country suffers when the horses thunder through—not something considered by Paterson, who lacks ‘the modern environmentalist’s eye for the small species and the subtle interaction.’ O’Connor ‘hoped to offer not so much an opposing vision as a more complete one, however less memorably expressed … to show not just the flying hooves of the gallant horsemen but some of the delicate species underneath.’ (p 76) The book aims to make a new statement about the nature of our relationship with the high country, a statement which will celebrate the culture implied in The Man from Snowy River, but make us look again at it, perhaps a little uneasily. In thus celebrating the human traditions of the mountains and yet laying a heavy emphasis on the non human reality of the environment, O’Connor undertakes an unusual task: to situate cultural history constructively in an appreciation of the natural environment without judg ing the issue of conflict between the two. Without rejecting the heroes of the past, he wants us to see them with a critical sympathy, softened with a slightly ironic humour.

The rest of O’Connor’s collection extends the ambition of his task by offering us a range of heroes, from plants to volunteers of the KHA. This offers another intriguing lead in the matter of redefining our approach to the mountains.

On the matter of cultural heritage Griffiths and Robin have lamented the fact that the work of scientists in the High Country have not entered the imagination as those of the cattlemen have, (Griffiths and Robin 1994) and it does seem strange that the adventures of the forester Baldur Byles, who in the thirties spent months in the Alps on a lone mission clambering in and out of deep gorges to investigate the state of mountain catchments are not part of the legends of the mountains. Similarly, Maisie Fawcett/Carr, dubbed by the cattlemen of the Bogong High Plains ‘the washaway woman’, laid the basis for our understanding of the effects of grazing with her exclusion plots. Both these people are virtually legends to those interested in the ecology of the Alps, but are distant from the imagination of the general public. ‘The scientists won the conservation battle, but lost the cultural debate’ (Griffiths and Robin 1994:7). Maybe it’s much easier for a rampaging horsem an to capture the public imagination than it is for a scientist struggling with transects while being bitten by millions of flies, but this is mainly a challenge of presentation: or, as Williams puts it in a different context: it ‘provides opportunity for new approaches to extension.’ (2002:2-3). Educators and managers have to put up the models they think should be admired and support them.

**Conclusion**

The task is to promote new heroes without disparaging the old ones, and to be prepared to look at different and at first sight paradoxical ideas, like the idea of withdrawal from selected areas. If the idea is not offered to the public more positively than has been possible in the past, exclusion zones will continue to be dogged by controversy and administrative problems.

In 1994 Alec Costin suggested a “reserve within a reserve” around Mount Twynam, a place of science only, protecting the vulnerable loose rocks and maintaining more natural ecosystems for future study.’ The idea is to create some ‘scientific reference areas protected altogether from tourist traffic,’ so as to avoid the eventuality that ‘the huge increase in tourist traffic [would] make it impossible to undertake scientific research in normally functioning eco systems (Griffiths and Robin 1994:22)’. Commenting on
this idea in their report Science in High Places Griffiths and Robin observe, ‘One day, humans may have to follow the sheep and cattle off parts of the mountains, victims of their own exclosures.’ (22)

The word ‘victim’ is an unfortunate one, derived from the perception—accurate at this time—that refraining from going somewhere is necessarily a deprivation. As we have argued, that depends on how you look at things. Costin’s idea is based around the strategy of drawing visitors away from the mountain, via the use of strategically placed viewing platforms and tracks, as much as it is about ‘exclusion’, a process which is in any case as much a matter of persuasion and education as compulsion. In any case, when the volume of crowds begins to destroy even to them the whole point of the excursion, such that it is no longer possible to see and feel what you came for, then withdrawal becomes a much easier matter to contemplate. Think of the road to the Kosciuszko summit. When park authorities proposed its removal, it was believed that ‘the public would not wear’ removal of an access right which had been there for sixty years. In fact the closure went ahead with little opposition. Surveys revealed that few claimed the right to scale Kosciuszko in a bus. (Costin 2002)

Time can be on the managers’ side. Research by Slattery on Wilson’s Promontory National Park shows that a park established for a hundred years fosters a pattern of traditions in the public mind which make it resistant to unscrupulous manipulation (Slattery 2002). A heavy weight rests on park administrations in the fostering of healthy traditions. These are not the result of sudden dramatic acts, but of years of decisions about tracks, consultation, interpretive material and the presentation of heroes and perspectives: of cultural realities which need to be nurtured too by teachers and scientists.

The idea of voluntary withdrawal has to be brought into the mainstream of our culture: not as a restriction but as an opportunity for increased understanding, better appreciation, for a clearer view of where we are.

References


Castlemaine Mail November 15 2002.


The Inspirational Value of Mountain Landscapes

Chris Johnston and Juliet Ramsay

Appreciating Australian landscapes

The appreciation of the beauty and drama of Australian landscapes by European explorers and settlers, is evident in the art and writings that in the early 19th century, captured the sublime landscapes of Sydney Harbour, the forests, waterfalls, fern gullies, plants and mountains which were used to inspire other settlers to the colonies. These early responses to the landscape were predominantly purely aesthetic, the artists had not had their lives moulded by this land, and unlike Aboriginal people, had not acquired centuries of narrative, myth, meaning and environmental understanding. The inspirational response to our landscapes has been further enriched as non-Indigenous Australians have learned to appreciate the depth and breadth of Australian Aboriginal attachment to land as being integral to their lives, religion, health and tradition and, have in turn, layered the landscape with their own narratives, myths and meanings, along with their increasing environmental understanding. For most, Australian landscapes are part of being Australian, their colours, shapes evocations and meanings are prolifically embedded in the cultural life of this country. Mountain landscapes in particular, inspire art, as paintings, poetry, literature, music. Thought, feelings, and spiritual beliefs.

However, although the evocations of the landscapes, including mountains, are realised and generally highly appreciated, those particular values have not been well represented in the majority of the mountain landscape listings in the Commonwealth Government's, national heritage register, the Register of the National Estate (RNE). This gap in heritage listings, has perhaps been exacerbated by the two strands of heritage discipline, cultural and natural, having different organisational support. Natural conservation groups reflect the interests of scientists, while cultural groups, such as historic societies and national trusts, predominantly reflect history and historic fabric. Universities separate the disciplines of science and, humanities and the arts while a number of State and Territory environmental and heritage agencies have separate natural conservation and cultural heritage legislation. Nonetheless, the protection of landscapes at the international level - the World Heritage Convention (1972)\(^1\) and at the national level – the Australian Heritage Commission Act (1975)\(^2\) established protection of both the cultural and natural values of places together in their respective legal documents. We can therefore respect the vision of the initiators of heritage legislation - that cultural and natural values are inextricably linked.

Approximately 544 mountains and ranges records are in the Register of the National Estate and of these 221 have included Aboriginal values, 80 of the records are for historic places (mostly mining sites and huts) while the aesthetic value of the places, when mentioned has, until recent years, been at best, only briefly noted as the place having 'scenic quality'.

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\(^1\) UNESCO (1972) Convention Concerning the Protection of the World Cultural and Natural Heritage.
Previous approaches to landscape assessment

The gap in the heritage records of aesthetic values of natural landscapes is not due to lack of effort from the Australian Heritage Commission (AHC). The Commission undertook a its first methodology study for aesthetic landscape values in 1979 (Fabos and McGregor). It is rather, that the assessment of aesthetic or inspirational values of landscapes has proved to be an elusive task, fraught with issues of subjective interpretations that have not been comparable to the confident and quantitative scientific assessments for natural values. The wider community has generally not nominated natural mountain areas for their aesthetic, inspirational and social values. Also, natural heritage scientists who nominate mountain landscapes are generally not comfortable with the descriptive language used to describe aesthetic inspirational landscape values. It is far easier to have a place registered for its biodiversity value than for its inspirational values. This focus on scientific values of natural landscapes has meant many heritage landscape records lack depth.

It was the regional forest assessment studies commencing in 1993 that provided impetus for further effort into methodology research and its application. A peer review workshop\(^3\) with a range of aesthetic experts from diverse backgrounds, reviewed methods, defined a suitable definition for aesthetic value that could be applied to landscapes, and approved a multifaceted approach that included documenting the experience of community members, cultural groups, and forest experts through workshops. It added to that information, the places that had inspired notable art, poetry or literature by publicly recognized artists and writers and evidence of aesthetic landscapes in tourism brochures, guidebooks, posters and periodicals. This resultant multi-faceted experiential approach was applied to most of the aesthetic value assessments for Regional Forest Agreement (RFA) - Comprehensive Regional Assessment (CRA) studies that were conducted from 1993 - 1999\(^4\). A suite of landscapes for each RFA region was identified as having significant aesthetic values and nominated for entry in the RNE. For those that have now been finalised such as for the East Gippsland RFA, aesthetic values have been included with the numerous large tracts of natural landscapes many of which are mountain ranges, slopes and mountaintops. Several mountaintops were identified for their ability to provide a significant aesthetic experience, and others as a vista feature, as well as numerous landscape features such as waterfalls, caves, gorges and ‘old growth’ or what is understood as ‘old growth’ forests. Of the 97 natural value place records for the Australian Alps many now have aesthetic values included in their record, thanks to the RFA research.

In the RFA research, it proved difficult to create a listing for a place based on a work of art. Association with works of art was generally used as support for the value. Research by (Lennon and Townley 1998)\(^5\) proved that poetry was a dominant media in describing landscape. A major component of the identification of values came from people attending the community and the forest expert workshops. They easily captured the particular meanings that could not have been identified in any expert assessment. They could also map areas and particular viewpoints and as well, they could describe the values, at times with great skill.

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\(^4\) Refer to the National Estate Reports prepared for each RFA at: //www.rfa.gov.au

...the trees stand quietly
looking across the valley
now filling with mist

moist aired evening magic
flows into the heart
and clears the head

a silence and peaceful solid vitality
emanates from those dark hills and green pastures
it rubs off on the soul

...K. Sacherin, describing the inspirational aesthetic values of Dawson Range, Victoria (1993)

This assessment approach needed to provide data that was substantiated and could meet the set thresholds for significance. Qualitative information (from people) established the heritage value and quantitative measures (from art, literature, tourism etc) helped to determine if places met the threshold.

The Australian Heritage Commission has explored other ways of recognising the aesthetic and social meaning of natural places. It has run the Indigenous Art Award, the Art of Place and the school program Places of the Heart. This has greatly increased awareness and strengthened social and inspirational appreciation of places. A challenge for the future to ensure that cultural and natural values of landscapes at the macro and micro scale, with their many linked intangible qualities are described as one place.

An opportunity for considering the national heritage importance of inspirational landscapes has recently arisen with the proposal for new national heritage legislation. New Commonwealth heritage legislation, expected to be in place early next year, proposes a National Heritage List that retains natural and cultural values as integrated heritage, where relevant.

Australia’s inspirational landscapes were considered a suitable theme to pursue for national heritage identification. Although there exists the possibility of building on the aesthetic landscapes methodology undertaken for the RFAs, there will be a need to establish a national level of significance (a higher level than for the RNE) and to clearly document the values of the landscape that inspire people. In addition, the appreciation of intangible values has become increasingly important in World Heritage identification. There is great scope for this proposed new national heritage regime to promote and develop the inspirational landscapes concept.

In this new area of heritage listing, perhaps a substantial creative work inspired by a place could be the reason for listing? New heritage assessments could be a stimulating celebration of a heritage landscapes and in return be inspirational to others. On the one hand, a new approach such as this provides an exciting direction for heritage assessments. On the other hand, listing is a legal process that demands a clear and repeatable process. Values need to be measured. They need to meet clear thresholds and be defensible in a court of law and these requirements do not sit comfortably with subjective, artistic expressions.

In seeking to address the task of a defensible method for the inspirational values of landscapes, early this year, the Australian Heritage Commission funded a study to explore the concept of inspirational landscapes and to outline a methodology for their assessment as heritage places. The consultant, Context’s, innovative response to the brief was accepted and an outline of the results of their research to date follows.

The Inspirational Landscapes Project

The Inspirational Landscapes project is designed to better understand what makes a landscape 'inspirational', how these qualities can be understood, analysed and documented to enable important inspirational landscapes to be recognised and protected as heritage places at the national level.
The project has three main stages. The first stage focuses on the concept of inspirational landscapes, seeking to explore different views and perspectives. The second stage will focus on development of an assessment methodology, considering current methods, significance indicators and thresholds. Stage 3 will involve testing the assessment method on some selected landscapes, clarifying and refining the approach and ironing out any bugs. The final stage is to prepare the project report incorporating the final methodology.

In Stage 1, ten perspectives essays have been commissioned from eleven Australian artists, writers, poets, activists, and heritage professionals (http://heritageforum.truenorth.net.au). The on-line conference was structured around four themes, plus a plenary session. 309 people registered for the conference, with 234 posts made over the two days of the conference. A conference report is to be posted on the web site (http://heritageforum.truenorth.net.au). Some of the ideas arising at the on-line conference are discussed in this paper.

Seeking the essence

‘Inspirational landscapes’ is a simple, but powerful concept. It combines two words that both encompass a set of diverse meanings. As a starting point, the project brief defines inspirational landscapes as:

- essentially those places associated with positive and inspiring aesthetic or cultural perceptions of a place and experiences derived from a place. They may be discrete sections of the environment or vast expanses of landscape … Significant stories associated with this theme may include:
- perceiving and celebrating landscapes in art, literature, film, song, photography and other media
- conserving and fighting for the protection of landscapes
- inspiring scientific ideas and understandings
- inspiring bushwalking and recreation and other stories.

This definition raises interesting questions for consideration:

Can we identify the qualities inherent in a landscape that ‘inspire’? What are the characteristics or deficiencies in those landscapes that don't or can't inspire?

Are there degrees of ‘inspirational’? For example, is there a difference between places we enjoy, versus those that are inspirational? Are they part of the same continuum?

Are there different qualities that inspire different forms of response; for example, what inspires contemplation versus arousing excitement? Is it a difference in the landscape or the viewer?

Inspiration and place

Fundamentally, ‘inspiration’ means the drawing in of breath - in this context, a response to a place. The sharp intake of breath, the ‘wow’ factor, the contemplative response - all of these 'take your breath away' responses are both personal and cultural. Stephen Martin's essay asks 'what is it that makes us stop and take a breath at a particular place or landscape? Is there something recognisable in the lie of the land or in the way we see it?'

Joy McCann suggested that inspirational landscapes reach far beyond the aesthetic response, quoting an Oxford Dictionary definition: 'inspire’ means to 'fill with the urge or ability to do or feel something'.

Is there a distinction between emotional response and 'inspiration'. At the conference, a strong view emerged that it was necessary to consider as 'inspirational' places that evoked negative emotions as well as the positive. Many examples were proposed including places of horror that may inspire people to act to prevent a repeat in the future (e.g. Nazi concentration camps, killing field of Cambodia, refugee camps).

Footnotes:
6 Stephen Martin: Our Landscapes. Essay prepared for the project
7 Joy McCann; ihayes: Forum 1 - To be inspired?; Juliet Ramsay: Forum 1 - Are modified landscapes inspirational?
Haydn Washington, in response, proposed that we separate out the anger and hurt that we feel at devastated landscapes (while recognising that these painful places may inspire artists, writers and activists) from the potential transcendent moments that may be inspired by natural landscapes.8

The term 'evocative' was also proposed as a way around this problem: an evocative landscape is one that evokes an emotional response, whereas an 'inspirational landscape' is one that uplifts, refreshes etc?

Even the boundary between negative and positive was recognised as blurry.

Beauty and fear often go hand in hand. The one attracts us while the other pushes us away. This creates a 'frisson' which many of us find exciting. The so-called 'sublime' landscape often seem to come into this category.9

Are inspirational landscapes primarily natural places or can 'modified' landscapes also be inspirational? It was agreed that many cultural landscapes and cultural features have the potential to be powerful and inspirational. Examples included the industrial Newcastle waterfront with its blast furnaces, steel mills and collieries.

Another emerging theme was the importance of the nature of the relationship between a person (or group of people) and a landscape, raising many questions about the knowing and experiencing of places, the power of the familiar place and the newly discovered place, and the many different ways of seeing and knowing that we each bring to our relationship with landscape. And do we need to see and experience a landscape to respond to it, or can we be inspired by places that we have only 'seen' through images created by others (through paintings or photographs for example) or even places that we have 'seen' only through powerfully-told stories?

The essays by Sally Morgan, Robyne Bancroft and Deborah Bird Rose highlighted Indigenous perspectives on the relationship with place, and how these may come to be shared by non-indigenous Australians.

Don Thomson wrote of another group within the community - farmers. His work demonstrates that farmers see landscape as a medium through which notions of 'good farming are continually redefined: that is, they are focused on the relationship and interactions between themselves and the landscape and vica versa.'

Jeff Malpas proposes that landscape is something that we experience, that we are active within and that is therefore 'inspirational' in every aspect of our lives. 'As landscapes are inspirational - as they flow into our lives - so the encounter with landscape is an encounter with that which makes us what we are'.11

For other conference contributors too, the split between people and the environment is a false duality, and is not helpful in understanding 'inspirational landscapes':

There is really no landscape that humans have not altered ... there are no humans that landscapes have not altered 12

Our responses to and relationships with place and landscape embodies all of our senses, our intellect, our knowledge and our culture and our experience. Like the attachments to place assessed as 'social value' which draw much of their power from the experience of place, inspirational landscapes appear likely to share this characteristic - that of being experienced not just 'seen'.

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8 Haydn Washington: Forum 1 - Are modified landscapes inspirational?
9 Christain Clare Robertson: My Inspirational Landscape - Scary Places
10 Dr Don Thomson, Forum 1
11 Jeff Malpas - as quoted in Forum 1
12 Haydn Washington: Forum 1 - Are modified landscapes inspirational?
Defining the indefinable and the rarely spoken of is part of the challenge in the concept of 'inspirational landscapes'. Haydyn Washington wrote of the 'sense of wonder' as something that peaks in a 'transcendent moment' and asks what it is about certain landscapes that lead to such moments. He suggests that part of the answer may be in the beauty of the place, the sheer joy of artistic line and form, the sense of wilderness (or freedom from human constraints and boundaries) and perhaps more.\textsuperscript{13}

And then there is the landscape itself. The term landscape is used in many different ways, and yet remains hard to define. At its least, landscape is still scenery; at its greatest, landscape embodies the idea of environment and the interaction between people and their environment, referring to both the spatial and temporal arrangement of things as well as to the layers of meaning and interpretation which we 'read' in the landscape.

\textbf{Culture and place}

Bronwyn Hanna highlighted that 'human experiences of place are inevitably mediated by social factors: gender, ethnicity, class, sexuality, ability, age and familiarity for example'. She asks:

\textit{Does every landscape appreciation have to get bogged down in a mass of competing interpretations, and if so, how many should be sought and included? Does this question need to be addressed before the attributes of landscape can be codified (since each interpretation included will involve the recognition of different attributes found in the landscape)?}\textsuperscript{14}

So how deep are the differences, and how much might be universal or at least widely shared? Katherine Gorge for example:

\begin{quote}
recently I had the opportunity to paddle a canoe up Katherine Gorge in the Northern Territory, and I met an enormous number of people from all around the world. Some had picked up a little bit of information about the place before going, others had no idea what to expect before they got there, but all of the people that I spoke to, even briefly, expressed how awe inspiring they felt the Gorge is. This was the first time that most people had been there, yet it inspired such strong, and similar, emotions and thoughts in all of them, regardless of their cultural and personal backgrounds ...So, is it possible for a landscape to be intrinsically inspirational?\textsuperscript{15}
\end{quote}

Within cultures and regions, it seems likely that there will be a shared sense of which landscapes 'inspire':

\begin{quote}
some people within a culture will share a 'common' perception of landscape - common values are, after all, what holds cultures together - at some level. There are likely to be some landscapes that do, therefore, inspire us more or less universally because of a shared cultural experience ... At the end of the day, it only really matters that people have different perceptions of and values towards landscape when landscapes become contested.\textsuperscript{16}
\end{quote}

An important message is that defining inspirational landscapes requires an answer to the question: 'for whom?'

\textsuperscript{13} Haydyn Washington: Forum 1 - To be inspired?
\textsuperscript{14} Bronwyn Hanna: Forum 1 - To be inspired?
\textsuperscript{15} Nicole: Forum 1 - To be inspired?
\textsuperscript{16} Don Thomson: Forum 1 - To be inspired?
And those inspirational landscapes?

From the on-line conference many places and themes emerged. Mountains topped the list of inspirational landscapes: Mt Warning, Mt Buffalo, Gariwerd (Grampians), Mt Speculation, the Brindabellas, and even Mt Ararat - Noah's mountain. Mountains take a strong hold on many people's hearts. Some mountains were named for their beauty; some for their intimacy and yet vastness; some for what we know and understand about them; some for their atmosphere, energy, danger and power (a sublime beauty).

Some directions

The aim of the on-line conference was to explore many of the challenging questions about how can the concept of 'inspirational landscapes' be used to identify and assess inspirational landscapes. It demonstrated the complexity of the questions, adding more ideas and further questions. Some key points:

- Does the concept of 'inspirational landscapes' capture the essence of a quality that we can assess as a heritage place?
- Is our aim to identify landscapes to which we deeply respond - whether it is a response to the power of a place, to its beauty, its tragedy, its horror or meaning? If our scope is this broad, the methodology will need to cross criteria boundaries and cover aesthetic, spiritual and social values.
- A useful concept - and one worth exploring further - is that of connectedness: I keep coming back to the 'inspiring' being reflected in moments of connectedness or realisation. The expression of connection between people and a landscape may be found in many existing forms (art, song, story, action, visiting etc), and creative ways of drawing out unarticulated connections will be needed.
- Should we look for universal values or focus on difference and diversity, asking 'which landscapes and for whom?'

Stephen Martin can have the last word:

*Our response to a landscape - the catch and its aftermath - have in common shared symbols and descriptions and stories. Landscapes and the shared and respected perceptions they evoke form a conspiration of understanding. And that's worth keeping.*

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Why Wait For A Rolls Royce When A Bicycle Will Do: A Practical Model For Prioritising Management Of Cultural Heritage In The Australian Alps

Jennifer Storer

Lanyon Historic Precinct, ACT

Abstract

Management of cultural heritage in the Australian Alps is largely the task of Parks Victoria, NSW National Parks and Wildlife Service and ACT Parks and Conservation. Given severely limited resources these agencies are looking at ways to quantify and prioritise the management of 1000s or more cultural heritage sites spread across a multitude of parks and regions. This paper briefly examines the history of strategic planning of cultural heritage management in this area and how management strategies are evolving to deal with the inherent challenges of burdensome planning and the limitations of using traditional valuation criteria. It then suggests an experimental model for inventory documentation and systematic prioritisation based on risk, stakeholder interest, rarity and physical integrity. Once prioritisation is done then those elements that come to the fore can be examined for their cultural values and then treated accordingly.

NB While the model could be applied to all cultural heritage it focuses on non-indigenous cultural heritage (hereafter called cultural heritage) because that is where most of the author’s experience lies. Also, the author would like to apologise for oversimplification of the issues owing to the desire to raise some macro concerns within obligatory word limits.

Introduction

National Park agencies manage most cultural heritage in the Australia Alps. The significance of their cultural heritage is acknowledged in most park management plans and their care is usually a legislated requirement. However their existence within areas protected primarily for their natural values means they are inevitably going to come second in the allocation of precious management resources.

While there will always be the battle to obtain better resourcing the fundamental challenge is to quantify and prioritise resources for 1000s of cultural heritage sites spread across a multitude of parks and regions. While this paper does not have the quintessential answer it offers a markedly different model to that presently utilised by park agencies that manage the alpine areas. To provide context for the model it is necessary to briefly examine the history of strategic planning for cultural heritage management in this area and how management strategies are evolving to deal with the inherent challenges. The proposed model is then offered as a way of the determining which cultural heritage elements demand attention first by utilising a simplified inventory system with a strict ranking process.
1. History of Strategic Planning for Cultural Heritage Management

Prioritising management of cultural heritage in the Alps is almost entirely dependent on their respective national park management agencies. ie Parks Victoria (VIC), NSW National Parks and Wildlife Service (NSW) and ACT Parks and Conservation Service (ACT). In the recent past the management of cultural heritage relied almost solely on Burra Charter\textsuperscript{19} styled Conservation Management Plans (CMPs) with their essential cultural significance assessments for identified sites. While over time this proved problematic it also left unfortunate legacies which, to a degree, still rest in the management psyche.

The original Burra Charter and resulting CMP template was most readily utilised for built heritage. While the profession has moved on to a broader understanding of what constitutes cultural heritage, “place means site, area, land, landscape, building or other work, group of buildings or other works, and may include components, contents, spaces and views”\textsuperscript{20}, many current CMPs or their namesakes are still focused on built fabric. This does not adequately address the breadth of cultural heritage within the parks.

The broadening of the concept of cultural heritage only appeared to confirm that to be fair to all heritage you needed to produce a CMP for every element. This meant spending more on doing CMPs and significantly in turn spending more on employing consultants, who had the necessary skills, to do them. This has proved too expensive and time consuming to do.

The ’Significance Assessment’, advocated in the Burra Charter, as the key determinant for the conservation of a particular place invaded thinking to the point that attempts were made to utilise it for prioritising management of cultural heritage in general. However the criteria used in the Burra Charter for significance assessment, ‘aesthetic, historic, scientific, or social value for past, present or future generations’\textsuperscript{21}, made it impossible to satisfactorily determine if the place with high aesthetic value was more important than the place with high scientific value.

Utilisation of what has been termed “relative significance”, assigning national, state or local significance was/is more useful but inherits similar problems associated with criteria that assess cultural value. It is wide open to abuse through the biases of the individual applying them. It is difficult to define what it is that demonstrates the value (look at the publications on applying the Burra Charter criteria). Ultimately it is all too easy to assign a high degree of cultural value to anything if you want to and the propensity for this renders many a significance statement so subjective as to be useless for prioritisation.

2. Evolving Cultural Heritage Management

The state agencies looking after alpine cultural heritage have just begun to address these problems. While I want to examine these processes critically I don’t want to detract from the amount of work and successes achieved by the cultural heritage professionals in their management. It is nothing short of amazing considering their limited resources and they are all in the early, as I said evolving, stages of forming prioritisation processes.

2.1 ACT

The ACT has no overarching strategy for the management of cultural heritage in Namadgi National Park (although it is intended to include one within the new park plan) and no dedicated heritage works funding. It is largely reliant on field officers to identify works that normally need to be championed by a community group to obtain external funding, such as heritage grants, from another area of ACT government. However unlike NSW and VIC it deals with effectively a single municipal region.

\begin{flushright}
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2.2 NSW

NSW have a substantial planning hierarchy with the most significant change towards a prioritisation process being the development of Cultural Heritage Management Strategies for individual regions\textsuperscript{22}. The draft for the Snowy Mountains Region\textsuperscript{23} suggests the following process:

\[\text{Overarching Cultural Heritage Management Policy/Strategy for the Region} \]
\[\downarrow \]
\[\text{Cultural Heritage Inventory} \]
\[\downarrow \]
\[\text{Assessment of Values for each place or landscape} \]
\[\downarrow \]
\[\text{Operational Management Plans (Other plans may or may not follow)} \]
\[\text{First level of prioritisation occurs here.} \]
\[\text{Heritage Action Statements/Conservation Management Plans} \]
\[\text{Cyclical Maintenance Plans} \]

Every element goes through a traditional significance assessment and is then subject to other “considerations”\textsuperscript{24} which are used to decide whether it will be conserved or not and how. The significance assessments, based on Burra Charter values, still dictate a large workload and the “considerations” have not been developed as yet into a real structure or hierarchy. The themes as utilised in the table for “places and landscapes to be actively managed” are perhaps too complicated to be effective in prioritising groups. There is also a superimposed complicated hierarchy of relative significance (National, Regional, Local value) in the table but its definition and its parameters for use in the prioritisation process are unclear.

Challenges in prioritisation have also been recognised at the point of funding allocation and NSW are currently drafting a set of weighted criteria. Regardless of its practicality I would argue that it occurs far too late in the planning process to be of great value.

\textsuperscript{22} Note it covers both indigenous and non-indigenous cultural heritage.
\textsuperscript{24} ibid p11
2.3 VIC
Parks Victoria also has a substantial planning hierarchy with the most significant change towards a prioritisation process being the development of one statewide Heritage Management Strategy\textsuperscript{25} for non-indigenous cultural heritage. The draft strategy suggests the following process:

Prioritisation for “allocating resources for managing historic places and objects (is) based on significance and historic themes”.\textsuperscript{26} By the term ‘significance’ in this instance they mean a valuing set of criteria and a list of other management considerations, ie “relative significance (and) risk to heritage value; levels of visitor service and public use demand; compatible management of indigenous, natural and heritage values; and contribution to the social and economic well being of all Victorians”.\textsuperscript{27} While Heritage Actions Statements are not written for all inventory elements it is unclear how those who receive the first level of detailed planning are decided.

While the use of “relative significance”, a cultural value assessment, in the prioritisation criteria forms a part of the considerations it is not the chief ranking process. However overall the prioritisation criteria still do not have a hierarchy and this renders them less useful than they could be. The themes are well utilised to formulate “strategic research projects”\textsuperscript{28} but they provide different groups rather than palpable priorities.

2.4 Summary
In general most management agencies suffer because of the substantial planning processes that need to occur before prioritisation can begin. The given considerations for prioritisation criteria suggest a sound beginning. However, the lack of any defined hierarchy means that firstly the process is open to accusations of hidden agenda setting and secondly the criteria fall short of their potential. Again, these are early stages of evolving prioritisation processes.

\textsuperscript{25} Parks Victoria, Cultural Heritage Division, Parks Victoria Heritage Management Strategy, Draft, Vic, 2002.
\textsuperscript{26} ibid p5.
\textsuperscript{27} ibid p19
\textsuperscript{28} ibid
3. Proposed Experimental Model

The aim of the model is to identify broad resource and planning requirements at the inventory compilation stage, prior to major planning exercises.

The objectives of the model are:
- to utilise a simplified inventory system – that demands less professional input and overall resources
- to defer the assessment of cultural values for each heritage element to a later stage.
- to provide a system that is flexible enough to be used for statewide, regional or thematic approaches

It is essential to note that while the system makes judgements it steers away from referring to this as “significance assessment” because the model does not assign cultural significance values to the element. That is, the model uses comparatively objective contributory management factors to determine which elements receive attention first but it does not imply that those elements are the ones that have to be conserved or indeed how to do it. It simply lists the elements that need a significance assessment, assessment of cultural values, first.

There are two key parts to the model, documentation and ranking. While none of the ideas are new it is the way that it operates which is so ostensibly different. The model should not be seen as prescriptive but just one that introduces another possibility to be explored. It would ideally be explained in a statewide overarching strategy for cultural heritage that also included an interpretation plan.

3.1 Description Dataset

It is impossible to get away from the need for an inventory of cultural heritage elements across the state and the best way to manage one is on a computer database. For the inventory it is undesirable to use anything more than the standard database available across an agency, which will typically be Microsoft Access. Also using a simple, self-explanatory form for inputting information will make it user friendly to a broad range of staff.

Outlined below is a suggested dataset that could be tailored to suit.

<table>
<thead>
<tr>
<th>Named Element</th>
<th>Element Type</th>
<th>Related to?</th>
<th>Theme</th>
<th>Position Co-ordinates</th>
<th>Region</th>
</tr>
</thead>
</table>

3.1.1 Named Elements

Parks Victoria give the definition of non-indigenous cultural heritage as

"...built structures and their surrounds; gardens; trees; cultural landscapes; shipwrecks; sites of important events; commemoration sites; contents of buildings; significant relics; objects; artefacts; records; knowledge; stories and traditions associated with human activity ..."

Less tangible elements like knowledge, stories and traditions can be accommodated but the more clearly defined they are the better the system will work. In terms of what can be listed you would need to determine some rules or risk recording say this year’s rubbish or every single 1930 beer bottle. eg list no objects that postdate the creation of the national park.

3.1.2 Element Type

Beside the name of the element a category gives useful information. I suggest:
- Landscape eg garden, tree, cultural landscape, view
- Built Structure (noting whether it is extant or ruin) eg building, headstone
- Maritime Archaeological Deposit eg shipwreck

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29 ibid p32
3.1.3 Related to?
This is the field which helps link related elements to one site. eg The Grey Mare 1890s hut, Grey Mare 1949 hut, the safe, alluvial workings, open cut workings, adit workings, 18km race, stamper batteries and much more. Using this field will help build site relationships, showing the complexity of some sites whilst allowing recognition of the individual value of certain elements.

3.1.4 Themes
Deciding on themes is difficult. I have worked on nomenclature for several databases and they can be the death of one. They need to be broad enough to group sites but narrow enough to be of use. The six areas listed by Parks Victoria are possibly too broad and the National, State and Local themes of NSW too complex. Given the diversity of the cultural heritage themes need to allow for a regional focus. Thus for the Alps they might be:
- Pastoral/agricultural
- Mining
- Forestry
- Survey/civil engineering
- Scientific Research
- Recreational
- Communications
- Monuments/memorials

3.1.5 Position co-ordinates
A recording of map, or better still, GPS checked northings and eastings.

3.1.6 Region
The administrative region/district in which the element is located.

3.1.7 Summary
All this base information can be manipulated any number of ways. You can tally the number of objects or extant buildings, elements in a particular region, reveal the richness of a particular site is by its related elements, you could use themes to assist with interpretation planning etc.

3.2 Prioritisation Dataset
This is more complex as it involves some judgement and where some basic training and/or internal/external professional support would greatly enhance the outcome.

Outlined below is a suggested dataset that could be tailored to suit.

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Stakeholder interest</th>
<th>Rarity</th>
<th>Physical Integrity</th>
</tr>
</thead>
</table>

An acknowledged limitation of the prioritisation fields chosen for the experimental model is its awkward, although not impossible, applicability to the more intangible elements of cultural heritage like views or traditions. (Given the nature of these elements it becomes all the more important that an interpretation plan is an integral part of the suite of management documents).
3.2.1 Risk factor
A useful definition of risk comes from the NSW National Parks and Wildlife Service,

Risk is the exposure to the possibility of such things as economic or financial loss or gain, physical damage, injury or delay, as a consequence of pursuing or not pursuing a particular course of action.30

This category is not there to acknowledge the general risk to all items, such as to deterioration due to being out in the elements, but note particular concerns. eg major visitor infrastructure being built close by, pest infestation, internal or external fire risk, increased vandalism in the area. Acknowledging a possible risk to people (staff and public) takes extraordinary factors into consideration. eg built structure about to collapse, old agricultural chemicals still in rusting tins, exposed mine shafts. For intangible elements the evaluation of risk has to be taken a little laterally. You would be deciding if the loss of the element was a strong possibility or not.

This is where a possible basic checklist could be utilised to calculate the following:
1. High Risk
2. Medium Risk
3. Low Risk

3.2.2 Stakeholder interest
Whether we like it or not the degree of stakeholder interest usually determines what receives attention.
- Hot topic
- Fair degree of current user interest
- Ambivalent to discontinued user interest

This takes stakeholders from state politicians to local action groups into consideration. While the former is unlikely to be ignored it does value help avoid ignoring an element that is only cherished by a group of local residents.

3.2.3 Rarity
This is probably the hardest for a person to decide and perhaps the most open to mistake. At the very least it would require input from a person who possessed knowledge of what heritage elements exist across a single park or region. A thousand examples of beer bottles might be reason enough to believe they were common elements. Only a few examples might lead you to believe they were rare or should at least signal to others that it was worth further investigation.
1. Rare
2. Not rare but not common
3. Common

Still it should be seen as just a very basic assessment of the element’s rarity on the basis that a rare element should demand attention over a common one because you might not be able to afford to lose a one off. Most intangible elements would fit into the first category.

3.2.4 Physical integrity
This gives a basic assessment of the element’s completeness with the necessary assumption that a ‘whole’ or near ‘whole’ element is usually better than bits of one.
1. Complete
2. Incomplete
3. Remnant

Although I write complete it could be defined by a rough percentage. Some definition with examples would help an individual understand that they are not assessing the physical condition/frailty of the whole or part but how much of it exists. In other words, how intact is an element in terms of fulfilling its intended function? Again, one has to interpret this category laterally for intangible elements. eg Is the view ‘complete’ or are their elements which disturb or obstruct it?

3.3 Interpreting the data

Once all the data has been filled in it is simply a matter of noting the hierarchy of the four categories in the Prioritisation Dataset to do the final ranking. Out of a duty of care all the elements noted as “High Risk” in the “Risk” category must be examined first. This is followed by those “Hot Topics” in the “Stakeholder Interest” category, as this is likely to dictate matters whether we like it or not. The last two are simpler in that something rare, “Rarity”, should receive attention first regardless of how much is left, “Physical Integrity”.

This means that high-risk elements, with a high degree of stakeholder interest, that are rare and complete are given attention first. Then all high-risk elements with a high degree of stakeholder interest that are rare and incomplete are given attention second. And so on…

eg First Priority

<table>
<thead>
<tr>
<th>Risk</th>
<th>Stakeholder Interest</th>
<th>Rarity</th>
<th>Physical Integrity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Second Priority

<table>
<thead>
<tr>
<th>Risk</th>
<th>Stakeholder Interest</th>
<th>Rarity</th>
<th>Physical Integrity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Third Priority

<table>
<thead>
<tr>
<th>Risk</th>
<th>Stakeholder Interest</th>
<th>Rarity</th>
<th>Physical Integrity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

Fourth Priority

<table>
<thead>
<tr>
<th>Risk</th>
<th>Stakeholder Interest</th>
<th>Rarity</th>
<th>Physical Integrity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
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This process is unlikely to pull out 1-3 greatest priority elements, rather batches of elements. In doing so it may create opportunities to consider integrated or parallel planning/treatment of elements facing similar issues. If there are too many elements that fall into the category of highest priority you could break it down further by using areas in the Description Dataset. eg by theme. Even if there is an even spread you may wish to allocate money to regions and allot their priorities to them. There are many ways to approach the prioritised groups.

Conclusion

This paper has briefly explored the history of strategic planning for cultural heritage management with its legacy of planning burdens and limitations of applying traditional significance assessments to a large body of cultural heritage. It has shown how state agencies that manage cultural heritage in the Australian Alps are exploring new ways to deal with this problem and limited resources by attempting to formulate prioritisation processes. These agencies have generally acknowledged that there are many criteria to be considered in the process but have so far not found a straightforward way to use them. The model presented is not a cut and dried solution but an opportunity for further discussion and possible adaptation. It utilises the essential cultural heritage inventory for simplified documentation and then applies systematic prioritisation based on risk, stakeholder interest, rarity and physical integrity. The ultimate aim being to simplify the process of where to begin with planning and resource allocation.
Select Bibliography/Resources


The author would like to thank those who manage cultural heritage in the Australian Alps and elsewhere for sharing their valuable time, information, wisdom and views.
Listening to the Voices of the Cultural Landscape

Eva Logan

Abstract

This paper explores the issue of local involvement in cultural landscape management, comparing the relationships of rural communities the mountain regions of mid-Wales and the Cooma-Monaro and Snowy Shires with their landscapes. The people are a vital part of these landscapes, cultural landscapes that are a palimpsest of the past and our canvas for tomorrow. There is a need to listen more closely to what the people of these communities have to teach including their knowledge of the landscape, related experiences, values and beliefs, as well as the effectiveness of past management approaches. The active commitment of the local level and its diverse communities to regional and national strategies, and vice versa, are vital to successful sustainable outcomes for the landscape.

The landscape of the Cambrian Mountains of rural Wales is one of lush green rolling fields, high hedgerows and grazing sheep, whilst the landscape of the Snowy Mountains region of New South Wales, east of the Kosciuszko National Park, plays golden green in the sunlight with fields of burnished gold and hardy sheep and cattle. These are rural localities with monuments and sites of national and regional significance and importance, yet they are places that arguably follow the global pattern of regional decline. This paper arises out of discussions with community members in these regions in 1999 and 2000. External pressures and internal changes are altering the nature of these communities and their culture. In considering future development strategies for regional areas, an appreciation of the diversity inherent in these regions and an in-built flexibility is required.

There is value in drawing parallels between Wales and Australia and exploring their comparative tensions even though there are some differences between them. These regions are rural sub-coastal, isolated by relief and proximity to major centres. As the Snowy and Cooma-Monaro Shire field area is secondary to Cooma, the Welsh region is secondary to Aberystwyth. These places have both been historically imposed upon by outside forces, they are both rural and in part due to traditional reliance on the now declining pastoral industries are looking to other sources of income. These diversified sources include cultural tourism ventures and alternate crops or grazing animals to enable them to stay on their land. The diversification approach and use is one that Australian community members were more familiar with, whereas the focus of the Welsh region is still largely on the single industry economy.

There is an increasing appreciation of the resources in the cultural landscapes of regional areas, of the need for local communities to value and protect what they see as significant, and seek to influence regional and national organisations to do more of the same. There is also the need for urban decision-makers to listen to the regional voices, so that vernacular landscapes, their heritage resources, people and the multi-faceted composition of perceptions of place are protected. The challenge for decision-makers is to incorporate these aspects into the processes of policy and project development, recognising that the translation of intentions into real outcomes is more difficult and unlikely to run smoothly and according to plan (Davis, et al, 1993:182). Whilst we appreciate and seek to protect and manage the current incarnation of the cultural landscape, the landscape cannot be understood without its prehistoric and historic context.

These areas were once regions of national and local significance. The Welsh region contains evidence of Iron Age occupation, a medieval Cistercian Abbey, Strata Florida (Ystrad Fflur) and was an important

Celebrating Mountains – An International Year of Mountains Conference
Jindabyne, New South Wales, Australia
route for drovers and travelers between villages and also between Sister Abbeys. Even up until the 1970s and 1980s a nearby village, Tregaron was the pony-trekking capital of Europe. The New South Wales region is also one with evidence of national significance, most notably the Snowy Scheme, recently listed on the Register of the National Estate. The most notable difference between the two regions is the length of the recorded history, a much more detailed story is evident through physical and written records in Wales.

The local Welsh landscape holds remnants of Iron Age hill forts, quarries, and the wetland of Cors Caron (Tregaron Bog) that teems with flora and fauna and other evidence of prehistoric and historic significance. To help give a picture of the landscape before the medieval period, it is interesting to note that the Cistercians, who settled the area in the late 12th century, tended to settle in areas that were sparsely populated. As information regarding the pre-Cistercian landscape in the region is minimal and written by these new settlers, it is unclear how much impact the Cistercians had on the movement and settlement patterns of people in the landscape. An increased focus on sheep grazing seems to have been one of the major changes wrought by the Cistercians in the 12th century (Davies, 1994:130).

The region then continued to pursue an agrarian economy, impacted more recently upon by the Industrial Revolution and the Great Depression (Davies, 1994:224; Hall, 1980:87). Of late, pressures on traditional industries have increased in part due to decreased protectionism and commodity prices, animal disease and competition from other producers and obsolescence.

The Welsh villages today can be either intimate environments or exclusive through language and cultural barriers. Strong local familial and historical bonds interplay with incomers escaping from the cities of England seeking the quality of life associated with a rural idyll. Tourists drift in and out intermittently, disappearing into the woods for a ramble, or perambulating the grounds of the ruins of Ystrad Fflur until the winds pick up and they dash back into the warmth of their cars and mini buses.

This New South Wales region supported the Aboriginal language groups of the Ngarigo (or Ngarego), and the Walgalu (also Wolgal or Walgal) and Ngunawal to the north (Tindale (1974), Howitt (1904), Wesson and Matthews (2000) in Young, 2000:22, 24-5), but the population was severely impacted upon by violence, forced removal to reserves and disease soon after Europeans took over the land. It is now well known that descendents of the original inhabitants who left the region or were removed from their ancestral lands to Reserves have maintained their association with the area (Young, 2000:3). Local people believe that the early settlers derived place names from the local Aboriginal languages.

Migration is a common thread to the Australian region’s European history of settlement. By the 1830s Old Adaminaby was an important cattle station and became a stopover point for the region in the gold rush of the 1860s focusing many thousands of people on Kiandra and its gold. Near the site of Old Adaminaby, there was a copper mine, which encouraged skilled workers and their families into the region.

People from a variety of backgrounds inundated the region in the mid 20th century when a large skilled workforce was needed to help create the Snowy Mountains Scheme. The Scheme remains an achievement of national significance for its construction works that provides electricity to the southeastern Australian grid and some water security to Australia’s arid inland. This large influx of people necessitated the establishment of a number of temporary townships, the remains of which are now only partly visible in the landscape, such as the remains of the former township of Adaminaby, a town moved to make way for the rising waters of the Snowy Scheme, now submerged beneath Lake Eucumbene.

On the heels of the Snowy Scheme were the development of Kosciuszko National Park and the tourism and skiing industries associated with Jindabyne, Thredbo in the 1950s and 60s. The pastoral industry is not the centre of the region’s economy as it once was and there are many examples of diversification on landholdings, especially related to tourism ventures which have enabled individuals to maintain their viability and their properties. Positive visions for the future are hindered by a lack of access to...
information and some fear of a loss of control over their livelihoods to external organisations. This is in contrast to the Welsh region where locally focused agencies act as a bridge between the government and funding bodies, and the community.

The local community identifies with towns and events outside their immediate area, but there remains a deep commitment to the local community and its future. The communities tend to welcome travelers in the Snowy region, although they are sometimes a little disparaging of the visitors’ ignorance of their town’s history. This attitude is in stark contrast to some of the Welsh region. There have been few projects or issues uniting the Snowy region community; even the Snowy Scheme was not a unifying force, suggesting one reason behind its seeming disjointed cohesion. The fragmented sense of local here is bound up with their relationship with other towns, such as Cooma, Tumut or Jindabyne.

Even though these regions were once important grazing and droving areas, they are now secondary to other villages and towns with memories and scattered remnants remaining of their past in the landscape.

As small scale industries and ventures keep the locals in work, results of the changes in agricultural practices, declining returns on produce and subsequent lessening options for employment include youth movement out of the region and impacts on local services. Young people are leaving these rural communities for opportunities in urban regions. As larger regional centres, such as Cooma and Aberystwyth tend to be the focus of employment, shopping and services, the decreased reliance on local services is problematic for the maintenance of local shops, evident in both Berridale and Pontrhydfendigaid.

Another significant change is an influx of retirees and second homebuyers as long-term residents sell up and move. These new homeowners, also known as rural retreaters, are often absentee landowners and contribute to cultural change through their lack of engagement with the local community. They are criticised for not contributing to the local economy as they shop, socialise and work in other regional areas. Through a lack of experience such rural retreaters may also have little awareness of land management issues and inadvertently contribute to the spread of unchecked weeds, or pursue practices not suited to the local environment.

In Wales, English incomers can cause an additional tension through the challenge of maintaining the Welsh language in the community. In Pontrhydfendigaid, regular Welsh language courses were run up until a few years ago then cancelled due to a decreased interest. Even with an increasing number of English incomers, some of whom now manage local businesses, the Community Council is still conducted in the medium of Welsh; a source of deep pride for the Welsh, frustration for some English.

There is also a difference in the approach of the English and Welsh in Wales, with the English being generally more keen for development to improve the area, whilst the Welsh are generally more protective of their cultural integrity. This sometime clash of priorities between the long-term locals and the newcomers from other areas, some of whom are absentee landowners, is not a new scenario and occurs in both regions. Current populations do not want to lose their sense of locality and identity so bound up in place.

When we talk of ‘community consultation’, the concept of community is not a homogenous entity, nor is consultation an inclusive process. Diversity and difference are the defining features of local communities. Managing this in a practical sense is far more difficult than well meaning theories or by simply changing the name of the concept to participation or engagement. There is no simple answer to the challenge of involving communities and giving them a sense of ownership over local projects, which in turn contributes to the project’s success.

Local people and locally organised groups need to be involved in meaningful landscape management that considers local resources and the range of issues specific to the place, facilitated through local leadership, accessible local level agencies and informal community networks. To impose a static project framework over diverse communities without their active involvement from the feasibility stage and to then expect motivated and committed support is to risk failure. Obtaining and maintaining such a commitment within an externally imposed framework is challenging, especially in the short-term environment of project development and funding cycles but also as communities employ formal mandates in an unforced, ad hoc
and diverse manner. Building the vital relationships and working within informal community networks is not a process that fits easily into a fixed, short-term approach.

There are significant social, economic and environmental challenges facing regional communities, but they are not passive observers. Some communities are working to shape their own futures using both formal and informal mechanisms. One Welsh farmer sees the challenge for farming communities in shifting their focus to the long term and addressing issues of community apathy, motivation and cohesiveness.

People are generally aware of the problems locally and regionally yet getting people actively involved requires the dissemination of information and opportunities to access new skills and resources to manage activities. Examples with organisations such as Greening Australia include field days with practical demonstrations and participation, or undertaking projects in prominent locations. It is seen as vital however not to push rural community members as they, like their urban counterparts, have lives and livelihoods to maintain and will adopt practices and get involved at their own pace.

If it is assumed that volunteers will contribute to the management of the landscape, it is important to understand why people would want to be involved. Volunteerism and involvement by the local community occurs on both an informal and more formalised basis. The push towards accredited training for voluntary groups moves the sector away from notions of community work, which is concerned with helping out on an informal basis. There must be a sense of ownership where people have a say in the goals and activities of the group, and consideration should be afforded the enjoyment factor, as a team spirit is necessary among volunteers. Alternately if they see it as a commitment and not a choice, this leads to guilt, and they either leave or feel obliged to stay. There is no exit policy within an informal network as it is more of an emotional or personal link and this can sour the experience. There needs to be two-way communication within the group.

The Welsh language is an important consideration for volunteering in Wales, especially in the distinction between formal and informal networks. Incomers into areas may have been previously in voluntary groups, but strong, informal networks can be difficult to tap into. This raises the possibility of introducing or encouraging externally focussed outreach workers.

In accessing assistance individuals, local businesses and community groups are sometimes hesitant to involve government and agencies for funding out of a fear of a loss of control over their local resources and future direction of the project. This was especially marked in the Snowy region, as opposed to the Welsh area where agencies with devolved responsibilities are more the norm. A manager of a regional voluntary organisation in Wales did however note that the community is wary of overly ambitious projects seeking to answer all challenges, and are themselves keen to see that such projects seek a consensus view as far as practicable, rather than just a vocal minority. In the context of tourism and heritage projects the pace and type of development are also important considerations together with local cultural concerns.

Antur Teifi, an agency in Wales that focuses on local economic and rural development and also manages funding applications to the Welsh European Funding Office for the Leader II Program, assisted in the organisation of the increasing number of Farmers Markets across County Ceredigion, a community led initiative. Communities and organisations either make inquiries of Antur Teifi for assistance, or Antur Teifi approaches communities for assistance in developing a project on a particular theme, such as the Printer’s Festival in 2000, which highlighted the resources available in the region. This agency acts as a mediator of sorts between government and communities, but such devolution can only be effective when there is adequate provision of resources and transfer of skills to fulfill responsibilities.

Rural areas that are off the beaten track for tourism can benefit from promoting a local resource or project that is unique in the region, such as a recent blues festival in Berridale. This can however be a tenuous solution as the village up the road seeks to emulate this success with a similar development. Even with sites of importance such as Ystrad Fflur or the shores of Old Adaminaby, these are places that tourists will drive to, take a photograph, jump back in the car and leave without stopping in the village as there is little to hold them there. Tourism ventures and heritage site developments are not answers in themselves to community employment or economic challenges.
Local knowledge and an understanding the past and the people are key to successful environmental, economic and cultural landscape management as it is local communities that know about the success or otherwise of past land management practices or businesses. Local communities can act as stewards for the landscape and are aware of what is of value in the region, or can be provided with the skills to do so. If such stewards are forced away from their land due to economic, social or environmental pressures the connections with the land and its significance, as well as the way of life and landscape that encourages an increasing number of urban dwellers into rural areas will be lost. What there is to sustain in the landscape will lose its human link.

Effective landscape management that focuses on improving the local economy, environment and quality of life requires locally supported projects and sensitive developments, together with capacity building and a partnership approach of participants. It adds complexity that rural challenges of a long-term nature should be managed within short-term environments, reliant on funding and the support of urban decision-makers and the urban majority. Awareness and involvement in community networks, both formal and informal allow for a deeper understanding of the avenues of communication that will assist in the harnessing and encouragement of support and action for cultural landscape management. This support is related to goals such as successful heritage site development, environmental management and more sustainable practices, projects and businesses.

**Bibliography**


Day Three – Mountains For The Future
Abstract

Survey and research for the Spotted-tailed Quoll Dasyurus maculatus was undertaken in the Kosciuszko region during autumn-winter 2002 to address gaps in knowledge about the species distribution, ecology and threats. Firstly, a region-wide distribution survey targeted the identification of extant populations through detection of scats (faecal droppings) at so-called latrine sites. Using this methodology, confirmed records for the Spotted-tailed Quoll were obtained from three of the four broad geographic areas targeted by the survey: Yaouk, the Byadbo Wilderness Area and Merriangaah Nature Reserve. A subsequent record was obtained from the fourth target area, Snowy Plains, through sand-pad monitoring for introduced predators. Importantly, the survey identified a high density population of quolls within the Byadbo Wilderness Area, suitable for further detailed studies. Subsequently, live-trapping and radio-tracking of individual animals was undertaken around the Jacobs River in north-western Byadbo. Twenty-two quolls were captured, 15 of which were fitted with radio-transmitters. Radio-tracking was undertaken over a period of 3 months. Results presented relate to home range, habitat use and den use. Analysis of scats collected from over 60 latrine sites within this area reveal Trichosurus spp. (Brushtail and/or Mountain Brushtail Possum) as the most important prey item for quolls in the area. Other important prey in the region include rabbit/hare, Rattus spp. and Long-nosed Bandicoot Perameles nasuta, with small amounts of other mammals, birds, reptiles and insects taken.

Introduction

The Snowy Mountains region of south eastern NSW contains some of the most unique landscapes and ecosystems in Australia. The focus of the region is the Kosciuszko National Park (KNP), which at 700,000 hectares is the largest conservation reserve in NSW. The region also contains many other smaller national parks and nature reserves that border or are nearby KNP. These conservation reserves, managed by the NSW National Parks and Wildlife Service (NPWS), are surrounded by a wider mosaic of rural land. The almost wholly timbered areas of national park abut private and leasehold lands that are variously timbered and cleared and predominantly support sheep and cattle grazing enterprises.

Sheep, and to a much lesser extent cattle, that are grazed in the region on lands that are close to a timbered/cleared interface have historically been at threat from attacks from wild dogs (Hancock 1972).
This threat is still present today. The NPWS routinely undertakes wild dog control through various use of the poison sodium fluoroacetate (Compound 1080) in an effort to reduce the impacts on domestic stock on adjacent land tenures. Recently however, in some areas adjacent to KNP the level of domestic stock loss through wild dog depredation has been unacceptably high.

The wild dog control methods currently being used within KNP and other reserves in the region include trapping and an intensive ground-based poison baiting program, in which baits laced with 1080 are buried in the ground. This methodology is conducted year-round, and differs from previous wild dog control efforts within KNP, which focussed on once-yearly aerial baiting. Aerial baiting, in which fresh meat baits containing 6 mg of 1080 are dropped from light aircraft, ceased within KNP in 1997 in response to concerns over the potential impact of the practice on populations of the Spotted-tailed Quoll *Dasyurus maculatus*, a native marsupial carnivore listed as threatened on the NSW Threatened Species Conservation Act 1995. Studies have shown that Spotted-tailed Quolls will locate and consume aerially deployed meat baits (Murray *et al.* 2000). A Species Impact Statement for aerial baiting within various areas of National Park estate in NSW prepared by McIlroy (1999) concluded that in light of a lack of information on the status, distribution and habitat preferences of the Spotted-tailed Quoll within KNP aerial baiting should not recommence.

The work described here is the preliminary results from the first year of an ongoing research program on the Spotted-tailed Quoll in the Kosciuszko region. The aims of the research program are to:

- Clarify distribution of quolls in KNP and adjacent reserves;
- Identify core populations for further research;
- Gather ecological information on quoll diet, breeding, home range size and habitat use;
- Investigate impact of aerial baiting for wild dogs and foxes on quolls.

This paper focuses on work carried out on the first three of the four aims stated above: distribution, identification of core populations and subsequent ecological research. Research investigating the impact of aerial baiting was not commenced in 2002.

The survey and research program, developed by the NPWS, is being overseen by the Advisory Panel for Wild Dog Management in the Kosciuszko Region. This group was established in 2001 to seek solutions to the ongoing wild dog issue in the region and consists of representatives of NSW Farmers, Cooma Rural Lands Protection Board, local graziers, NSW Agriculture and the NPWS.

**Distribution Survey**

The distribution of the Spotted-tailed Quoll in the Kosciuszko region has until now been poorly understood. Very few targeted surveys or studies have been undertaken for the species within the region (Belcher 1995; Wildlife Unlimited Consultancy 1997; Nelson, *et al.* 2001), and other records are sparse, both in space and time (NPWS Atlas of NSW Wildlife). As such, a component of the research framework established for this project was a broad scale survey for the Spotted-tailed Quoll. The survey focussed within areas of conservation reserve adjacent to other tenures with a high risk of wild dog attacks on domestic stock. The Advisory Panel for Wild Dog Management in the Kosciuszko Region identified four key problem areas: Yaouk, Snowy Plains, Byadbo Wilderness Area and Merriangaah Nature Reserve (Figure 1). These four areas are briefly described below.

**Yaouk**

This area is centred on the Yaouk Valley, through which the Murrumbidgee River flows, approximately 25 kilometres north of Adaminaby. The expansive valley floor predominantly contains grassland and grassy Snow Gum *Eucalyptus pauciflora* woodland. Steeply rising forested slopes surround the valley which is ringed by rounded, rocky exposed granite peaks to over 1800 metres. Much of the forested mountains are within either Kosciuszko National Park to the west, Namadgi National Park (ACT) to the north, and Scabby Range Nature Reserve and Yaouk Nature Reserve to the east and south-east respectively.
The forest areas are comprised of a mix of dry montane mixed gum open forest (E. pauciflora, E. dives), tall gum/ash open forest (E. pauciflora, E. dalrympleana, E. delegatensis) on sheltered slopes, and sub-alpine Snow Gum (E. pauciflora) at high elevations, particularly in the northern part of the study area. Above the tree line on the highest peaks, such as Mount Morgan and Bimberi Peak, an alpine shrub and herbfield community occurs.

Figure 1 Quoll Distribution Survey Areas 2002
Snowy Plains

This area stretches from Lake Eucumbene down to Lake Jindabyne along the eastern edge of KNP, west across Happy Jacks Plain in the north and the Brassy Mountains in the south. Major drainage features include the Eucumbene, Gungarlin and Burrungubugge Rivers. The ranges rise to the west of the Eucumbene River to the higher elevation flat open grassy plains and undulating forested hills and peaks. The vegetation of the area is similar, in both forest type and topographic occurrence, to that described above for the Yaouk area.

Byadbo

The Byadbo Wilderness Area comprises the extensive south-eastern section of KNP, approximately 40 kilometres south of Jindabyne. The area is dominated by the Snowy River, which flows east-west for approximately 40 kilometres through the area before turning south for 20 kilometres toward the Victorian border. The topography of the area is highly dissected with cliff-faces and outcrops of large granite boulders locally common. Major tributaries of Snowy River include Byadbo Creek, Stony Creek, Reedy Creek and the Jacobs and Pinch Rivers.

The area lies in a deep rainshadow from the Australian Alps, receiving less than 600 mm rainfall annually. Consequently, the area supports a unique mix of vegetation types. The Snowy River Valley contains a dry White Box *E. albens* and White Cypress Pine *Callitris glaucophylla* community below 650 metres (Pulsford 1991), with narrow strips of riparian Ribbon Gum *E. viminalis* in the more sheltered tributaries. Above 650 metres a grassy or shrubby Yellow Box *E. melliodora* woodland occurs, grading through Long-leaved Box *E. nortonii* woodland to Mountain Gum *E. dalrympleana* open forest with increasing elevation.

Merriangaah

The recently declared Merriangaah Nature Reserve is situated approximately 25 kilometres north west of Bombala. The reserve is centred on the steep, incised MacLaughlin River gorge upstream of the Snowy River. The reserve also includes areas of undulating forested land in its north east corner.

The vegetation of Merriangaah NR is similar to that found in the Byadbo, with the rainshadow of the Alps resulting in dry open forest and woodland communities. Yellow Box/Apple Box woodland occurs on the lower slopes and Peppermint (*E. dives*) open forest on the higher areas. The MacLaughlin River gorge within the reserve is characterised by steep rocky cliffs and slopes, particularly on its eastern side. Large granite outcrops, with large boulders, occur through the western and southern sections of the gorge.

Methods

Distribution survey

The survey targeted the identification of extant populations of quolls through detection of scats (faecal droppings) and latrine sites. Latrines are communal defecating sites, which are thought to serve a range of social purposes including olfactory communication of female reproductive status and definition of territories (Edgar and Belcher 1995). Due to the role they play in the reproductive ecology of the Spotted-tailed Quoll, accumulations of scats on latrines peaks during the breeding season (Belcher 1995) which occurs during the winter months (Edgar and Belcher 1995; Jones *et al.* 2001). Latrine sites of quolls are typically found on rocky outcrops, in rocky creek beds, on and at the base of cliff faces, on logs and even on roads (Belcher 1995; Triggs 1996; Jones *et al.* 2001).

Reconnaissance was undertaken between February and April 2002 within each of the four study areas described above to pinpoint areas for latrine searching. At least three days reconnaissance was carried out in each of the four survey areas. Areas with cliff faces, rock outcrops and rocky riverine corridors were targeted to increase the likelihood of detecting quoll scats. Firstly, topographic maps, wildlife databases, NPWS staff, local authorities and landholders were consulted to obtain an overview of each area. Areas where wildlife databases or local knowledge indicated sightings of quolls in the past were also noted.
Aerial inspection by helicopter was then used to further refine the search area. These areas were then inspected on the ground to confirm accessibility and inspect for rock outcrops beneath areas of dense forest canopy. All predator scats encountered were collected.

Areas selected during reconnaissance were then surveyed intensively commencing mid-May 2002. Groups of two to seven people traversed cliff lines, rock outcrops and sections of rocky riverine corridor. Helicopters were used to access remote or inaccessible locations. Each of the four areas was searched for a minimum of three days. Again all predator scats were collected and their positions recorded using Garmin GPS. All scats were sent to noted hair analyst Barbara Triggs for predator and prey identification.

It should be noted that in addition to this survey other survey and monitoring programs were undertaken across KNP for a range of fauna. One such project was conducted by the NPWS Snowy River and South West Slopes Areas. Soil plots 1 metre wide and the width of a road (see Newsome and Catling 1979) were established to record animal tracks as part of monitoring programs for mammals in areas where wild dog and fox control is being undertaken.

**Byadbo ecological research**

A trapping program for Spotted-tailed Quolls was established in the Jacobs River area of the Byadbo Wilderness, approximately 40 kilometres south of Jindabyne along the Barry Way. The area was selected due to the fact that active latrines were known exist (J. Dawson, pers. obs.) and that a concentration of incidental records had come from the area over the preceding 10 years or so (NPWS Atlas of NSW Wildlife).

Rock outcrops and rocky creek lines were first searched for quoll scats and latrines. Treadle-style cage traps were placed at sites where latrines were located. In total 51 traps were set throughout the area in groups of up to 3 traps at each site and each was baited with fresh chicken and checked early each morning.

Two trapping sessions of eight nights each were carried out from 30 May to June 7, and from June 14 to June 21. This resulted in a total of 608 trap nights, as not all traps were open on each night. During the first trapping session each captured quoll was weighed, sexed, and micro-chipped prior to release. During the second trapping session quolls were identified by scanning for the micro-chip, and recaptured animals were sedated with Zoletil (8 mg per kg) and fitted with a radio-collar. All sedated quolls were held for two hours and supplementary fed prior to release. Finally, trapping to recover collars was undertaken in early September at the completion of the project.

Post-trapping, radio tracking was carried out both on foot using a directional hand-held antenna, and aerially from a helicopter every second or third day for between 8-12 weeks following capture.

During the on-ground tracking opportunistic searches were conducted for latrines and scats. Due to the role that latrines play in the communication of reproductive status of female quolls not all scats were collected from active latrines in the early part of the breeding season (May-July). Instead, a selection of older scats was collected from each latrine and fresher scats were left undisturbed. The location of each latrine was marked using a Garmin GPS and all sites were revisited when it was apparent that breeding had been completed in late August and early September. At this time all predator scats encountered were collected.
Results

Distribution survey

Figure 2 shows the distribution of new records of the Spotted-tailed Quoll from the scat and latrine survey and soil plot monitoring during 2002. Records were obtained from all four of the target survey areas. Positive identification of Spotted-tailed Quoll scats, through detection of grooming hairs, was obtained for three areas: Yaouk, Byadbo and Merriangaah. Only a small number of records were obtained for the Yaouk and Merriangaah areas, whereas the Byadbo area revealed in excess of 70 latrine sites. It must be noted however that the survey effort in Byadbo, particularly in the Jacobs River section, was far in excess of that for any of the other three areas as a result of over 3 months of ongoing ecological research. While no confirmed quoll scats were collected from the Snowy Plains area, quoll tracks were identified on a soil monitoring plot in the Snowy Plains area in September 2002 (G. Mifsud pers. obs.).
**Byadbo trapping**

In the first two trapping periods completed in the Jacob River area of the Byadbo Wilderness, 21 Spotted-tailed Quolls were captured a total of 99 occasions from a total of 608 trap nights (16% success rate). Final trapping in September to retrieve radio-collars resulted in one additional individual being captured, bringing the total for the project to 22. Nine female and 13 male quolls were captured. Males weighed between 1.2 and 3.6 kilograms, while females ranged from 1.0 to 2.5 kilograms.

Radio collars were fitted to 15 captured quolls (8 males, 7 females). One male shed his collar within the first week. For the remaining 14 animals, between 20 and 45 fixes were obtained including trapping records and tracking fixes. Preliminary minimum convex polygon analysis of this data shows that male Spotted-tailed Quolls in the area had home ranges over the autumn-winter breeding period of 360-2560 hectares (mean 990 ha). Excluding the extreme high and low values, the remaining 5 animals inhabited between 600-1100 hectares each. Female home ranges were between 87-665 hectares (mean 255 hectares) with most animals occupying between 140-260 hectares.

From on-ground radio-tracking, daytime den sites were located in a wide range of situations. Quolls were tracked to dens in large and small rock outcrops, living and dead trees (up to 3 metres above the ground), and holes such as disused rabbit and wombat burrows.

Analysis by Barbara Triggs of in excess of 550 quoll scats, collected from over 60 latrines found in the Jacobs River area alone, revealed twenty species, or groups of species, as prey for quolls in the area. The Brushtail (and/or Mountain Brushtail) Possum *Trichosurus* spp. is by far the dominant prey item in scats from the area with 51% of all scats containing hair from *Trichosurus* spp. Other important prey species or groups by item in scats include *Rattus* spp. (*R. rattus, R. fuscipes*) 18%, rabbit/hare (*Oryctolagus cuniculus/Lepus capensis*) 9%, and Long-nosed Bandicoot (*Perameles nasuta*) 5%. Other prey items detected in less than 5% of scats include *Antechinus* spp. (*A. agilis, A. swainsonii*), House Mouse (*Mus musculus*), Swamp Wallaby (*Wallabia bicolor*), Eastern Grey Kangaroo (*Macropus giganteus*), Red-necked Wallaby (*M. rufogriseus*), Wombat (*Vombatus ursinus*), Sugar Glider (*Petaurus breviceps*), Ringtail Possum (*Pseudocheirus peregrinus*), Eastern Pygmy Possum (*Cercartetus nanus*), birds, insects and reptiles. Of particular interest was the finding of Platypus (*Ornithorhynchus anatinus*) hair in three scats from a latrine along the Jacobs River, and one scat with cat (*Felis catus*) as a prey item.

The analysis of hair in scats completed by Barbara Triggs also provided information on the number of quoll scats that contain grooming hairs, a factor which positively confirms the presence of quolls. Of the scats collected in this study from the Jacobs River area only 8% contained quoll grooming hairs.

**Discussion**

The results of the distribution survey, and associated records of quolls, across the four study areas shows that the Spotted-tailed Quoll occurs throughout forest and woodland habitats in the Kosciuszko region. The use of targeted searches of habitats containing rock outcrops and rocky riverine corridors for quoll scats and latrines provides an effective method for detecting the presence of the species. It is important to note however that positive records were located predominantly in the May-August breeding period in which latrine use peaks. Searches undertaken in February-March as part of reconnaissance for the survey revealed very few records.

The low percentage of Spotted-tailed Quoll scats collected that contained grooming hair has implications for the use of latrine searching as a survey method. Identification of quoll scats in this study relied on several distinctive morphometric and olfactory characters (see Triggs 1996), as well the location of the scat. Sample scats encased in perspex blocks were used to familiarise inexperienced observers with the appearance of quoll scats. Spotted-tailed Quolls are the only predator in south-eastern Australia that will communally defecate (Belcher 1995), often selecting flat, elevated positions on rock outcrops and along rocky river corridors for latrines. A high degree of confidence of the presence of Spotted-tailed Quoll can therefore be assumed when an accumulation of predator scats is found on a rock, particularly when combined with the distinctive twisted, cylindrical appearance and its oily, ‘quolly’ odour.
Spotted-tailed Quolls were detected throughout a very broad range of elevations and habitats in the region. Quoll scats were found at elevations from 300 metres along the Jacobs River in White Box/White Cypress Pine woodland, up to 1650 metres on Sentry Box Mountain in the Yaouk study area, in sub-alpine Snow Gum woodland. The discovery of a large, high density population of Spotted-tailed Quolls in the rainshadow woodlands of Byadbo Wilderness Area is a very significant and surprising find. This type of habitat has until now been considered as being of low quality for quolls, being vastly different from the tall, moist forests of the coastal lowlands, escarpment and ranges of the eastern seaboard where the major populations were thought to occur. The capture of 22 individuals within the Jacobs River study area, and extensive evidence of quoll presence across the Byadbo Wilderness Area, indicates that this is a large population, comparable to any other throughout mainland Australia or Tasmania.

It is clear from both the targeted latrine searches and radio-tracking work that Spotted-tailed Quolls utilise all parts of the landscape in which they live. Dens of quolls were located by radio-tracking throughout the topographic sequence. Similarly, latrines were located from rocky creek lines to outcrops on ridges, and in similar situations where they occurred in between. The spatial configuration of home ranges obtained through radio-tracking confirms this total landscape use.

Configuration and landscape position of home ranges differed for males and females. Female home ranges tended to be centred along riparian zones and their associated local catchments. This may be due to variation in prey distribution or availability within the landscape, with a bias in favour of riparian habitat, as Belcher (2000) suggests that female home range size is correlated to prey density. There was very little overlap between most female home ranges, with the exception of two pairs of animals which shared areas of habitat. Belcher (2000) states that female Spotted-tailed Quolls are intrasexually territorial, but that they tolerate female offspring within their territory, an explanation that would explain the sharing of habitat in this study. Genetic analysis, to be undertaken for the animals captured in this population, will either confirm or confound this conclusion.

Home ranges of male quolls in this study were large when compared to female ranges and crossed the full range of available habitats and landscape features present. Male home ranges also overlapped considerably, with up to five of the seven collared males utilising one section of the study area during the course of the study. Male home ranges also covered several female home ranges during this winter breeding season, indicating that males spend this part of the year traversing the landscape in search of sexually receptive females.

**Conclusion**

The survey and research reported in this paper has shown that the threatened Spotted-tailed Quoll occurs throughout the forest and woodland habitats of the Kosciuszko region. Surveys targeting the detection of quoll scats and latrines are an effective method for detecting the species across large areas. The location of a large, high density population of the Spotted-tailed Quoll in the Byadbo Wilderness Area of southern Kosciuszko National Park is a highly significant find, adding this unique rainshadow woodland habitat to those areas known to provide high quality habitat for the species. Further ongoing ecological research is planned in 2003 to expand on the findings reported in brief here.

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References


The inverted treeline is the most readily identifiable vegetation boundary in the mountains.

It is the boundary between frost hollow sod grasslands and the hillside forest. The Snowy Mountains are perhaps the world's best repository of these ecological phenomena. Historically, early transhumant graziers used these valleys for summer grazing for over a century and during that time they expanded grasslands upslope on favourable gentle north-facing slopes, destroying the original treeline boundaries. Today, after almost half a century, many of these inverted treelines remain disjunct and recovery of the tree canopy has been negligible. For management purposes the current mapping of these valley grasslands fails to recognise this important ecological boundary. Over the last decade, a succession of three honours projects by students of the School of Resources, Environment and Society, ANU, have added significantly to our knowledge of the inverted treeline.

The first attempt at defining inverted treelines across the northern end of KNP was undertaken by Wimbush (1967). This first approximation was achieved by simply joining remanent tree boundaries along an appropriate contour line. This provided a good estimate by assuming that the cold air settles in valley floors like 'milk in a saucer',

Studies of cold air flows in Long and Numgar Plains (Trevitt, Paton, Hillicker, Tanton, and Banks 1990 Unpubl.) involved injecting smoke into the cold air masses and recording their movement on full moon nights. This confirmed that cold air is not static but actively dynamic and with air masses of different temperatures i.e. from 00 to -28C. These flowing air masses do not mix but 'sloshed' about the valley over uneven terrain producing undulating treelines around the valley margins. Therefore, while the contour provides the general location of the original treeline, its accuracy is limited and to map these boundaries will require detailed information. It would be impracticable to map every treeline by using smoke injection so alternative methods were sought.

Given that the two ecosystems, sod grassland and forest, are radically different it was hypothesised that surface soil nutrients may provide the ideal boundary marker where trees have been lost. The results of two trial transects indicated that calcium and to a lesser extent manganese levels were higher in the forest than the sod grassland, Banks 1990 unpubl. and 1997. Calcium and manganese were 4000 and 2000 ppm under the forest canopy and 1200/900 and1500/700 ppm in the sod grassland respectively. The soil depths were similar throughout, ~ 50 cm, and it was suggested that different fire and grazing regimes may be in part responsible for these observed differences,

The next step was to confirm these soil nutrient levels over a larger area. A detailed study on a gently sloping profile extending out into the sod grassland confirmed this soil nutrient pattern (Hedenstroem,1993). This thesis found that the Eucalyptus pauciflora trees were more strongly
redistributing Ca and Mn from deep in the soil profile to the surface soil profile, i.e. the A1 horizon under trees was richer than the A1 under grasses and herbs of the sod grassland. The study extended across the powerline easement where trees had been removed in the mid-1950's in order to test the permanence of this signature once the tree cover had been lost and/or its decay rate. This proved inconclusive given the level of site disturbance.

A second analysis of an intact inverted treeline followed (Little, 2001). This was a detailed 3-dimensional study examining profile patterns both across the inverted treeline and along tree to tree and grass sod to grass sod transects. The study site was on a steep slope where the tree boundary was clearly defined; in addition this tested for any down slope movement of soil nutrients which may blur the soil nutrient signature. The study added to our knowledge and understanding of the plant-soil interactions and processes that lead to the development of patterns of cation distribution in soil profiles under and adjacent forest and sod grassland ecosystems.

Little (2001) clearly demonstrated that soil profile and soil-surface patterns of Ca and Mn concentrations are strongly related to characteristic indicators of the forest and sod grassland nutrient cycles. Patterns were observed that correlated with litter depth and development between two trees of differing sizes and ages, and in relation to the presence of grass tussocks in the sod grassland. The greatest variability in ecosystem processes lie in litter depth and vegetative composition and in plant root and soil profile chemistry. The concentrations of Ca and Mn were strongly related to characteristics nutrient cycling processes despite the slope across these ecosystems. These signatures indicate that the concentration of these soil nutrients can provide useful markers for mapping this boundary where the tree cover has been lost during the grazing era. With this information it was felt that mapping these treelines was now possible if sufficient resources were available.

Another approach was then followed by Miller (2002). Satellite image analysis was used to test whether remote sensing could be used to discriminate tree cover, followed by aerial photographic interpretation, and ground truthing to map the inverted boundary on Long Plain. Soil nutrient patterns were used as a last resort where all other techniques were inconclusive. Remote sensing provides a quick method but yielded a less than satisfactory analysis. Using this technique boundaries could be drawn that were perhaps no better than those of Winbush (1967). Importantly it failed to distinguish shrubs of Hakea species and the wet valley floor below the inverted treeline from the trees above it and in most instance it missed identified the Weeping Snow Gum, *E. lacrimans* on low rises in the middle of the valley. The application of aerial photography to this problem was important as it allowed for the detection of *E. lacrimans* and the remnant fallen timber. Thus improving mapping accuracy. There were areas of cleared land where all evidence of past trees has progressively disappeared over time. Here the results of Little (2001) were applied and soil transects across implied boundaries were sampled. The results showed the expected elevated Ca and Mn levels on former forest soils had faded to the point where the original inverted boundary could not be identified. On reflection several factors were hypothesised; these were related to down slope erosion and the removal of much of the soil from the A1 horizon where this signature lies and with a century of grazing and burning this had removed any elevated Ca and Mn soil nutrients. Given these uncertainties Miller (2002) was able to reclassify the area frost hollow sod grassland down from 62 to 48.5 Km². The difference being anthropogenic grassland lying above the inverted treeline.

Further research into the distribution of shrubs, herbs and grass species in relation to the inverted tree lines is underway and the soil signatures from these species are being investigated to seek further information on the distribution of cations and anions in surface soils. More detailed analysis of processes of redistribution of nutrients and other elements is also being undertaken. The overall aim at this stage is to assist in the assessment of rehabilitation and remediation work following disturbance.
References

Poster Forestry Symposium, March Department of Forestry, ANU.


Consequences of dingo control strategies on dingo behaviour and hydatid disease transmission

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Dingoes were introduced into Australia 4000-5000 years ago with Asian seafarers. Following their introduction, dingoes out competed the original top order predator, the thylacine, and the also the Tasmanian devil. Dingo numbers remained relatively low until after 1788 when Europeans arrived into Australia and began to make major environmental changes. The important changes as far as dingoes were concerned included the introduction of livestock and the creation of artificial watering places. This led to an increase in the dingo population, which in turn led to increased predation on sheep and conflict with farmers. The predation on sheep caused the farmers to instigate dingo control, this control combined with widespread land clearing, caused dingoes to become extinct in some areas.

When the settlers came Australia they also brought their dogs to move/guard livestock, for hunting and as pets. Hitherto, Aboriginal people had tamed dingoes and used them to assist with hunting but dingoes are very headstrong and it was not long before the Aborigines appreciated the benefits of the more compliant dog breeds brought to Australia by the settlers. It was also not long before the Aborigines adopted these new types of dog in favour of dingoes.

Domestic dogs can breed with dingoes and after the arrival of domestic dogs to Australia, domestic dog genes began circulating in the wild dingo gene pool. Settlement was more concentrated in south-eastern Australia than in other parts, hence the domestic dog population was highest and opportunities for hybridisation with dingoes greater. The result has been that dog genes are now widespread in the dingo gene pool in south-eastern Australia and up to 75-80% of the dingoes in some areas being hybrids. Corbett (1995) has suggested if hybridisation continues at the same rate, dingoes as a pure genetic entity, could be extinct in the wild in Australia by about 2100.

Wild dogs are territorial with a strict social structure. Their social structure influences their rate of reproduction. The pack is controlled by a dominant dog and bitch and these animals discourage other pack members mating with their mate and should subordinate bitches become pregnant and have puppies, the dominant bitch kills the puppies in all litters born to the subordinate bitches. Conventional control methods are at best ad hoc, with an animal is shot here, one trapped there and another poisoned somewhere else. The effect of this activity, should one or both of the dominant pair be killed is that the pack is destabilization and animals disperse. Individuals may pair up and breed successfully, maybe 2 or 3 pairs in an area previously occupied by a single breeding pair in a pack situation (Corbett 1995). This increased fecundity may rapidly increase the population of wild dogs in an area with consequent increased predation pressure on sheep and other wildlife species When displaced from their home range, wild dogs may travel long distances to find new uncontested territory. Recent studies in south-eastern New South Wales have shown wild dogs commonly moving distances of 20-40 km with a few individuals travelling between 60-80 km (Jenkins, unpublished data).
*Echinococcus granulosus* (the hydatid tapeworm) was also introduced into Australia with domestic livestock and dogs. *Echinococcus granulosus* became established in wildlife and is now widespread in many areas, maintaining an important reservoir for transmission to domestic animals and humans. The key to the transmission success of *E. granulosus* in wildlife on the Australian mainland was the presence of naive populations of *E. granulosus*-susceptible canid predators (dingoes) and prey (macropod marsupials). The current distribution of *E. granulosus* on mainland Australia is largely dictated by rainfall. Optimal transmission of *E. granulosus* occurs in regions that are not too hot and dry (temperatures below 30°C and rainfall of more than 25 mm/month for 6 months of the year). *Echinococcus granulosus* occurs most commonly in wildlife in areas associated with the Great Dividing Range, from Victoria to Queensland.

The hydatid parasite has two distinct body forms, tiny tapeworms in canids (dingoes, domestic dogs and foxes) and large fluid-filled hydatid cysts in herbivores (domestic livestock and macropodid marsupials) also pigs and humans. The tapeworms in the canids produce microscopic eggs that pass out with the faeces and contaminate pasture. The eggs in the environment may remain infective for as long as one year and may be accidentally eaten by animals during grazing and by humans through poor personal hygiene following close contact with infected canids or canid faeces. The cysts contain the next generation of tapeworms and have to be eaten by canids to complete the life cycle.

Infection in humans is life threatening and treatment of choice is major surgery to remove the cysts. During the removal of hydatid cysts great care must be taken not to spill any of the cyst contents into the patient. If any of the next generation of tapeworms are split into the intestinal cavity or chest cavity during surgery they grow into new cysts. Seventy percent of human cysts occur in the liver, 20% in the lungs and 10% almost anywhere else in the body.

The early transmission of *E. granulosus* from introduced domestic animals into wildlife was greatly assisted by the agricultural practice of transhumant grazing. Transhumant grazing occurred widely in the alpine areas of Victoria and New South Wales during the 1800s and 1900s and persisted for almost 150 years. The practice consisted of moving large numbers of livestock, particularly sheep, to remote alpine pastures in late spring. They remained in the mountains for three to four months, before returning to the lower altitudes in late Autumn. In the area of alpine New South Wales that now constitutes the Kosciuszko National Park, more than 200,000 sheep and 17,000 cattle were moved annually into the area to graze. The last of the leases permitting grazing of livestock in that area was revoked in 1972.

The presence of large numbers of sheep and sheep dogs in these remote alpine areas expedited the transmission of *E. granulosus* into dingo and macropodid populations. The dingoes scavenged carcasses of hydatid-infected sheep and predated on hydatid-infected live sheep. The faeces from hydatid tapeworm-infected drover’s dogs and dingoes contaminated the alpine pastures with eggs of *E. granulosus* that could be accidentally ingested by herbivorous native wildlife.

The prevalence of *E. granulosus* in wild dogs in south-eastern Australia is high ranging between 25% and 100%. The worm burdens of infected wild dogs are commonly in excess of 1,000 worms but worm burdens greater than 50,000 up to 100,000 worms occur regularly. Unusually heavy burdens, in excess of 200,000 and 300,000 worms have been recorded. Not all the worms are at the same stage of maturation ensuring a continuous release of eggs into the environment. All recent prevalence and worm burden data for wild dogs clearly indicate wild dogs represent the most important definitive host in the transmission pattern of *E. granulosus* in Australia today, perpetuating transmission in wildlife and providing a source of infection to domestic livestock and humans.

The tendency for wild dogs to live in a defined home range, either individually or as a pack, and for displaced individuals to travel long distances in search of new uncontested territory, have important implications for the dispersal of *E. granulosus* eggs in the bush. The home ranges of wild dogs vary according to availability of prey and the sex of the animal, average size ranges between 19 km² for females and 24km² for males (Corbett 1995). *Echinococcus granulosus*-infected individuals, particularly those with heavy infections will quickly contaminate their home range with *E. granulosus* eggs. In optimal conditions (cool, shaded, damp areas), some eggs of *E. granulosus* will remain viable in the environment for about a year withstanding freezing temperatures in winter. Infected wild dogs moving long distances may carry *E. granulosus* eggs into areas hitherto uncontaminated.
The most widespread wildlife intermediate hosts for *E. granulosus* in eastern Australia include three species of macropodid marsupial, eastern grey kangaroos, red necked wallabies and swamp wallabies, wombats and feral pigs. Of all intermediate host species examined in eastern Australia, the highest prevalence of infection (up to 65.5%) and the highest cyst fertility has been found in swamp wallabies.

Swamp wallabies are a favoured food item of wild dogs and the site of predilection of hydatid cysts in wallabies (also kangaroos and wombats), the lungs, may render infected individuals more susceptible to predation, through compromised lung function. Hydatid infection causes debilitation and death in macropodids. Sick hydatid-infected red-necked wallabies has been reportedly captured by hand in Queensland. In Canada, it has been shown that wolves catch a disproportionately large number of moose infected with pulmonary hydatidosis. Swamp wallabies occur commonly throughout the area of eastern Australia associated with the Dividing Range and are pivotal in the successful transmission of *E. granulosus* in wildlife.

Hydatidosis has only been reported in wombats in Victoria. Many wombats having been examined in New South Wales from areas where *E. granulosus* is prevalent in the wild dog population but none found infected. Wombats should be considered as an intermediate host but only of minor importance.

There have been no reports of horses or goats naturally infected with hydatid cysts, except for a report of infection in two feral goats in Western Australia. Experimental infections of feral goats with eggs, obtained from an *E. granulosus*-infected dingo, failed to produce any infections in feral goats but good infections were obtained in control Angora goats (Jenkins, unpublished data). These few data suggest feral goats and horses to be of no importance in the transmission of *E. granulosus* in south-eastern Australia.

Feral pigs are numerous in much of south-eastern Australia and hydatid infection in feral pigs is common, ranging between 9% and 49% with cyst fertility ranging between 15% to 22%. Wild dogs prey on pigs but mainly pigs less than one year old because the older pigs are usually too big and strong for the wild dogs to subdue. However, wild dogs will scavenge carcasses or remains of larger pigs left in the bush by hunters. The preference of wild dogs for young pigs and the small number of adult pigs with viable protoscoleces in fertile cysts indicates that the contribution of feral pigs to the transmission of *E. granulosus* in south-eastern Australia is small.

Wild dogs are important in the transmission of *E. granulosus* to domestic livestock. Locations in south-eastern Australia of particular importance for the transmission of *E. granulosus* from wild dogs to sheep occur along the interface of Crown Land (national parks and state forests) and grazing land. Wild dogs are attracted to these areas to predate on sheep and at the same time they contaminate the pastures with eggs of *E. granulosus*. *Echinococcus granulosus* is also transmitted to cattle from wild dogs. Cattle are commonly grazed in rougher pasture and scrub, unsuitable for grazing sheep. Cattle may also be grazed in these areas in preference to sheep because of the high numbers of wild dogs resident in the area. Hydatid infection in cattle has been reported from all states in Australia and it is thought cattle are mainly infected from hydatid-infected wild dogs. Cattle have a minimal role in the transmission of *E. granulosus* in Australia as adult cattle are too big to be predated on by wild dogs and cyst fertility in cattle is commonly less than 1%.

The role of flies in the transmission of eggs of *E. granulosus* from wild dog faeces to potential wildlife and domestic animal intermediate hosts and humans has yet to be fully assessed. Coprophagus flies occur in large numbers in the bush in Australia and in New Zealand they have been shown capable of ingesting eggs of tapeworms and these eggs retained their infectivity during passage through the flies.

Human hydatid disease still occurs regularly in Australia but under reporting is a major problem leading to official figures under representing the true situation. In view of the amount of infection found in wildlife it is not unreasonable to speculate that a proportion of human cases occurring in Australia are derived from wild dogs. Directly linking cases of human hydatidosis to contact with wildlife is difficult. There is a long latent period from the time of infection to the time of diagnosis (commonly 10-15 years) and human cyst material is genetically indistinguishable from hydatid tissue from wildlife. In two cases of human hydatid infection investigated in Queensland, one person had had contact for 9 years with...
domestic dogs fed offal from macropodids, whereas the other had had contact with a wild-caught dingo pup five years previously. Other reports of human hydatidosis associated with wildlife include a case thought to have occurred via domestic dogs fed offal of kangaroos and a dingo trapper who was thought to have become infected through handling the carcasses of dingoes infected with *E. granulosus*. Anecdotal reports of hydatid infection in dingo trappers from eastern Victoria have been mentioned in the literature and a ranger of the New South Wales National Parks and Wildlife Service became infected following several years of collecting dingo scats for diet analysis.

National parks of south eastern Australia, particularly those associated with the mountains, are a major destination for public recreation. The high prevalence of *E. granulosus* infection in the wild canids resident in these parks constitutes a potentially important public health risk, both for visitors and park staff. Direct physical contact with wild dogs for visitors and the park staff is likely to be rare, but contact with faeces (containing the infective eggs of *E. granulosus*) is much more likely, since wild dogs frequently defecate on bush tracks and around picnic and camping areas.

**Suggested further reading**


Managing A Legend – Wild Horse Management In Kosciuszko National Park

Pamela O’Brien and Liz Wren

NSW National Parks and Wildlife Service

The Man from Snowy River
By A.B. Paterson

There was movement at the station, for the word had passed around
That the colt from Old Regret had got away,
And had joined the wild bush horses – he was worth a thousand pound,
So all the cracks had gathered for the fray.
All the tried and noted riders from the stations near and far
Had mustered at the homestead overnight,
For the bushmen love hard riding where the wild bush horses are,
And the stockhorse sniffs the battle with delight.

With the publication of Banjo Paterson’s poem in the Bulletin in 1890 an Australian legend was born. This legend has been reinforced in Australian culture by popular books such as Elyne Mitchell’s classic, The Silver Brumby and the popular film, The Man from Snowy River.

The Snowy Mountains and horses have become entwined in the national folklore. Thanks to movies such as The Man from Snowy River, they bring to mind images such as stunning scenery, fearless mountain horses and drizabone-clad Snowy River riders. Perhaps it’s precisely because the nation has become so urbanised that the idea of wild horses running free in a rugged and scenic mountain environment is so appealing. The strength of the nation’s connection with this image was demonstrated very powerfully when a Man from Snowy River-inspired performance introduced the Sydney 2000 Olympics to an audience of billions worldwide.
Kosciuszko is a key element of the legend as it was the battleground for one of the very early conflicts between land use and conservation in Australia. The impacts of practices such as cattle and sheep grazing and annual burning in the alpine area of what is today Kosciuszko National Park had been noted as early as the late 1800s. By the 1930s the beginnings of a conservation movement in Australia had taken up the cause and in 1944 Kosciusko State Park was reserved for all time.

Today the NSW National Parks and Wildlife Service has the responsibility of managing the cultural heritage of the Snowy Mountains while also protecting the natural values for which the park was reserved. These values include many unique landforms such as glacial lakes and cave systems, as well as plants and animals found nowhere else in the world. The alpine area alone contains 21 species of endemic plants. The headwaters of rivers such as the Snowy, Murray and Murrumbidgee are also found within the park and these rivers provide a very high quality source of water for irrigation and electricity for a large part of southeastern Australia.

Horses have figured in what is now Kosciuszko National Park since the earliest days of European settlement. Their numbers remained at a relatively low level for many years following the establishment of the park in 1944 and the withdrawal of sheep and cattle grazing. However during the past 20 years the horse population has increased as a result of a lack of active management and it is now estimated that there are as many as 3,000 horses in the park.

By the late 1990s horses had begun to appear in the alpine area – the land above 1850 metres where it is too cold for trees to survive. In response to the increase in environmental impacts resulting from feral horses, in 2000 the NPWS moved to develop a management plan for feral horses in the fragile alpine area.

In developing a management plan for feral horses the NPWS recognised there is a wide range of conflicting views in the community about the issue and that it is an issue which inevitably attracts a high level of media interest. NPWS staff believed that to develop a management plan for horses that would be sustainable into the future, community support was essential.

In October 2000 a process of community involvement was begun. A key decision taken at the beginning of the process was that the solution to managing horses would be developed through the process of community involvement.

The process of community involvement began with a communications plan. This plan identified key stakeholders, particularly those who could be of the greatest assistance as well as those who had the potential to have a negative effect on the process. A process was detailed for briefing stakeholders in the early stages of the project in order to enlist their support. The communication plan established key messages to be promoted throughout the project and communication tools such as information sheets, newsletters and material for the NPWS website. A detailed media strategy identified the NPWS spokespeople, detailed media points and included a news release. The plan also identified media monitoring as one means of evaluating the success or otherwise of the communication plan.

Support was sought and gained from the key stakeholders prior to a media announcement about the commencement of the project. Various stakeholders were then approached to be involved in the Wild Horse Management Steering Committee. The steering committee included representatives from local government and the Snowy Mountains community, the park’s advisory committee, horse riders, conservation groups, tourism, scientific experts, animal welfare bodies and NPWS staff.

The steering committee agreed on a range of activities aimed at canvassing public opinion about horse management and possible management techniques. The activities included public workshops, information sessions, providing information on the NPWS website and media. The workshops, information sessions and calls from the public resulting from media articles were all valuable in identifying the key issues of concern about horse management. This process highlighted the very wide range of views in the community about the issue; eg some people want horses to be retained in national parks because of their cultural connections and many people do not realise that horses are in fact an introduced species, while others are adamant that horses must be eliminated from the park as soon as possible and that shooting is the most effective and humane method. What is apparent is that people view horses quite differently to other non-native species such as feral pigs, wild dogs and goats. While there are very divergent views...
about horses, there was also agreement that the alpine area of Kosciuszko is significant and needs to be protected, that horses should be managed and that however they are managed, it must be humane.

In June 2002 a Draft Wild Horse Management Plan for the alpine area of Kosciuszko National Park was released and placed on public exhibition. This was developed following extensive input from and consultation with the Wild Horse Management Steering Committee.

In order to proactively promote the plan, a series of public information sessions were held in towns around the Snowy Mountains, including Jindabyne, Cooma, Tumut and Queanbeyan. The objective of these sessions were to provide accurate information about the proposed horse management methods and to provide the opportunity for the public to discuss the issue personally with both park staff and steering committee members.

While the plan was being finalised volunteer horse riders worked closely with NPWS to undertake a trial of the method of trapping horses in the alpine and sub-alpine area in the Rams Head Range/Dead Horse Gap area. These local horse riders brought a high level of experience and skill which was instrumental in the successful trapping of 13 horses.

The Horse Management Plan for the alpine area of Kosciuszko National Park proposes a return to traditional methods of capturing and removing horses from the park. The plan’s key objectives are: to conserve and protect the natural values of the Kosciuszko alpine area by removing horses; to ensure the alpine area remains free from horse impacts and to minimise the likelihood of horses causing a traffic hazard on the Alpine Way. Over the next two years, horse riders under a contract arrangement will trial roping (also known as brumby running), trapping and mustering (as a to remove horses from both the alpine and nearby sub-alpine areas of southern Kosciuszko. These methods will be evaluated for their effectiveness in humanely removing horses from the alpine area and reducing environmental impacts.

Management of Kosciuszko National Park has many aspects that are contentious and about which there are a very wide range of views. It is a park which has a very wide range of stakeholders who may have equal amount of passion for the park, but often have very different points of view. Involving the community in finding solutions to management challenges such as controlling horse impacts provides both challenges and opportunities.

Horse management in Kosciuszko will go on into the future. What has been learnt from the process to date is that staff must be committed to the process of community involvement and this commitment must be ongoing because once the commitment to engage the community is made, it must be continued. While it is a process that is labour-intensive, involving the community does have many benefits. Being open about the process and inviting people to have their say often results in a greater understanding of the issue among the community. It also results in greater ownership of the issue among the key stakeholders. For example, members of the Wild Horse Management Steering Committee have become advocates for the process. Finally and most importantly, it provides the opportunity to build long term positive relationships with particular stakeholders and sections of the community. This support is vital in managing contentious issues.
Community And Cultural Values: The Upper Mersey Valley And The Tasmanian Wilderness World Heritage Area

Jim Russell and Chris Johnston

Abstract

The upper Mersey valley, largely within the Tasmanian Wilderness World Heritage Area (WHA), represents deep affection, sense of place, and a sense of history for local communities. With World Heritage declaration, these people were “locked out” and left out of decision-making. This paper covers two approaches to these problems: an upper Mersey cultural values study, and recent Tasmanian Parks and Wildlife Service responses that changed WHA planning prescriptions and the culture of management. The upper Mersey study incorporated important variations from Australian Heritage Commission methods for social and aesthetic values assessment. The differences are explained in terms of doing full justice to local values and place perceptions (and historical values). Secondly, the paper analyses the WHA’s two management plans (1992, 1999), and finds a major turnaround in accepting cultural values. Tasmania’s parks are beginning to recognise an expanded mandate, shifting the focus from the exclusively natural. Important questions remain about how cultural values will be understood, valued, and integrated into management of large-scale natural areas.

The Upper Mersey

In the past, mountains were a place apart, valued for their special resources but away from dwelling places. This place, the upper Mersey Valley, is one such example where people’s experiences, work and endeavour in the mountains created special and ongoing attachments. It is also a place where new reserve boundaries and the WHA have affected nearby communities.

Through the initiative of Jim Russell and Simon Cubit, a project was developed to explore the cultural associations of the upper Mersey Valley. This valley is located high within and adjoining Tasmania’s Central Plateau. The project received funding from the National Estate Grants Program. Its primary purpose was to assess the cultural values of the upper Mersey using methods derived from those used throughout Australia in the Australian Heritage Commission’s regional assessment of forested areas (e.g. Australian Heritage Commission and Department of Conservation and Natural Resources, Victoria, 1994), but with the aim of closely involving the community in understanding values and assessing significance.

The methods used in the regional assessments involved community heritage workshops to provide information on social significance, and a combination of these workshops, forest critics workshops and analysis of art and tourism images, for aesthetic significance (e.g. Tasmanian Public Land Use Commission, 1997). Prior to starting the project, the place was well known to one of the team, Simon Cubit, who had long family associations with the region and had recently spent time investigating the history and places that provided evidence of that history.

The upper Mersey Valley has been used for thousands of years. Aboriginal Tasmanians made seasonal forays at least 10,000 years ago and more regularly around 3,000 years ago as the climate became warmer. Vegetation patterns, especially open grassy clearings surrounded by forest, are likely to be remnants of Aboriginal burning that were copied by the wave of settlers from the 1820s.
These settlers used the open grasslands for grazing with different families taking up areas within the upper Mersey. As the land to the north around Mole Creek and Liena was set aside for freehold farming, those settlers started to use the upper Mersey Valley and other parts of the Central Plateau. From the 1880s hunting for the export fur trade assumed great importance with people snaring wallaby and possum in the Valley throughout winter. An evocative Tasmanian film, The Tale of Ruby Rose (1989), presents some of the hardships faced by snarers and their partners during snowbound winters.

After the Second World War, development of hydro-electric dams and forestry again changed this landscape. Roads encouraged others to visit to enjoy its remarkable beauty, to walk and to fish the many lakes of the Plateau. Recognition of its environmental significance resulted in National Parks and WHA (1988-89) designations.

Understanding Cultural Values

The project aimed to understand the cultural values of the communities with close associations with the upper Mersey Valley, that is, those who lived locally and those who had visited over many years. Of the cultural values recognised by the Australian Heritage Commission (Register of the National Estate Criteria), two are based on expressed community values - aesthetic value (criterion E), ‘importance in exhibiting particular aesthetic characteristics valued by a community or cultural group’ and social value (criterion G), ‘strong or special associations with a particular community or cultural group for social, cultural or spiritual reasons’. Both require an understanding of the values held by the particular community for whom the place is being assessed. That is, we were not looking at generic values or values held across the Australian community. Rather our task was to distinguish the values of these specific communities, and to use these as our assessment criteria. In doing this we felt that we were breaking new ground.

Our approach was to hold informal gatherings with people who shared an interest in common. That meant identifying “communities of interest” and, with the help of key people in each “community”, gathering a group together to discuss their values, make a preliminary list of places and document their significance.

The areas of community interest identified were: hunting, fishing, cattle grazing, bushwalking, horse riding, forestry/sawmilling and huts. Recognising that these interests largely reflected adult male pursuits, we also held groups for women who regularly visited and used the upper Mersey Valley, women who knew about the upper Mersey but were not regular users or visitors, and school children at Mole Creek Primary Schools (Grade 6). We also met with public land managers whose work took them into the upper Mersey. We expected that by working with each group separately, the different and distinct layers of meaning and value would be more clearly revealed.

Following these meetings, we distilled these values into a set of criteria and checked them back with the communities involved. As well, we were able to present all of the material from the small discussion groups to the whole community as part of an exhibition in the Mole Creek Memorial Hall in June 1997 and this proved a great talking point.

The “communities of interest” were self defined with participants identified by a key person within that “community”. Each group met at a place of their choosing, often at the Mole Creek Memorial Hall. Much of the group’s discussion revolved around defining the place itself and mapping its boundaries for each person. Often time was spent reflecting on the place, describing it to us and creating powerful visual images through the telling of stories - often we felt as though we had magically moved to the Valley and were no longer sitting in the hall. Large maps of the Valley were marked to show the boundary of the place, the areas that people had used or continued to use, travel routes and other known features. A second map recorded all the places of importance. Collective discussion revealed which places were of the greatest importance to the identity of this “community of interest”. Perceived threats were also noted.

One of the most important results of the work was in understanding what the terms social significance and aesthetic significance might mean within these “communities of interest”.

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Celebrating Mountains – An International Year of Mountains Conference
Jindabyne, New South Wales, Australia
For social significance, the following specific values were identified.

**A different way of life:** A special place, beyond civilisation and not like “home”, and yet a place that welcomes you back. It’s a different way of life. A challenging environment; familiar but never safe.

**Symbols:** Places that symbolise what this community stands for and cares about.

**Bringing history alive:** Places that bring history alive because of what we know about the past and because of our own experiences there. Some places recall generations of people who’ve lived and worked there.

**Stories and legends:** Place names and the places themselves help recall stories and legends about individuals and families, past events, tragedies and exploits. These stories are written in the landscape for those who know where to look.

**Landmarks and stopping places:** These mark the journey into the Mersey Valley. They are at the heart of knowing where you are – and even who you are. It’s almost a spiritual journey.

**Lookout points:** Places where you can see beyond – to see the vastness of the landscape and to see what is happening elsewhere.

**Familiar and favourite places:** Places that are or have been part of our lives over many years; the places you come back to time and time again.

**Personal places:** Places special to me that perhaps no one else knows about.

And for aesthetic values:

**Landmarks of beauty and grandeur:** Features that are beautiful or imposing, and generally well known locally.

**Lookouts and views:** Places where people respond strongly to beauty or rugged grandeur. Views can be beautiful, breathtaking.

**Natural features in a landscape:** Individual places or elements in the valley or on the plateau that are particularly beautiful.

**Wild landscapes, with their plants and animals:** A landscape that strikes you as beautiful, impressive, or powerful. Some may be particularly evocative of the upper Mersey as a whole – a place of extraordinary beauty and wild but, at times, forbidding grandeur. Some people are particularly struck by places where they may encounter wild animals.

**Huts:** Some are especially evocative of emotional responses to what a hut provides – warmth, shelter, and a welcoming atmosphere.

**Special, unusual features:** Some built structures in the landscape are widely known in the community and remarked on because they include unusual, striking features.

**Discovery:** Features and landscapes of the upper Mersey are so many, varied, and changeable in mood that there is always more to be discovered.

The results were integrated with historical values and a series of places identified and proposed for the Register of the National Estate (Russell et al., 1998). The process of understanding the values of each “community of interest” and their places provided a new approach and deepened our understanding of the significance of the places within these specific communities and also across the broader local community. Extending the process to include those who were not regular users of the upper Mersey Valley, but who “knew” the valley through local culture and stories revealed to us how such knowledge and deep attachment to places is passed on through a community. A parallel project by Dr Joan Knowles focussed
Managing For Cultural Values

The history of the WHA is tied in its origins to the dams debates – the Lake Pedder and the Franklin campaigns to save the landscapes of South West and Western Tasmania – with one outcome being that the wilderness catch-cry had swamped the claims of certain local communities like those in the Mole Creek area. The resulting “lock out”, expressed in the first WHA management plan (Parks and Wildlife Service 1992), meant that many “traditional practices” were stopped or severely regulated. The targets turned out to be some of the strong expressions of attachment to places that the anthropologist Joan Knowles was to identify later in her parallel project. The WHA plan’s actions included closing several bush camps, forced cessation of seasonal grazing and burning, restrictions on horseriding, hunting, and fishing, and general discouragement of a community sense of ownership of huts, stockyards and tracks.

The sense of loss was often clearly expressed by Mole Creek and other participants in the upper Mersey study, too. Women, for example, were strong in their belief that the community ties to the mountains and valleys, involving passing practice and knowledge on to the next generation, would wither in the face of the WHA prescriptions (Russell et al., 1998).

The years following the 1992 WHA plan saw intensive lobbying on behalf of the locals, lobbying which led to the Knowles project and, perhaps indirectly, to the upper Mersey study. In the meantime, wide-ranging discussions had been taking place both in Australia and overseas during the 1990s on the relationships between wilderness and cultural landscapes, and on cultural values in natural areas in general (e.g. Jane Lennon and Associates, 1999). The ascendancy and exclusivity of wilderness was under challenge from a number of authors (see account in Russell and Jambrecina, 2002). One expression of a groundswell in this change in thinking was a Policy Statement from the Australian Conservation Foundation (1999), ‘Wilderness and Indigenous Cultural Landscapes in Australia’, which formally recognised the prior occupancy by Aborigines of the nation’s lands now believed to be “natural” or “wilderness”, and pledged working towards maintenance of the connections between Aboriginal communities and land. The pressure from communities in Tasmania, the local findings by Joan Knowles, and the broader intellectual climate were all conducive to taking stock of past management in the light of experience and fresh insights: both a 1997 draft and the finally adopted 1999 WHA management plan incorporated a new approach to accommodating concerns from a diversity of communities (Parks and Wildlife Service, 1997; 1999).

Some restrictions were eased, including a provision for companion dogs in parts of the WHA under controlled conditions, and the Community Huts Partnership was established. These were moves to bring members of some communities back into the WHA. In the upper Mersey study, participants in the bushwalking “community of interest” discussions were strong in their protests about WHA regulations, mentioning in particular the role of the companion dog alongside the lone walker who might spend several days or more at a time on the Central Plateau.

The Parks and Wildlife Service measures in the 1999 plan involved a new recognition in Tasmania – that cultural values were to be understood not only in terms of fabric associated with historic events, but with practices expressive of attachments to places that communities were committed to maintaining (Russell and Jambrecina, 2002). Models for community involvement in parks exist in many places and have preceded Tasmania’s awakening to the possibilities of community stewardship of reserves, but not always in what have been regarded as natural areas. For instance, Parks Canada, owner of the historic 202km Rideau Canal between Ottawa and Kingston, found that in order to successfully manage the waterway,
cooperation would have to be sought from the many people living in a 4700km catchment, including the two cities, many regional centres, and rural areas (Russell and Jambrecina, 2002).

Such models suggest a departure from the strictly natural designation for some parks and reserves, or parts of them, in favour of the IUCN category of Protected Landscape/Seascape, involving safeguarding people-land interactions (IUCN Guidelines for Protected Area Management, cited in Phillips, 1998).

**Conclusion**

In effect, Tasmania is exploring a new model of protected area management, one that is finding its first expression in the mountains and valleys of the WHA. The upper Mersey study, as well as the earlier findings of Joan Knowles (reported in 1997 whilst the former study was a work in progress) laid the local intellectual basis that demonstrated community attachments. The upper Mersey project tried some new ways of assessing cultural values, and collectively the studies were successful in uncovering multiple values of place. For its part, the Parks and Wildlife Service has responded to community disaffection, but the efficacy of the new plan depends on what is done to implement it. The WHA Planner stated in mid-2002 that the Parks Service had moved forward in a number of areas (such as Aboriginal interpretation, Aboriginal involvement in fire management/research, the Community Huts Partnership, and Wildcare) but still had a way to go in others. Some communities remained disaffected about certain issues which raised questions of how far the Service was willing to pursue matters seen as detrimental either to WHA values or other reserve users. Community interest mapping and interpretation of past practices in the Central Plateau Conservation Area segment of the WHA were items awaiting attention; a start had been made on the former but had since lapsed (O’Loughlin, T., pers. comm., Nov. 2002).

These initiatives point to fresh possibilities for management, perhaps heralding a new era of non-Indigenous community involvement in natural areas like the WHA (as well as Indigenous participation, with a much longer history outside Tasmania). Tasmania’s Parks and Wildlife Service will need encouragement to pursue this new agenda, and perhaps heritage professionals are the ones to give it. The big questions are whether resources will be generated to further develop and undertake projects to understand community cultural values, how the heritage practitioners and the managers will respect the identified values, and how the managers will regard the role of communities in implementation and integrate people and their values into natural area policies and strategies.
References


Management Of Wild Dogs And Foxes: A Nil Tenure Approach To A Landscape Issue

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Abstract

Wild dogs and foxes are a major problem to sheep producers in Australia. Foxes also have a major impact on native fauna throughout the Australian landscape. Historically, wild dog and fox management in Australia has been fragmented, ad hoc and under-resourced. The traditional method of assessing control programs has depended on the number of baits taken and target animals killed rather than responses to control by those species impacted upon by wild dogs and foxes. Federal government agencies have recommended a more strategic approach to the management of these predators, but until now, such an approach has not been widely adopted.

A nil tenure approach allowing local communities, in collaboration with government land managers, to co-operatively address wild dog and fox management across all land tenures was proposed. The nil tenure approach involves the removal of property boundaries from maps and substituting them with criteria of landscape relevance such as vegetation type. By collectively identifying the scope of the issue, the control techniques available and the level of resources required, the nil tenure approach allows management strategies to be formulated at the landscape level.

In 2000, a working group comprising representatives of all land managers (of both private and public lands) was established to implement a co-operative program to manage wild dog and fox predation in and around the Brindabella and Wee Jasper Valleys in southern New South Wales. Using the nil tenure approach, this group formulated, implemented and reviewed a trial wild dog/fox management program over the 2001/02 financial year.

In the trial year, sheep predation was reduced by 68% on the previous 12 months and by 60% on average annual losses. Wildlife activity is also being monitored but it is too early to detect any changes in abundance. The success of the trial year and the continued cooperative support of private and public land managers has led to the approval of labour and financial resources for the Brindabella/Wee Jasper project from all cooperators until 2005.

The nil tenure approach highlights the benefit of focussing on the ‘common problem’. The implementation of this simple approach has swept aside over twenty years of negative relations between private and public land managers in the area.

The Brindabella and Wee Jasper valleys cooperative wild dog/fox control plan can be viewed at www.npws.nsw.gov.au
**Introduction**

The management of wild dogs (including dingoes, Canis lupus dingo, feral domestic dogs, C. I. familiaris, and their hybrids) in South East New South Wales (NSW) has traditionally been an extremely emotive and at times political issue. The relationships between managers of private and public lands over the last two decades has varied between cautious cooperation at best to the non productive depths of verbal abuse, suspicion and the associated frustration of ill coordinated and under-resourced control programs.

Red foxes (Vulpes vulpes) have been accepted as a threatening process for some native wildlife and a cause of lamb loss in merino sheep enterprises (Saunders et al. 1995). The control of foxes has been less contentious because private landholders have recognised common benefits from programs conducted by public land managers.

The impact upon domestic stock by wild dogs has long been accepted as a very real encroachment upon the earning capacity of rural grazing operations (Fleming et al. 2001). The traditional view held by the rural industry is that of government managed lands providing large areas of refuge for pest animals to breed and impact upon adjoining private lands (English and Chapple 2002). The traditional approach of public land managers has been to acknowledge the impact of wild dog attacks as sporadic financial losses of varying degree with little acknowledgement of the emotional distress endured by landholders or agency field staff. Divergences in these views have a significant impact upon the ability of land managers (of both private and public lands) to effectively and co-operatively manage this landscape issue. A strategic approach to the management of vertebrate pests has been proposed (Braysher 1993), and adapted for wild dogs (Fleming et al. 2001), to overcome some of the traditional differences of perception between private and public land managers. However, there had been little progress in the formation of co-operative groups to deal with predation by wild dogs and foxes.

This paper presents a case study that demonstrates the successful implementation of the strategic approach to managing wild dogs and red foxes by a community group. A number of fresh strategies were employed to enhance the acceptance of divergent views and to arrive at consensus. The paper also details the novel nil tenure approach, which is crucial to the success of the program presented in the case study.

**Methods**

**Consultation process**

A meeting of the New South Wales National Parks and Wildlife Service South West Slopes Regional Advisory Committee and local landholders at Wee Jasper Memorial Hall on the 9th November 2000 identified the need for a local solution to the problem of wild dog predation of livestock. Landholders identified a high level of support for a committee comprised of local land managers (of both public and private lands), the Yass Rural Lands Protection Board (RLPB) and its wild dog control specialist.

**Working group**

The Brindabella and Wee Jasper Valley Wild Dog/Fox Working Group was formed at a meeting on the 18th December 2000. Representatives on the working group included, four private landholders, field and administrative staff of Yass RLPB, representatives from State Forests NSW, a ranger from NPWS and a representative from the Australian Capital Territory and South eastern NSW Wild Dog management Project. These people brought a wide range of skills and experience to address the issue. Once formed, the working group set about identifying the scale of the issue. As individuals, these land managers possessed a high level of field knowledge in their individual areas of expertise. As a collective and unified working group this level of expertise and field knowledge was utilised to take ownership of the issue and identify a local solution.

**Identifying the real issue**

In order to identify the full impact of the wild dog issue, landholders were consulted and they quickly identified impacts that were not traditionally recorded. Landholders stated that whilst the economic impact of sheep lost to attacks by wild dogs was significant the emotional impact from wild dog attacks was not widely acknowledged. During meetings with members of the working group, and on an individual basis, landholders highlighted the level of emotional distress that can affect a family enduring...
Sheep killed
Sheep maimed

Major concerns consistently identified by landholders included:
- Ongoing emotional distress even though the financial impact may have ceased
- A feeling of helplessness in addressing or reducing the likelihood of wild dog attacks
- A feeling of a lack of control over the issue
- Constant drain emotionally and financially when undertaking controls measures in isolation
- Loss of productive country due to de-stocking wild dog prone areas
- Negative impact upon working relationships with adjoining public land managers

The impact upon domestic stock was more clearly identified through wild dog activity and stock attack reports collected by Yass RLPB (Figure 1).

Figure 1. The numbers of sheep killed and maimed by wild dogs in Yass RLPB district, 1996 – 2001 (Yass RLPB records)

The impact upon native wildlife was also identified as an important component in the assessment of all impacts of wild dogs and foxes in the Brindabella and Wee Jasper area. To obtain baseline information about those prey species that potentially were affected by wild dogs and foxes, scat samples from the area were analysed by independent experts.

Nil tenure issue mapping

Once the working group documented the full impact of wild dogs, the nil tenure mapping process was suggested and implemented. Ownership of the land was not identified on the assessment maps because the working group represented all land managers across the valleys and the problem affected them all. This nil tenure approach allowed the working group to focus upon the issue rather than land tenure. The basic identification of wild dog habitat as bushland, regardless of land tenure, and cleared lands as the impact zone for stock attacks provided a valuable common point of agreement with all land managers. The planning process could then proceed by focussing on the issue at a scale appropriate to the problem rather than at a scale constrained by property boundaries. Action to manage the problem could then be targeted where it would achieve the most effective control. Historic stock loss areas and access routes utilised by wild dogs to reach grazing areas where stock attacks were occurring were mapped after tenure was removed.
Control methods
Once the attack sites and access routes were identified, the working group then evaluated the available control options (Fleming et al. 2001) using a decision table (Table 1).

Table 1. A decision table used to assess control methods (after Fleming et al. 2001).

<table>
<thead>
<tr>
<th>Control Method</th>
<th>Activity Detail</th>
<th>Advantages</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trail baiting</td>
<td>Poison baits laid along trails (buried/unburied)</td>
<td>Cost effective cover large areas</td>
<td>Risk to non target species</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Target takes unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Risk to trappers dogs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Bait shy target species</td>
</tr>
<tr>
<td>Bait stations</td>
<td>Earth mound buried poison baits 15 cm depth</td>
<td>Opportunity to free bait</td>
<td>Labour intensive and time consuming to establish</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(significant expense)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Significant resources required to maintain</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Bait shy individuals of target species</td>
</tr>
<tr>
<td>Aerial baiting</td>
<td>Poison baits dropped from helicopter</td>
<td>Coverage of large area in short time Access to remote areas</td>
<td>Expensive (aircraft costs)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“one off” control</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>risk to non target species</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>risk to trappers dogs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>target takes not measurable</td>
</tr>
<tr>
<td>Trapping</td>
<td>Softjaw traps</td>
<td>Target specific Site specific Minimal risk to non target species</td>
<td>Expensive Specialist skills</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not suitable for large areas</td>
</tr>
<tr>
<td>Fencing</td>
<td>Barrier fencing</td>
<td>Exclude wild dog and fox impacts</td>
<td>Expense of erection and maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Can send problem next door</td>
</tr>
<tr>
<td>Shooting</td>
<td>Firearms used to shoot individual target species</td>
<td>Target specific</td>
<td>Not effective as primary control</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Very opportunistic</td>
</tr>
<tr>
<td>De-stocking</td>
<td>Removal of stock from attack areas</td>
<td>Less likelihood of attack</td>
<td>Lost production Limited areas to relocate stock</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Adjoining properties targeted</td>
</tr>
</tbody>
</table>

The working group recommended that bait stations and trapping be utilised for both strategic and reactive management. These control techniques are considered to be the best practice methods for the control of canids that can be utilised across all land tenures in the control area. Control activities were to be targeted at the identified historical wild dog routes and as such did not impact on the conservation of dingoes in areas further removed from the grazing land.

Nil tenure solution mapping
Field establishment of the bait stations and sign posting (1080 poison warning signs) of the areas was undertaken by the working group with assistance from additional NPWS, State Forests and RLPB staff. Bait stations consisted of sifted earth mounds with a star picket (metal fence post) and a numbered tag with an identification number for each bait station. Bait stations were free (unpoisoned) baited for a period of up to 4 weeks to allow non target species to be identified and to enable approvals, notifications and advertising of the program to be undertaken. The bait station locations were logged with a hand held Global Positioning System (GPS) and downloaded onto the NPWS mapping layer. This map identified all
bait station locations across the Brindabella and Wee Jasper valley. The solution/control layer (bait stations) was overlaid onto the issues layer (bushland/wild dog habitat/stock attack sites/wild dog access routes) to ensure adequate coverage of the problem areas identified by the working group.

**Tenure overlay (land manager cost identification)**
To identify and fairly apportion the costs for each land manager taking part in the program, the tenure layer was then overlaid on the solution/control layer (bait stations). The co-operative plan was then documented with a copy provided to Yass RLPB, State Forest of NSW and NPWS. The provision of a co-operative plan with 9 months of trial results allowed the working group to promote the long-term benefits of funding the co-operative plan for a 3-year period. Within the plan, provision was made for reactive control in the event of predation incidents and agreement was reached on the funding such reactive control.

**Monitoring**
Traditional monitoring techniques related to the number of stock killed/maimed and the number of baits taken or wild dogs trapped was maintained to allow valuable comparisons with historical records. To ensure adequate assessment of the success of the program a passive wildlife monitoring system was established in consultation with CSIRO Division of Sustainable Ecosystems. The protocol for monitoring was as follows:

- Two 25 kilometre transects along rarely used vehicular tracks with 1m-wide raked sand plots (Catling et al. 1997) placed every 1km (Engeman and Allen 2000) to monitor presence/absence/response of large mobile species.
- Within the 25km transects were nested two 5km transects with sand plots placed every 200m to record presence/absence/response of smaller animals.
- Two additional transects were placed outside the wild dog/fox control area to act as a nil treatment.
- Transects are checked daily for 3 days during each monitoring period and footprints of target and non target species on sand plots are recorded.
- The presence of each species is then identified as a % of soil plot nights with tracks and abundance ratings are then identified using % abundance comparisons table (Catling and Burt 1994).
- Transects are checked at least twice per year in Autumn and Spring (March/April and Sept/Oct).

**Results**
The main result of this program has been the co-operation between previously uncooperative groups. The planning process and the use of the nil tenure approach has led to acceptance of the common plan and better relationships and mutual trust between private and public land managers. While this is difficult to objectively measure, the fact that all members have signed their agreement to the plan supports this change.

Stock losses for the valleys for 2001/02 was reduced by 68% when compared to stock losses for the previous financial year (Figure 2). The increase in resources for the corresponding period is clear and there appeared to be a relationship between increased resources and a decrease in stock losses (Figure 2). Conversely, a reduction in resources (as in 1998/99) was closely followed by a substantial increase in stock losses. As a consequence of this observation, a stable level of resources will be provided for the next three years.
Review of the data collected on wild dogs controlled and stock losses has clearly identified Autumn as a period where wild dog activity and associated attacks are at their peak (Figure 3).

Figure 2. Stock losses and resource commitment comparison (Yass RLPB 2002)

Figure 3. Stock losses and wild dogs controlled per quarter 2001/2002 (Yass RLPB 2002)
Wildlife activity is also being monitored but it is too early to detect any changes in abundance but the species represented in the diets of wild dogs and foxes in the area are shown in table 2.

Table 2. Results of scat collections for Brindabella and northern Kosciuszko National Parks (Triggs and Story 1998 – 2001) and Tinderry Nature Reserve (Triggs and Story 1997 – 2001)

<table>
<thead>
<tr>
<th>Species</th>
<th>Brindabella and northern Kosciuszko National Park</th>
<th>Tinderry Nature Reserve</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wild dog Fox</td>
<td>Wild dog Fox</td>
</tr>
<tr>
<td>Swamp wallaby</td>
<td>32 (47%) 5 (18%)</td>
<td>48 (30%) 39 (19%)</td>
</tr>
<tr>
<td>Kangaroo</td>
<td></td>
<td>10 (6%) 7 (3%)</td>
</tr>
<tr>
<td>Red neck wallaby</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Brush tail possum</td>
<td>9 (13%) 4 (14%)</td>
<td>10 (6%) 30 (14%)</td>
</tr>
<tr>
<td>Ring tail possum</td>
<td>2 (7%) 9 (5%)</td>
<td>23 (11%)</td>
</tr>
<tr>
<td>Eastern pygmy possum</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Yellow bellied glider</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Greater glider</td>
<td>1 1</td>
<td></td>
</tr>
<tr>
<td>Sugar glider</td>
<td>1 4 (2%) 9 (4%)</td>
<td></td>
</tr>
<tr>
<td>Antechinus</td>
<td>2 2 (7%) 2</td>
<td></td>
</tr>
<tr>
<td>Bush rat</td>
<td>2 1</td>
<td></td>
</tr>
<tr>
<td>Broad tooth rat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Echidna</td>
<td>32 (47%) 18 (11%)</td>
<td>3</td>
</tr>
<tr>
<td>Insect</td>
<td>2 5 (3%) 18 (8%)</td>
<td></td>
</tr>
<tr>
<td>Vegetation</td>
<td>7 (10%) 6 (3%)</td>
<td></td>
</tr>
<tr>
<td>Wombat</td>
<td>4 (2%) 15 (7%)</td>
<td></td>
</tr>
<tr>
<td>Reptile</td>
<td>2 2</td>
<td></td>
</tr>
<tr>
<td>Bird</td>
<td>6 (9%) 10 (6%)</td>
<td></td>
</tr>
<tr>
<td>Fish</td>
<td>1 12 (5%)</td>
<td></td>
</tr>
<tr>
<td>*Rabbit</td>
<td>6 (9%) 6 (3%)</td>
<td></td>
</tr>
<tr>
<td>*Hare</td>
<td>4 (2%) 3</td>
<td></td>
</tr>
<tr>
<td>*Cat</td>
<td>1 2 (7%)</td>
<td></td>
</tr>
<tr>
<td>*Black rat</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>*Sheep</td>
<td>3 (4%) 5 (3%)</td>
<td></td>
</tr>
<tr>
<td>*Cow</td>
<td>1 5 (3%) 10 (5%)</td>
<td></td>
</tr>
<tr>
<td>*Pig</td>
<td>1 17 (11%) 13 (6%)</td>
<td></td>
</tr>
<tr>
<td>*Goat</td>
<td>5 (3%)</td>
<td></td>
</tr>
<tr>
<td>*Fox</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of scats analysed</td>
<td>68 27</td>
<td>159 208</td>
</tr>
</tbody>
</table>

Species listed under Threatened Species Conservation Act 1995
* Introduced species

While individuals of these native and introduced species are being taken by wild dogs/foxes, the impact upon local populations is unknown. There are also more complex issues related to the interactions between the introduced predators and dingo and quoll populations.
The implementation of the wild dog program for Brindabella and Wee Jasper has allowed the comparison of species controlled and species attacked, injured or missing (Figure 4).

Monitoring the abundance of a number of species has identified that wild dog abundance in the Brindabella and Wee Jasper areas is at a much lower rating when compared to an area where little or no wild dog control is undertaken (Tantangara). Prey response to this reduction in wild dog abundance will be assessed following further surveys (Figure 5).

Figure 4. Pest animals controlled / stock losses Brindabella and Wee Jasper Valleys 2001 – 2002

Figure 6. CSIRO sand plot monitoring Autumn survey 2002. (% of plot nights with tracks)
Discussion

The implementation of the Brindabella and Wee Jasper wild dog/fox control plan has clearly identified the value of a nil tenure working group approach when addressing landscape issues such as wild dog management. A 68% reduction in stock losses, in the initial year, along with a notable improvement in working relations between public and private land managers has ensured the commitment of resources for the following 3 years. The implementation of a robust monitoring system which not only monitors stock losses but also the response of native animals and other pest species to wild dog and fox control over time will enable the program to be continually evaluated by the working group.

The nil tenure approach highlights the benefits of focussing on the 'common problem’ rather than criticising the efforts of adjoining land managers. The establishment of the working group and the ability of this group under the nil tenure model to effectively address the wild dog issue has swept aside over 20 years of negative relationships between private and public land managers in the area. More importantly, it has had a positive impact on the emotional well-being of farmers in the area who now feel that something positive is being done to address the constant financial and emotional impact of wild dogs. Through this truly consultative process local land managers have not only taken “ownership” of the issue but have identified and pursued the resources required to successfully implement a local solution.

The success of the trial nil tenure approach and the continued cooperative support of private and public land managers has led to the approval of labour and financial resources for the Brindabella/Wee Jasper project until 2005. The Rural Lands Protection Board system in NSW has adopted the nil tenure approach for the management of all pest species across NSW.

The simplicity of the nil tenure approach and the implications for effective cooperative landscape planning has also been recognised by Federal and State politicians who have expressed interest in pushing the limits of the nil tenure approach to include land degradation and weed management issues.

Reasons for success

The key processes and agreements that have resulted in the success to date of the Brindabella/ Wee Jasper Valleys Co-operative Wild Dog/ Fox Control Plan have been:

- Community consultation and agreement on common goals between managers of private and public land
- The use of the *nil-tenure* approach to focus on the impacts of wild dogs and foxes and remove blame for the presence of these pests.
- The use of the *nil-tenure* approach to apply control where it is most likely to be successful.
- The use of the *nil-tenure* approach to allocate limited resources to best deal with the problem.
- The instigation and publication of the process to reactively deal with predation incidents so that private landholders can be confident that their predation problem will be dealt with rapidly.
- Guarantees of long-term funding by government agencies.

Acknowledgements

To the landholders of Brindabella and Wee Jasper whose commitment to finding a cooperative solution to the valleys wild dog issue is matched only by their positive and patient attitude to the successful implementation of the plan.

To the members of the Brindabella and Wee Jasper Valleys Wild Dog/Fox Working Group whose efforts ensured the objectives of the plan made it from the Wee Jasper Hall to the bushland interface where the work was needed.

To Bob Wilson who turned our ideas into maps.

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References


Day Three – Kosciuszko Plan Special Session
Introduction

The Independent Scientific Committee (ISC) was formed as a contribution to the 2002 review of the Kosciuszko National Park Plan of Management. The ISC was asked by NSW National Parks and Wildlife Service (NPWS) to report on the park’s values, their significance and condition, the way in which they should be monitored, the pressures on the values, and knowledge gaps.

The Committees interim report states why the Park is important. The values assessed were natural and cultural heritage, and the social, recreational, tourism and economic values. The natural ecosystems and landscapes are fundamental to the Park’s values and importantly they provide the setting and the context for the cultural heritage values. The natural and cultural values are the core values on which the social, recreational, tourism and economic attributes depend.

The interim report includes chapters on the individual values and an integrated statement of its significance. Attachment One provides detail on ISC members. The Interim report does not attempt to include all of the vast data set on the Park. Much of this detailed information is contained in other documents.

Many of the values identified by the ISC are of international or national significance. The Park has been recognised at international level by listing as a UNESCO Biosphere Reserve, and by the World Conservation Monitoring Centre as one of the 167 world centres of biodiversity. Blue Lake is a wetland of international importance under the Ramsar Convention.

The ISC found that very few large natural protected areas such as Kosciuszko National Park remain in temperate Australia, where the natural dynamics of ecological processes can still occur without significant human intervention. Kosciuszko National Park forms the central segment of the Australian bioregion that supports all the alpine ecosystems and endemic species found on the Australian mainland. The Park forms about half of the area of the Australian Alpine National Parks system and its national significance is enhanced by its connection with other large natural areas in Victoria and the ACT.

The Park provides ecosystem services that are nationally-valuable: the Park’s soils and catchment provide clean water to southeastern Australia, and its large tracts of forest contribute to reduced risk of climate change by sequestering carbon.

As the ISC undertook its review, a parallel process was underway involving Aboriginal people with connections to the park, to identify the Aboriginal values of the Park and how they could be managed. Therefore, the ISC has not addressed these values in detail.

In reporting to the International Year of the Mountains Conference in Jindabyne in November, the ISC did not provide detailed findings. As a result of further work since the conference these findings are summarised below.
Internationally significant values of the park

The park has numerous values of international significance, most related to its natural heritage. They include:

- the suite of karst areas, particularly Cooleman and Yarrangobilly Karst
- soils that are of outstanding scientific value as examples of some of the great soil groups, both individually (the alpine humus soils) and in association with each other; fossil soils and remnants of fossil soils of high scientific value and practical importance
- alpine areas that are of international significance as a prime example in the world of mid-latitude alps (eg the vegetation contains at least 21 endemic species and 33 that are rare in a total of some 204 species of flowering plants)
- subalpine ecosystems that provide habitat for a number of rare animal species (eg. mountain pygmy-possum in podocarpus heath and corroboree frog in sphagnum bogs)
- probably the most outstanding development of subalpine treeless flats and valleys in the world (internationally significant ecophysiological work has been undertaken on the tree lines)
- populations of thirteen vertebrate taxa that are listed as threatened or near threatened by the World Conservation Union (IUCN), including the endangered mountain pygmy-possum, which has the longest life span of all known small terrestrial mammals
- natural fire regimes, which are partly a function of climate, that have created subalpine, montane and lowland landscapes of international significance covered with a catena of eucalypts
- a cultural heritage theme of science and conservation, with numerous places of outstanding international research value.

Significance related to individual values and themes of the park

Geological
The park’s geological significance includes features such as the Ordovician to Lower Devonian rocks that form part of the Lachlan Fold Belt; the dissection resulting from the Tertiary uplift, which has produced spectacular scenery (notably the mile-high drop from the summits of the Main Range to the Geehi Valley); evidence of the great climatic changes in the Pleistocene that produced glacial features (eg cirques, terminal and lateral moraines, lakes, erratics and ice-scratched surfaces and periglacial features) and extensive periglacial evidence; and Holocene features of the park (sediments and peats) that have given valuable information on vegetation changes associated with post-glacial warming.

Soils
The park’s significance for soils relates to the great soil groups represented, particularly alpine humus soils, and the ecological services provided by the soils.

Karst
The park’s significance for karst relates to values ranging from hydrological and geomorphological, to habitat for endangered species, and to cultural heritage of the past use of these sites.

Aquatic ecosystems
The park’s significance for aquatic ecosystems includes four small natural lakes (Albina, Blue, Club and Cootapatamba) that are the only lakes on the Australian mainland that were formed by glacial action. These are also the highest lakes (1890–2070 m) in Australia. There are significant lakes and subterranean water bodies associated with karst. Large rivers above altitudes of 900 m are considered an endangered habitat in the Snowy Mountains region. Undiverted, ‘wild’ river sections upstream of dams are the Upper Murray River to Murray Gates, Thredbo River down to the village, Goodradigbee River to Brindabella Station and Yarrangobilly River.

Flora
The park’s significance for flora includes the vegetation of the alpine and subalpine zones and the Lower Snowy River area, and the adaptation and dominance of a single Genus (Eucalyptus) over the entire elevational range from the coast to the subalpine tree line; this is the only occurrence of this in the world.
The alpine flora is of world interest as it is a mix of species of autothonous (local) species and species of peregrine origins (from other continents). The significance lies in the many commonalities of the floristic groups and the affinities and differences between genera and species, compared with other Australasian alpine areas.

Fauna
The parks significance for fauna includes the extent of its biologically diversity. Terrestrial habitats and fauna of the alpine and subalpine zone (15% of area) support populations of 100 native species including endemic or alpine specialists: one mammal, four frogs, four reptiles and a range of invertebrates (eg 10 species of Orthoptera and 10 species of Megascolecid earthworms). The park provides the opportunity to study global declines in amphibians, particularly at high altitude, and restoration of the predator hierarchy in large conservation reserves. The fauna of the alpine environment, and the alpine environment itself, is generally acknowledged as among the most vulnerable in Australia under future climate change caused by the enhanced greenhouse effect.

Landscapes and wilderness
The landscapes of the park underpin values related to wilderness, ecosystem processes at landscape scale, and cultural heritage. There are six wilderness areas recognised under the NSW wilderness legislation, which constitute 346,145 ha, or 50.14% of the park. These wilderness areas are significant at national and international levels as part of the Australian Alps wilderness.

Ecosystem processes
Ecosystem processes that are significant at the landscape scale include the natural fire regime on which many plant communities and species depend; the hydrological regime that is related to macroclimate and microclimate variations; soil formation; and the extreme seasonal variations including processes of snow fall, accumulation and melt, which are particularly critical in maintaining many of the most significant biological and aesthetic values of the park. The park contains the largest contiguous area of snow country in Australia, making it of national significance for this phenomenon.

Aesthetic
Aesthetic values are found in the natural scenery of Kosciuszko National Park; both its wildflower displays and its snow-garnished slopes and forests, exhibit aesthetic characteristics highly valued by a large proportion of the population. There is much steep country, sometimes juxtaposed to water, within the Kosciuszko National Park, but the natural aesthetic qualities that make it an exceptionally beautiful place for many people lie in the pastel pastiche of eucalypts, cypress pines, scleromorphic shrubs and tussock grasses that clothe gently undulating hills and flat-floored valleys, and the mosaic brightness of flowering daisies on the rounded slopes within the alpine plateau.

Cultural heritage
The cultural heritage of the park is found in many themes.

Aboriginal use
There is new archaeological evidence for Aboriginal use of the alpine country, which, as well as being significant to Aboriginal people, provides important information for non-Aboriginal Australians interested in the story of human adaptation to this ancient landscape. Further work on significance to Aboriginal people is being done, but was not available at the time of this draft. There is evidence of a long history of Aboriginal occupation in the alpine areas of Australia, demonstrating successful adaptation to environments unique to Australia and having potential to provide important new information about the length and nature of Aboriginal occupation.

Pastoral
The pastoral theme, as it is expressed in the alps in general and Kosciuszko National Park in particular, represents montane pastoralism, a unique high country way of life representing a period of economic and social development which is of historic significance at a national level. Currango, built in 1850 and spanning 150 years of European occupation, is of national historic importance, being the largest and most intact example of pastoral settlement above the snowline. The whole Kosciuszko landscape has been affected by the pastoral phase and there is significant evidence of the pastoral era on the landscape. Much
of this evidence constitutes damage to the pre-European environment left by the Aborigines, but it also has significant historic value. The pastoral theme as expressed in Kosciuszko is also of national aesthetic significance, preserving evidence of vernacular architecture and design. The various bush skills, and traditional crafts and construction methods, which are a response to the unique environment, are important for the continuation of traditional skills and for research into them.

**Kosciuszko Huts**
The Kosciuszko Huts in their landscape setting, including the group of pastoral huts, probably comprise the biggest group of different types of huts, designed for the widest range of purposes that exist in a comparative area anywhere in Australia. The complex of huts, ruins and huts sites have national historic and social significance.

**Mining**
The mining theme of the park relates to the adaptations that were required in Australian mining practise (its living and working conditions) to cope with life in a remote and rugged Australian environment. These adaptations include the Kiandra landscape, a gold rush site of national historic importance; there are additional outstanding sites at Grey Mare and Tin Mine.

**Water harvesting**
The water harvesting theme is illustrated at the Kiandra goldfield, and is also related to the Snowy Mountains Hydro Electric Scheme, a large part of which is within Kosciuszko National Park. The Snowy scheme is the largest engineering scheme ever undertaken in Australia, with national significance as an engineering feat, a symbol of Australian achievement and a basis for Australia's multicultural society.

**Conservation**
The conservation theme relates to the effort that created Kosciuszko National Park, which was of historic importance in the development of the conservation movement at a national level. Its subsequent development as a major national park has had an important national influence on the development of park management policies and procedures in Australia.

**Recreation**
The recreation theme of cultural heritage has a number of aspects of significance, including the Yarrangobilly Caves complex and Caves House and associated developments, which have historic and aesthetic significance as a component of the complex of cave sites developed for tourism as part of an important national social movement. The Kiandra area has significance as the place where downhill skiing was first practised as a recreation in Australia. The ski fields and ski resorts have elements of significance for historic, aesthetic and social reasons, for the important social movement they reflect, and because of elements of the architecture and layout.

**Tourism and recreation**
The tourism and recreational value of Kosciuszko National Park has been assessed as significant at a national level because of the natural scenic qualities of the park. These include its mountainous landscapes, its size and the presence of snow, and the exceptional variation in diversity of natural settings for recreational opportunities, including education opportunities. The park is especially valuable for its large areas of natural lands, which offer opportunities for solitude and self-reliant recreation.

Kosciuszko National Park and the Victorian Alps are the only two mountain snowfields tourism destinations in mainland Australia. The domestic tourism significance of the park lies not in the total number of visitors who are attracted to it, but in the uniqueness of the tourism experience. It is one of the few areas of Australia where people are able to experience the unique climate, scenery, history and danger of an alpine destination.
Uses and service functions

Significant use values of the park include water supply for irrigation and agriculture, and power generation.

The soils and catchments of Kosciuszko National Park provide vital ‘service functions’ including water yield and protection of the park’s catchments; they supply clean water for domestic use, industrial uses, irrigation, hydro-electric power and a wide range of recreational activities.

The contribution of the waters from the Snowy River to the value of irrigated agriculture in the Murray-Darling Basin is significant. Through Snowy Hydro Ltd, the Snowy River contributes at least 7% ($245 million) to the annual value of irrigated production in the Murray-Darling Basin. The Murray-Darling Basin comprises about 70% of the nation’s irrigated land and the value of production from the Basin represents approximately 40% of the national total.

Power generation is a use of the park’s resources. The Snowy Mountains Hydro Electric Scheme has a generation capacity of 3756 megawatts, and can provide up to 11% of the total power requirements of the mainland of eastern Australia. It is an important peak load and emergency supplier because of the speed with which it can respond to sudden power demands. From a national perspective it is important as a power generator using a renewable resource.

The recreation use values are significant to the region’s economy; it has been estimated that the value of recreation in the NSW part of the Australian Alps is in the order of $5 billion per year.

Pressures

The ISC makes the following findings in respect of pressures on the park’s identified values.

General

- The park’s natural heritage values underpin the majority of its other values thus the pressures on its ecosystems and fundamental ecological processes such as increased development, fire management and introduced species have the greatest potential to affect the values of the park. The impacts increase in severity when these pressures are overlayed with increase in visitor use and intensification of regional development.

- While all parts of the park are affected by individual or cumulative pressures, the alpine and subalpine areas are the most vulnerable, and increased pressures from tourism and recreation activities and facilities are of particular concern.

- The pressures on the park’s values demand adequate capacity within the NPWS and the understanding and support of the community to effectively manage the full range of the park’s values.

Climate change

- The Kosciuszko National Park Plan of Management needs to recognise the implications of the climate change as a pressure on the park and incorporate a planned management response based on conservation of the park’s values.

Development

- Expansion of development within the park for increased access and tourism infrastructure, both for summer and winter facilities and services (motivated mainly by commercial reasons) will increase commercial pressure on the park’s values. Management of these pressures needs to give priority to conservation of the core values of the park, on which sustainable tourism and high quality visitor experience depends.

Visitor use

- Increasing visitor use has widespread implications for loss or degradation of the park’s values. In particular, the increase in visitors in the alpine and subalpine areas in summer is seen by the ISC as the highest priority pressure that needs to be addressed by park management.
Park management
- The park will need to institute a program of continuous development and retention of appropriate and adequate skills, knowledge, competencies and resources to manage the park’s values; otherwise the process of management will itself be a pressure on the park’s identified values.

Pressures on ecological processes
- Pressures caused by disturbance of catchments, the managed fire regime, and by introduced plant and animal species are causing substantial impacts on the park’s biodiversity and the natural ecological communities by disturbance of the ecological processes on which their conservation depends.
- There are major pressures on the ecological integrity of the park caused by catchment and hydrological pressures, invasive introduced species and inappropriate fire regimes that interrupt the natural ecological processes. Some of these pressures need the understanding of the community and there is need for a program that builds the community’s capacity through involvement and understanding of the issues.

Regional land use
- The regional setting of the park brings pressures as intensified land use and new developments (stimulated by the existence of the park itself) potentially isolate the park as a natural area, and create edge impacts on the boundary areas of the park. These pressures require an inclusive regional management approach by the park’s management rather than an introspective one.

Cumulative effects of pressures
- The cumulative effect of pressures on the park’s values needs to be considered in management; most values are experiencing more than one pressure.

Values as pressures
- Some pressures have been identified that might also be related to or part of other values of the park; these will need careful consideration and management.

Knowledge Gaps

The Kosciuszko National Park Plan of Management would benefit by inclusion of, or reference to, a protocol for knowledge management for the park that would:
- make existing knowledge available
- incorporate and disseminate new knowledge as it becomes available
- record advice on existing and new knowledge needs of the park.

The values of the park should be reviewed from time to time to incorporate new knowledge and understanding. This process should not be dependent on a review of the plan of management, but should be a periodic and systematic procedure.

The cooperative management and liaison arrangements established for the Australian Alps national parks should be encouraged and strengthened, as they offer opportunities to share knowledge about the alps.

Unfortunately, the inhouse resources devoted to research by the NPWS continue to decline; therefore, opportunities for collaborative research between the NPWS and other organisations should be pursued. The NPWS must maintain a high level of expertise in all of the park’s value areas, otherwise there will be loss of understanding of essential knowledge areas and diminished and inadequate ability to translate this knowledge into appropriate management responses (eg fire ecology and research over the past 15 years).

The knowledge gaps about the Kosciuszko National Park identified by the ISC should be addressed systematically in conjunction with the implementation of the plan of management.

Summary
There have been significant changes since the 1982 Plan of Management was developed. These include future climate change, the rate and spread of development within the Park, the availability of new technology, socio-economic changes, and much greater recognition of cultural values. The ISC found that, while many values were in good and stable condition, pressures that could lead to degradation of significant values if not adequately managed include the expansion of development, imposition of inappropriate fire regimes, increase in summer visitation, possible climate change and introduced plants and animals.

The ISC is aware that the Park holds much more information than is yet known. This is illustrated by continued recording of previously undocumented plants and animals, and new perspectives on cultural values. A process for continual updating of knowledge is needed to assist conservation management.

The Park’s importance is the sum of all of the values identified in the ISC report – plus others not explicitly discussed. All of these values are worthy of being conserved.

**ISC members**

The members of the ISC are:

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Towards one Australian Alps National Park

Anne Reeves

A paper presented by Anne Reeves on behalf of the National Parks Association of the ACT, the National Parks Association of NSW and the Victorian National Parks Association.

Introduction

I acknowledge and thank the traditional owners for welcoming us to their country for this conference.

We also express our appreciation of all those who care for our high country today – and this especially includes the national parks agencies in their various state manifestations, working often way beyond the call of duty, seeking to meet the requirements of those who belong to, love and use these lands. The agencies are sadly unresourced for the task and their efforts all too often go unsung if not denigrated.

I also want to thank the many contributors to this conference. We have all learnt from each other, and this paper I hope reflects some of our learning too.

This paper is presented on behalf of three organisations which, collectively, have a long and successful history in the promotion of biodiversity protection in south-eastern Australia. Together, the National Parks Association of the ACT, the National Parks Association of NSW and the Victorian National Parks Association have a membership of around 7000 people, and they speak for a much larger constituency. They are the peak non-government environment organisations for protected area management in their respective States or Territory.

Recapturing the Vision

It is time to recapture the vision. We need to look forward adventurously, capturing the spirit of past inspirational thinkers such as John Muir whose work contributed to the establishment of Yellowstone, the world's first national park; and of the contemporaries, people like Diane Strand of Crow First Nations people. We need to develop comprehensive forward-looking strategies for our own high country, combining the best of park management from each State and Territory.

The concept of National Park protection has been well established in Australia now for over a century. But somehow its objectives still get blurred from time to time, and in this day and age, when everyone has a say in conservation, it sometimes seems more blurred than ever. It doesn’t hurt to look again at some of our early heroes, people like Myles Dunphy in NSW, and Crosbie Morrison and Ros Garnet in Victoria. They, and many others, saw a clear need for national parks which would be actively managed in the interests of protecting our natural heritage. We are forever grateful for their pioneering work.
We need to recapture their vision, thinking big and bold. In doing this, we want to work cooperatively with the Aboriginal owners whose long pattern of occupation and use was – often brutally – disrupted as waves of pastoral, mining, agricultural and other exploitative activities moved in from elsewhere.

Our three organisations are developing proposals to protect for all time the inspirational country of our Great Dividing Range, a Brisbane to Melbourne sweep of national parks and connecting lands for the benefit of present and future generations. This overarching vision aims for continuity north to south with east to west cross-links – a summit to sea vision across the altitudinal range, and the remarkable, globally unique, diversity of a single genus, the Eucalyptus.

The mountains of south-eastern Australia within this great arc have been particularly close to the hearts of our three organisations, and we have fought many battles over the years, mostly successfully, to gain national park protection for the greater part of the region.

Unfortunately, as we know too well, national park protection does not always ensure adequate conservation protection. The newcomers who disrupted the pattern of Aboriginal occupation certainly worked hard to make a crust. But many of their activities, though broadly accepted in their day, are now recognised as incompatible with the long-term protection of the values we share and care about. They compromise the right of our children’s children to inherit the mountains in their natural magnificence.

We believe it is both essential, and possible, to significantly increase the effectiveness of conservation protection for the Australian Alps. This is not a criticism of the existing managers, most of whom are very dedicated and do great work. It is a statement that there are some entrenched activities and management practices that are not working, and existing administrative structures are not able to deal with them effectively.

We believe it is time to create a unified Australian Alps national park, linking existing contiguous national parks in the ACT, NSW and Victoria. And we believe this can be done in a way that builds on current arrangements, yet improves and extends the capacity for effective management.

**Management Issues**

Before outlining our proposed management structure, I should briefly mention a few of the management problems that will benefit, we dearly hope, from a single park approach.

**Stock grazing**

Summer grazing of sheep and cattle has taken place in the Australian Alps since the early 1800s, and the practice has written itself into Australia’s folklore. Like a lot of old habits, however, it has long proved unsustainable. While grazing has been removed from parts of the Victorian alps, and has been completely removed from the mountains of ACT and NSW, it remains oddly entrenched in many parts of Victoria’s Alpine National Park.

The above photograph, of the slopes of Mount Jim in Victoria, shows cattle tracks through heathland, and the almost total devastation of a snow patch community.
Grazing also lays waste to the once extensive sphagnum bogs of the high plains, damages waterways and introduces weeds.

**Feral horses**
Over the last ten years there has been a great increase in the number of feral horses throughout Kosciuszko National Park, and the other alpine parks. Currently they number many thousands, and are damaging waterways and causing soil erosion. Alpine soils are particularly fragile and easily disturbed by hard-hoofed animals, and injured ecosystems take many decades to regenerate in harsh alpine environments.

**Pest plants and animals**
The introduction of pest plants and animals is a rapidly growing problem worldwide. There are already a number of intractable problems in the Australian alps. High levels of co-operation, increased funding and co-ordinated research are needed now to successfully address this issue.

**Alpine resorts**
While winter resorts are generally outside national park boundaries in Victoria, in NSW they lie within Kosciuszko National Park. Strict constraints to development are essential for these high-impact resorts, wherever they occur in the alps, and operations must be reviewed for their sustainability.

Global warming is making the viability of resort facilities highly questionable.

**Managing visitors**
Recreational demand, both summer and winter, continues to rise. Visitor access requires careful management for minimal impact, and visitor expectations should be consistent across the park. Opportunities for four-wheel-driving and horse-riding, in particular, should be limited.

**Inherited infrastructure**
The Snowy Scheme has left a legacy of dams, aqueducts, roads and powerlines. Diverted waters have left many streams and rivers dry. As awareness grows, we must find ways to restore impacted ecosystems.

**Water**
Most of the major rivers of south-eastern Australia (the Snowy, the Murrumbidgee, the Murray, the Kiewa, the Mitchell) begin their journey within the current alpine parks. Indeed the alps provide an ecosystem service to the nation in this regard. There are clear benefits in reversing the degradation of many of the watercourses in the alps.

**Setting the Scene**
At Federation, the States retained responsibility for public land. So we have inherited a situation where, through an accident of history, management of the alpine bioregion of the south-eastern Australian mainland, and the associated bioregions of the eastern and western slopes, are severed by State and Territory borders. This has produced inconsistencies in conservation management reminiscent of transport’s inherited dilemma of one railway with two gauges. Our dilemma is much easier to fix, however …

Since 1986 there has been a Memorandum of Understanding, signed by the various governments responsible for managing the mainland Australian Alps National Parks. The principle of co-operative management has been growing since then. Indeed our three National Parks Associations want to pay tribute to the people who worked to set up this body, and who have worked hard to make it successful ever since.

The degree of co-operation already achieved by the respective governments is considerable. In the most recent (1998) Memorandum of Understanding they have agreed, for example:

“to ensure that management plans provide for complementary policies and management practices throughout the Australian Alps national parks.”
This is a very good aim but it has proved difficult to achieve, particularly in relation to some of the management issues mentioned above. They have also agreed to:

“pursue the growth and enhancement of intergovernmental co-operative management to protect the nationally important values of the Australian Alps.”

We believe our proposal here today is in line with that excellent objective. We believe it is time to take a small but bold step forward, and create a single great national park – which we call for the moment the Australian Alps National Park.

**An Australian Alps National Park**

The greater park is simply an amalgamation of existing contiguous alpine and sub-alpine national parks in the ACT, NSW and Victoria.

These parks (ACT’s Namadgi NP, NSW’s Kosciuszko and Brindabella NP and Victoria’s Alpine and Snowy River NP) are currently managed under the respective legislation of each State and Territory. A logical extension of the co-operation generated through the Memorandum of Understanding is the creation of a protected area with a unifying name (sections of the park can retain local names) and the creation of unifying and consistent management plans. Management of the tri-state park can remain the responsibility of the existing agencies in the ACT, NSW and Victoria, and remain, with some small changes, under their current legislation.

**Indigenous involvement in park management**

A critical and fundamental element of future success is acknowledgment of the traditional owners. The recent Boomalla Conference for Country (held in Canberra in March 2002) was seen by participants as a first step in coordinated Aboriginal response on natural resource management in NSW, setting an agenda.
for Aboriginal involvement in planning processes. Maintaining management under existing agencies, taking on board such initiatives, could also allow continuation of existing indigenous co-management arrangements where they already exist, notably in Namadgi National Park. We can learn from this. It also allows the continuing development of relationships with traditional owners in other parts of the alps. Given that there are a number of Indigenous communities involved, and that legislation requires such arrangements to be made at a State level, it would seem beneficial to maintain management with the States.

The Australian Alps Liaison Committee (AALC) has already been involved in programs promoting indigenous involvement in the region, and we look forward to the proposed new Memorandum of Understanding, which we understand advances this co-operation.

**Management Structure**

While management of the greater park should remain with existing agencies and legislation, there are a couple steps to take to allow appropriate and consistent management practices. We must strengthen the AALC, and we must constitute an effective independent advisory body.

**AALC evolution**

Firstly, the Australian Alps Liaison Committee, under an extended Memorandum of Understanding, has the capacity to evolve into a body capable of co-ordinating policy for the new park. It would oversee the development of consistent management plans. It would also develop strategies for, and co-ordinate the implementation of, major conservation programs and other cross-border projects. This body would be essentially an amalgamation of the policy arms of each State and Territory agency, with input from Federal environment and heritage agencies.

**Expert advisory body**

Some of the most interesting, and some of the most intractable, conservation issues in Australia involve alpine and sub-alpine landscapes. And management of these issues is compounded by the onset of global warming and by the many years it takes to repair damaged ecosystems at high altitudes. To ensure the park gets the best conservation management possible, and to ensure management prescriptions are not subjected to political whims, or changing levels of expertise or experience within management agencies, an alpine management advisory body must be established.

This would be a body of, say, five to six people with well-established reputations in protected area management and experience and expertise in management of ecological systems in alpine and sub-alpine regions of south-eastern Australia.

It is important that this body is able to offer free and independent advice. It should report to the environment ministers of the three States and Territories, and to the Federal environment minister, with its deliberations facilitated by a rotating secretariat. The reports made by this advisory body should also be available to the community, enabling peer review – a most important process in the development of truly effective ecosystem management practices.

Appointment of its members should be staggered, with long-term tenure (as with the ABC board), to encourage impartiality and expertise.

Another model is that of the Land Conservation Council, as set up in Victoria in 1970 to make informed recommendations to successive governments on the wise used of public land. Though this body and its successors have never had power to enforce their recommendations, governments have almost always enacted them. Indeed, the LCC model has very successfully put the formulation of proposals for management of public land at arms-length from the political process.

A statement from the 1970 Victorian Conservation Minister, Bill Borthwick, when introducing the Land Conservation Council legislation, is memorable. He told Parliament:

"There is no humbug about this. The Government is perfectly sincere in its endeavour to take the consideration and recommendations about the future use of public land out of the realm of political and emotional argument, and place it in the
This is an important principle for an advisory body. And we believe an expert panel, co-ordinated by a rotating secretariat and reporting to all conservation ministers with responsibility for the alps, is an essential and very pragmatic step to take. Importantly, the advisory body must be empowered to make its own reports, as well as any commissioned by government. It would also be advisable to enact parallel legislation in the States and the Territories to secure the appointment of this body. These are not costly or difficult changes. The first, the evolution of the Australian Alps Liaison Committee into a stronger cross-agency policy and program co-ordinating unit, largely involves a re-arrangement of staff responsibilities. The second, the independent expert advisory body, would be comprised of part-time appointments, though to act effectively it will need a budget. They are very necessary structures to have in place, and should serve as a model for other Australian cross-border parks in the future.

**Research**

But there is still one important piece missing in our management process: the development of research into ecosystem management, and especially research into techniques for the effective restoration of damaged ecosystems. There are currently a number of individuals and organisations working in various fields in this regard, and a number of very good collaborative programs already in place. In New South Wales we have the Australian Institute of Alpine Studies, based here in Jindabyne. It is a very welcome and effective network of researchers from many parts of the country who are working on alpine and sub-alpine ecosystems.

In Victoria, the Research Centre for Applied Alpine Ecology, based at La Trobe University, links the work of around twenty ecologists, some based in Universities and some in government departments. It is also tied to the Ovens Research Station, a horticulture program developing techniques for revegetation of alpine areas. Most importantly, the La Trobe based group holds the accumulated data from the monitoring of around 70 vegetation plots in the Victorian alps, some of which have been monitored since the 1940s.

*A cattle exclusion plot set up by soil ecologist Maisie Fawcett on the Bogong High Plains, in Victoria, in the 1940s. (Photo: Historic Places Section, NRE)*
The group also runs the renowned Alpine Ecology Course, attended by around 700 park planners, alpine resort managers, tour operators and other interested people since 1989. There is also the excellent work on alpine ecology coming from the Department of Geography at the University of Tasmania, and there is excellent work being done by a number of other individuals and groups.

The capacity for an extended and very effective collaborative research program is clear. While such a collaboration is probably best left operating independently of government, it needs increased recognition and support to flourish.

**Conclusion**

So it will take co-operation, but with it, we can establish one of Australia’s greatest protected areas. Indeed, we must ensure its protection lives up to IUCN Category 2, National Park, which is identified as a:

“Natural area of land and/or sea, designated to protect the ecological integrity of one or more ecosystems for present and future generations, exclude exploitation or occupation inimical to the purposes of designation of the area and, provide a foundation for spiritual, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.”

The proposed greater park is also part of a wider landscape increasingly appreciated by the community for its natural values. There is a proposal growing for nomination of the region for World Heritage listing. In Geoff Mosley’s words:

“*The forests of the NSW Far South Coast and Gippsland and the adjoining alpine areas display a sea to snow array of eucalypt communities which are of outstanding universal interest. In addition official world heritage assessments (notably that of Professor Kirkpatrick) have shown that the area has a range of other values of world heritage significance including: periglacial phenomena; coastal and alpine heathlands; and alpine and coastal wilderness.*”

The greater park is also a very significant part of a proposed Melbourne to Brisbane Conservation Link. The alpine and sub-alpine region of the south-eastern Australian mainland, and its associated foothill forests, will remain the jewel in the crown, however.

**We must set the standard for conservation protection here. We must ensure that we can deal with current threats, and guard against future threats. We must hone and employ our knowledge and our skill, to ensure future generations can experience nature at its finest.**

We must now build on our co-operative efforts to create one of Australia’s greatest protected areas.

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In The National Interest – The Australian Alps

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Existing national recognition of heritage in the mountains

Since 1976 the acknowledgement of heritage at the national level has been through listing on the Register of the National Estate established under the Australian Heritage Commission Act 1975. There are several hundred places on the register listing natural, historic, and cultural sites in the mountain areas of the mainland and Tasmania. The Register is a very valuable resource for the identification of heritage however listing provides only limited protection, being confined to triggering a consultation obligation for Commonwealth Ministers or agencies that intend to take an action that may have an adverse impact on the heritage values of a listed place.

The obligations on the Commonwealth to protect heritage were extended by the enactment of the Environment Protection and Biodiversity Conservation Act in 1999. Heritage is protected on all Commonwealth land through the operation of section 26 of that Act and heritage is protected in all areas in Australia and overseas from actions of the Commonwealth (section 28).

Commonwealth constitutional power to protect places in the national interest

I interpret ‘national interest’ as being the heritage conservation aspirations of the majority of Australia’s citizens no matter which state or territory jurisdiction that heritage occurs. It is not primarily an intergovernmental issue but an issue of whether national aspirations should take precedence over the narrower perspectives that may operate at the regional or state level.

One school of thought, indeed the predominant school of thought up to the 1980’s answered in the negative. The Australian concept of ‘nation’ is that set out in the Australian Constitution. Australia is a federation of sovereign states with a couple of territories added on. Those sovereign states ceded certain powers to the Commonwealth and these powers are set out in Section 51 the Constitution. The Commonwealth Government can only enact laws where there is a constitutional head of power.

The drafters of the Constitution never envisaged that the national Government would play a role in the matters that are the preserve of the states, for example protection of areas and sites of natural or historic heritage significance or the management of issues relating to Indigenous Australians. The latter was a matter specifically excluded by section 51 (xxvi) until it was changed in the 1967 referendum.

The system of government is quite different to that operating in, for example, the USA. Except for the original states in the Declaration of Independence, the majority of the US states are children of the
Federal Government. In Australia it was the other way around. In the US, as a consequence, many states have large tracts of federal land managed by federal forestry, national parks, land management agencies and defence bodies. In Australia the Commonwealth has negligible land holdings. The national park system in Australia is, for all practical purposes, a state park system. Kosciuszko National Park, in US and Canadian terms, is a state park. Australia’s only ‘national parks’ are Kakadu and Uluru - Kata Tjuta National Parks in the Northern Territory and, more recently, Booderee National Park in the Jervis Bay part of the Australian Capital Territory.

This system by and large works well. The states and territories have professional land management agencies that have a sound history of land management and a sound history of working in cross jurisdictional cooperative arrangements such as the Alps Liaison Committee. Cracks can start to appear when controversial issues of national interest arise that are variance to the wishes of the state or territory jurisdiction involved.

State governments operate as a consequence of their political mandate granted by the voting population. A state government will make resource management decisions in accord with what they perceive to be the best interests of the citizens who voted for them or what they perceive to be in the best interests of their state. The national interest has been either imposed by the Commonwealth, where it has the constitutional power to so impose, or through national consensus through forums like the Council of Australian Governments. This body is made up of the Prime Minister, the state Premiers and the Territory Chief Ministers.

In relation to national heritage protection the exclusion of the Commonwealth started to break down in the 1970’s. After 23 years of Commonwealth conservative government the Whitlam government was elected with a reformist mandate. In the environmental policy area the new government set out an agenda that was in direct conflict with the traditional constitutional role of the states. The agenda included:

- Establishment of the Great Barrier Reef Marine Park declared in 1975, is the world’s largest marine protected area, covering some 345,000 sq.km.
- The enactment of the Australian National Parks and Wildlife Act and moves to proclaim Kakadu National Park in the Northern Territory
- The enactment of the Australian Heritage Commission Act
- The enactment of national environmental protection laws

The state governments and the Commonwealth opposition parties furiously resisted the social, economic and environmental reform agenda. After a constitutional crisis engineered by two state governments creative interpretation of the filling of senate vacancies the Whitlam government was dismissed and the conservative Fraser government was elected in a landslide.

The reform agenda however left its mark. The incoming Fraser government retained the environmental initiatives. Kakadu was proclaimed a national park. The Australian Heritage Commission was formally established and began its task of assembling the Register of the National Estate. National environmental impact protection laws were maintained. One of the most significant steps taken by the Fraser government was to take unilateral Commonwealth action to protect the environment in the national interest. Fraser Island in Queensland is the world’s largest sand island. Vociferous debate about mineral sand mining had continued from 1971. In November 1976, the Prime Minister Fraser announced that from the following month no export approvals would be given.

Fraser’s action was significant. For the first time Commonwealth Government was prepared to use its limited constitutional power (section 51(i)) to protect environmental values in a sovereign state over the strong contrary wishes of a state government.

Fraser’s next initiative was also significant. In 1980 a law was passed to make it illegal to capture, injure or interfere with any cetacean within Australia’s 200 nautical mile fishing zone. In 1981 the importation of whale products was banned. Again Fraser was using constitution power
The Fraser government soon became involved in another state rights environmental controversy. In Tasmania successive state governments had based the cornerstone of state economic development on the availability of cheap hydroelectric power. National opposition to this policy centred on the campaign to save Lake Pedder, which was lost when the lake was drowned in 1973. The Lake Pedder campaign however stimulated national opposition to the proposal to dam the Franklin River in the Tasmanian southwest wilderness.

In July/August 1982, the Federal ALP had adopted a policy of saving the Franklin River. In early February 1983, Prime Minister Fraser called a federal election. The ALP ran strongly in the subsequent election campaign, on a policy of saving the Franklin. The ALP under the leadership of Bob Hawke won the election.

Turning the narrative slightly back. On 27 August 1974 the Whitlam Government became the 7th country to ratify the United Nations Educational, Scientific and Cultural Organization Convention concerning the Protection of the World Cultural and Natural Heritage. To date 175 countries have signed the convention. The Great Barrier Reef, Kakadu National Park and Willandra Lakes Region were inscribed on the World Heritage list in 1981. Lord How Island and the Tasmanian Wilderness were inscribed in 1982.

With the mandate of the 1983 election the Hawke Government decided to test the use of foreign affairs powers to protect the Tasmanian Wilderness World Heritage Area against state government hydroelectric works. The World Heritage Properties Conservation Act 1983 was enacted to give effect to Australia’s treaty obligations under the World Heritage Convention. This interpretation of constitutional power was upheld by the High Court thus extending Commonwealth power to cover any matter that was an obligation under a treaty ratified by Australia.

The Australian use of the World Heritage Convention to protect places in the national interest is unique amongst convention members. Members at various World Heritage Committee meetings have been greatly bemused and not a little bit irritated as Australian domestic squabbles dominate the agenda. Whist state governments now vie with each other to propose new listings it was not so long ago that that state and territory government representatives lobbying against Australian nominations haunted the corridors of Committee meetings.

Whilst World Heritage listing will continue an important element of our outstanding heritage it is an expensive and time consuming tool to use to protect places in the national interest, given that the difference in the threshold level between outstanding universal heritage significance and national heritage significance will tend to push use of the convention in the direction of over-representation and thus devaluing the convention.

The needs to a better means of protecting places in the national interest rather than the somewhat cumbersome World Heritage nomination and listing process.

The Commonwealth thus has a series of heads of power from the Constitution to protect heritage in the national interest. These are, in the context of section 51, power to make laws with respect to:

1. Trade and commerce with other countries, and among the States:
2. Foreign corporations, and trading or financial corporations formed within the limits of the Commonwealth:
3. The people of any race, for whom it is deemed necessary to make special laws:

In heritage protection terms it is a reasonable cocktail however there are significant omissions. These mainly relate to the protection of historic and cultural heritage other than Indigenous heritage. Those omissions do not apply to the actions of private companies as the Commonwealth can regulate these.

In 1997 the Council of Australian Governments (COAG) entered into an agreement that delineated the roles and responsibilities of the Commonwealth for the protection of the environment. That agreement identified a series of matters of national environmental significance the protection of which was a role for...
the Commonwealth. These matters included the convention matters I referred to above. Provisions for
the protection of these matters became the contents of the Environment Protection and Biodiversity
Conservation Act in 1999. There was one matter omitted from that Act that was included in the 1997
COAG Agreement – the protection of places of national heritage significance.

After 6 years in preparation and extensive consultation a series of Bills have prepared to allow for the
protection of places of national heritage significance. To the extent that it is constitutionally possible,
these places will be protected to the same level as World Heritage places. The Register of the National
Estate will be retained as a valuable inventory of heritage.

The Bills passed the House of Representatives on 15 November 2002. On the 16 November the Bills
were read a second time in the Senate however the Senators for the Australian Democrats refused to
accede to a motion to have them debated in this session. The ALP opposes the Bills in their current form,
proposing a series of amendments suggested by the Australian Conservation Foundation. ICOMOS,
WWF, the Humane Society and the Australian Council of National Trusts support the current Bills.

**Protection of places of national significance in the Alps**

If the Heritage Bills are enacted it will be possible for any person to nominate a place with national or
cultural heritage values as a place of national heritage significance. The Australian Heritage Council will
assess the heritage values of that nomination. The Council will assess whether those values reach the
threshold of national significance. After a period of public consultation and evaluation of comments the
Government will weigh up the heritage and other community issues raised in the consultation process and
make a listing decision.

The legislation provides a statutory protection and management framework for listed places as well as
provisions of conservation agreements and Commonwealth funding assistance.

From the community’s point of view the protection includes ready access to the Federal Court by
interested persons or groups to seek orders or injunctions to ensure due processes are maintained and
national heritage values are protected.

When the national heritage place framework has been established the Commonwealth intends to draw
future World Heritage place nominations from the national list. Currently Australia has acceded to a
World Heritage Committee request to limit its nominations to one per year to allow other member
countries to propose nominations. In drawing a nomination from the national list some important stages
would be have been addressed by the national listing process. These include establishing heritage value
to the threshold of at least national significance, working through the often-problematic issues of
boundaries and management arrangements. A protection regime will also have been established whilst
World Heritage nomination is assessed.

**Matters of national interest in the Alps other than heritage**

My discussion to this point has focussed on the protection of natural and cultural heritage. There are
other matters of national interest in the Australian Alps.

The Alps contain vital catchment areas, the stability of which is vital for water supplies for millions of
Australians and the well being of a major part of our agricultural sector. On catchment protection
grounds alone there is a compelling case to strictly control catchment-damaging activities arising from
inappropriate developments and heavy-handed fire management practices. The same catchments are vital
economic resource base for the production of hydroelectric power.

The Alps form a vital economic base for regional economies, particularly those serving mountain tourism.
The health of those economies largely depends on prudent management of the natural resources that
underpin those economies.
Impacts of non-toilet human waste disposal on natural ecosystems in Tasmania I -
Do bushwalkers leave more than just footprints in natural environments?

Kerry Bridle and Jamie Kirkpatrick

Current Minimal Impact Bushwalking (MIB) guidelines suggest that walkers bury toilet waste in a hole 15 cm deep and 100 m away from huts and campsites. However, it is not uncommon for walkers to come across evidence of inappropriate disposal of human waste, especially toilet paper. A three-year study into the relative decay of toilet paper, facial tissues and tampons was instigated to determine the relative breakdown of these products in a number of natural environments. Samples of bleached and unbleached toilet paper, facial tissues and tampons were buried at five high altitude sites (western alpine, eastern alpine, montane moorland, montane eucalypt forest, subalpine rainforest) from 6 months to 2 years. Half of the buried samples were “treated” with additions of a solution that had the same nutrient concentrations as human urine. Additional samples were buried under rocks in two extreme alpine environments.

Our results showed that unbleached toilet paper decayed more quickly than bleached toilet paper that, in turn, decayed more quickly than facial tissues. However the difference in time taken for decay to occur was minimal between these three products. These products approached total decay within 2 years at three of the five sites (montane eucalypt forest, subalpine rainforest, eastern alpine). Tampons were the most resistant to decay across all five sites, only approaching any substantial decay (greater than half of the original volume decayed) at the montane eucalypt and the subalpine rainforest sites. Very little decay of any of the products occurred at the western alpine site that had a mean decay of less than 25% of the original volume after 2 years buried in the ground. Products that had been subjected to nutrient additions (artificial urine) were more decayed than those that had not. Products that were buried under rocks at the surface were not more decayed than those in the ground. Mean annual rainfall and soil elements relating to soil acidity are important determinants of decay success across sites.

The management recommendations from this project are:
1) to recommend no disposal of faeces, toilet paper or tissues in treeless vegetation above 800 m in western Tasmania; 2) to emphasise that placement of waste under rocks causes more environmental harm than disposal by burial, even in alpine environments. We agree with the current MIB guidelines that all waste in other environments should be buried in a hole 15 cm deep, 100 m away from water and campsites and that tampons should be carried out.
Impacts of non-toilet human waste disposal on natural ecosystems in Tasmania II -
Do people follow the minimal impact bushwalking guidelines?

Kerry Bridle, Julie von Platen, Micah Visoiu and Jamie Kirkpatrick

While the current Tasmanian Minimal Impact Bushwalking (MIB) guidelines have been implemented since 1986, it is not uncommon for bushwalkers to come across evidence of inappropriate human waste disposal along tracks and at campsites. Why people are not following the recommendations to go 100 m from campsites or water and to put waste in a hole 15 cm deep is not known. What we would like to know is whether there is a health risk associated with this non-compliance.

Mapping of faecal deposits around 2 alpine hut sites was undertaken to determine how far people travelled to dispose of human waste. Soil samples were also collected from three radial transects around a high altitude campsite and a hut site. These soil samples were analysed for the presence of elements such as nitrogen, phosphorus, potassium and calcium (common in human waste) and for the presence of faecal pathogens such as faecal coliforms and faecal streptococci. In addition, samples of human faeces and toilet paper were buried in a montane moorland environment and two alpine environments to determine the visual decay of faeces and the longevity of faecal pathogens. Samples from the montane moorland environment were visually assessed at 1, 3 and 6 months. Samples at 3 and 6 months were also analysed for the presence of faecal pathogens and bacteria. Samples at the alpine environments were dug up at 9 months (1 sample) and 12 months (12 samples), and analysed for the presence of faecal pathogens.

The results from the mapping survey showed that most people travelled less than 50 m away from the hut sites to go to the toilet. These results agreed with the soil nutrient analyses that showed peaks in nutrient concentrations at 20 – 50 m away from the hut/campsite. However, no faecal pathogens were found in these soil samples. This indicates that while many people are not be travelling the suggested 100 m away from the hut, faecal pathogens were not easily moved through the soil body. Samples taken from the real faeces told a different story. There was no visual evidence of faeces or toilet paper in the alpine environments after 9/12 months burial. However, faecal pathogens were present. By contrast, the faeces/toilet paper samples in the more acidic and organic soils of the montane moorland site were highly visible after 6 months, but pathogen counts were negligible.

While walkers may encounter the partially buried faeces of other walkers, the public health risk associated with these encounters is variable depending on environmental parameters such as soil acidity/productivity. If human waste is adequately disposed of in a hole 15 cm deep, then the public health risk is minimised. Managers of sites with relatively high visitor numbers or sites that are constricted by topography may need to consider installing toilets or deterring people from camping at particular places to reduce the possibility of contact with human faeces.
Soil properties and exotic plant occurrence following road disturbance in high altitude areas of Kosciuszko National Park, Australia.

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The construction and maintenance of roads in Kosciuszko National Park has seen profound disturbance to existing vegetation and soil, as well as the introduction and proliferation of exotic plant species. Changes in chemical and physical soil properties were found to occur along roadside verge compared to the natural state. Soils from natural areas had higher humus levels, less gravel and sand, and higher levels of nitrogen and phosphorus. Roadside disturbance caused an increase in soil pH and EC, with significant changes in nutrient concentrations. A relationship was found between soil properties and the occurrence of different exotic plant species along roadsides. The exotic Achillea millefolium, (yarrow) was found predominantly along high wash off areas with significantly higher soil pH and exchangeable levels of calcium and potassium than natural areas and disturbed areas without yarrow. Management of roads and associated ecotypes are discussed.
Function and Sustainability of Australian Alpine Ecosystems: Studies in the Tall Alpine Herbfield Community, Kosciuszko National Park NSW, Australia

Stuart Johnston

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The tall alpine herbfield community in the alpine area of Kosciuszko National Park NSW, is a limited and biologically significant climatic climax ecosystem. However, past grazing practices and the current impacts of tourism, exacerbated by the harsh climate, have resulted in extensive vegetation degradation and subsequent soil erosion of the alpine humus soils. These phenomena have occurred over large areas of the tall alpine herbfields. These disturbances have also produced ecosystem states different from that of the natural climax state. Observations have shown that where the impact of degradation of the ecosystem has been less severe, the ecosystem retains the capacity to slowly return to its climax state. However, if the disturbance and subsequent degradation are more severe, the ecosystem will not recover but will reach a different stable state. In this paper the state-and-transition model is applied to describe the alternative states, and the transitions between states, of the tall alpine herbfield ecosystem. The implications for management for the tall alpine herbfields are also outlined.
Final Forum – Issues For The Future
Outcomes for the Mountains of Meaning Sessions

Compiled by Juliet Ramsay

Summary of Presentations

The concept of Mountains of Meaning was proposed as a conference theme by Australia ICOMOS to build onto the Aboriginal Gathering proposed by the Australian Alps Cultural Heritage Working Group to celebrate International Year of Mountains.

The participation Aboriginal people associated with the Australian Alps and special Aboriginal sessions were funded and organised by the NPWS and coordinated by NPWS officer, Rod Mason and Dean Freeman.

Australia ICOMOS ran two special sessions called Mountains of Memories – talk sessions involving people who have lived and worked in the Australian Alps area.

Sub-themes proposed for papers covered intangible values- the meaning, spiritual and inspirational values of mountains to people; the experience of living, working and playing in mountain landscape; design and technology in mountain environments; methods and models in heritage assessments and managing cultural heritage in mountains. The following is a summary of the Mountains of Meaning sessions.

1. Australian Alps Guest Speakers

Jason Adler discussed the sacred sites in NSW and that there were over 600 listed ceremonial sites. Sacred mountains must be protected for Aboriginal people. The mountains have historic importance, as places were Aboriginal people sought refuge to avoid Europeans. Some such as Mt Warning and Mumbulla Mountain have been protected. The sustainability of the natural environment is important but natural and cultural heritage should be managed together.

Jane Lennon discussed the 199-place data information on cultural places of the alps and how the alps fit within the 6 national heritage themes. She noted how cultural places remain as dots on the map and the cultural landscapes they are associated with have not been delineated. The cultural meanings behind the alps landscapes must be understood.

Dianne Strand a guest speaker from the Southwest Yukon and member of the Crow Clan of the Champagne and Aishihik First Nations spoke on the Southern Yukon Ice Patch Research- linking Science with Community. The research arose from the discovery of large areas of caribou dung becoming evident in the melt of ice patches that revealed well-preserved human artifacts and the body of an ancient hunter. She spoke of the cross cultural research arising how outreach programs have involved elders and teenagers of the community and how ‘the gifts from the past’ are providing many opportunities for community education and development’.

Key Points

- The importance of tying together the cultural threads such as mountain music
- We should not appropriate space without understanding it such as historic sites
- There is a cultural tradition of scientific meaning
- Cultural interpretation should be by the cultural people
- There is a need to respect Indigenous people’s efforts in recovering their culture
- There is a need for partnerships to address cultural heritage in a regional context
- There is a need to accommodate Indigenous people and local communities in healing their grief
- Cultural landscape management guidelines are needed in the KMP
- There is a need to maintain the connections to the land – particularly ceremonial
- Indigenous people feel displaced
- Empowerment should be given to Indigenous people as managers of the land
- There should be one Australian Alps Park with one Aboriginal name and it should be a centre of excellence in management.

2. Inspiration and Icons

Messages from the Aboriginal perspective were provided by Jo Wilmot and Glenys Coulthard who both emphasised the need for Australians to understand Aboriginal associations with land, the importance of ceremonies such as ‘singing up country’ and the special role of women, that having legal title to their land is important and that Indigenous heritage should be interpreted by Indigenous people.

Serge Domicelj stressed the need to understand the motivation behind the meanings given to mountain places discussing the history behind Inca routes as example, also discussing how perceptions of mountains and motivations changed during the 19th and 20th centuries.

The concept of understanding motivations was brought up by Aedeen Cremin who used a 19th century image of the Hartley in the Blue Mountains to discuss how it was manipulated to convey colonial picturesque social meanings.

Olwen Beazley discussed intangible spiritual values, natural phenomena values and inspirational values of mountain landscapes nominated for World Heritage listing, how the organisation is evaluating the value and issues associated with the evaluations.

Catherine Brouwer discussed issues relating to a study of the heritage values of the Glasshouse Mountains in Queensland, their special relationship to each other as a family of mountains, their iconic value in the locality and the superficial way in which the Murra peoples’ legend has been appropriated for tourism.

Marilyn Truscott using the Man From Snowy River icon and Craig’s Hut discussed the myth making by Australians and how many people celebrate fabricated heritage.

Key Points
- Non-Indigenous people should not interpret indigenous heritage.
- The motivation behind meanings should be understood.
- Real stockmen and stockwomen’s stories need to be told to redress the Man from Snowy River myth.
- Fabricated heritage should not receive conservation dollars.

3. Living and Working

Matthew Higgins spoke on Clement Wragge and the meteorological station he established in 1897 on the top of Mount Kosciuszko. He discussed how the station was prepared for the insulation and snow.

Ruth Lawrence’s presentation based on historical research, traced the history of the Yaitmathang people of North East Victoria their land affinity, cultural landuse, economy, use of totems, track networks from Gippsland, minimal use of fire (being only in small areas around 1 ha) and the devastation of their lives by Europeans.

Robert Kauffman provided an overview of mining in the alps commencing with the Aboriginal mining. He stressed the enormous contribution mining made to the region in terms of the development of towns.
but also that over a billion dollars was made from mining in the Alps area. He stressed that although the
miners opened up the area, that mining heritage is being lost in favour of iconic cattlemen. He also noted
that recording histories in themes does not do justice to the interaction of the Aboriginal activities,
grazing, mining and tourism.

Barry McGowan discussed the Chinese presence in Australia, how Chinese miners migrated freely
between fields and their sound organisation. He noted that the Kiandra Goldfields were the most
significant Chinese mining camp in Australia with up to 700 people in Kiandra in 1860. After the
mining, Chinese families continued until the 1920s with members of the Yan family being the first skiers.
Distinctive remnants from Chinese mining remain as neat tailings mounds, and pig ovens.

Geoff Ashley discussed the integration of natural and cultural components of the mountain landscapes
and the need to work with the messy mixes of cultural landscapes. He discussed the original of huts for
mining, summer grazing, outstations, the government resorts, the Snowy Scheme developments, briefly
touching on the recreation lease areas. He noted the cultural features are an entrée to understanding the
natural landscapes, and noted the correlation of huts on the edges of alpine herbfields and how the
ephemera of the cultural landscapes are disappearing, without methodologies in place to solve problems.

Key Points
- The impact and influence of the Chinese is not well known
- Landscape management should be a holistic approach of cultural and natural
- Cultural landscape ephemeral features are being lost
- Aboriginal mining research needs an Aboriginal perspective for the history of mining

4. Mountains as Catchments

Michael Pearson in his paper 'Thatching the Roof of Australia', noted that by the 1880s the Kosciuszko
mountain landscape had been seriously overstocked with 81,000 acres divided into 51 snow leases
resulting in serious sheets and gully erosion. Reduction of grazing commenced in 1944 and restoration
commenced in the post war reconstruction of Australia. The landscape was stabilised with extensive
straw mulching and netting but it took many years for the full vegetation to return.

Key Points
- Interpretation needs to outline the history of degradation and rehabilitation on the main range

5. Aboriginal Cultural Interpretation and Indigenous Forum

Cliff Coulthard gave the Iga-Warta story the Dreaming story Wilpena Pound being the created by 2
giant serpents and the geological story of it being the oldest in the world. He explained that his family
have owned land since 1970 and how sheep property has been converted to run tours as a family
operation. There is no white advisor and no government money. The Elders have said there is a need to
share some culture in order to gain respect. People can climb some mountains others are sacred and
cannot be visited. Cliff has a vision of a trail through Central Australia linking Aboriginal groups
(tourism groups).

Joe Willmot noted difficulties traditional owners have in maintaining full control at Uluru.

Bobby McLeod said Aboriginal people need to learn from each other with belief in the one, which is the
'mother'land. The biggest cause of division to Aboriginal people is money – it breaks up families. Rod
mason spoke of how stories and paintings teach history. Traditional people know where they are because
of the stories, language and ceremonies form a 'high order'. Old people carry the stories.

Key Points
- Respect has led to a reduction in graffiti and other damage at Wilpena Pound
- The family Aboriginal business needs to stay small to stay in control
- Aboriginal people want control of what is said – first hand
There is a need for an annual get together of all park ranger Indigenous and non-Indigenous for mutual learning.

Aboriginal people need to be united and need recognition as traditional owners.

Aboriginal people should not have to ask permission to care for country.

Aboriginal culture is very alive.

6. Managing Together and Special Cultural Session

Matilda house explained her upbringing and her family’s role in the cooperative management agreement for Namadgi. Maxine Cooper spoke of the rights and obligations of joint management.

Rachel Lenehan and Warwick Baird discussed the mountains of the meaning on the south coast of NSW, and explained developing the return of Biamanga National Park that contains Gulaga and Mumbulla Mountains. They discussed the registration of Aboriginal owners, and the genealogical and anthropological research that assisted in establishing the register that provides a foundation for joint management. The structure of a management board was discussed.

Ian Christie spoke of the Parks Victoria partnership process with Aboriginal communities and their commitments to supporting a range of aspects for Aboriginal involvement. Co-management is the start of the journey.

Megan Goulding outlined her recent study for the Australian Alps for seeking directions on Aboriginal heritage management, how it involved meetings on country with all groups with an open agenda, and providing reports to people with an opportunity for people to change them. The themes for research and directions were outlined.

Key Points
- Wilderness legislation is offensive to Aboriginal people – does not allow for continued use by Aboriginal people.
- A vision is when Aboriginal people are managing the park/sites and make decisions.
- Aboriginal people should be able to choose and appoint representatives to the management boards in the lease back arrangements.
- How can Aboriginal people secure access to Aboriginal sites on private land.
- Aboriginal people are looking for serious engagement with agencies and want their responsibility for country recognised.
- Continuum and connection is important, not just the past but the past, present and future.

7. History of Recreation

Ian McLeod spoke of the Do-It –Yourself skiing and the MOU between government and the Canberra Alpine club in maintaining Mt Franklin lodge for recreation and how now the partnership between the CAC and Act Parks enable interpretation and links to the early days.

Margaret Doring based her paper on personal memories with photos of over 100 years and 5 generations of skiing in Victoria.

John Siseman described the Australian Alps Walking Track as Australia’s premier long distance walking track with isolation and wilderness its key features – it is a great success but has encountered a few problems.
Key Points

- There is a need to collect, conserve and commemorate the intangible and fragile memories of early days of mountain recreation.
- The ski resort policy is moving away from the club and community spirit to private lodge and commercial apartments.

8. Methods and Models

Diedre and Bernard Slattery spoke of the issues arising from rapid growth in visitor access, the damage to natural places and the need to move away from former cultural traditions of dominance, suggesting scientist as the romantic heroes and role models.

Juliet Ramsay spoke of the lack of inspirational value in the heritage records for mountain landscapes and outlined a study in progress that is seeking a new method for identifying inspirational national heritage values, describing how it has used essays from experts from diverse background and an on-line interactive conference.

Jennifer Storer presented an experimental risk management model for prioritising management of historical sites in the Alps where there are few resources.

Eva Logan discussed the importance of listening to the voices of the cultural landscapes in comparing cultural landscapes of the Snowy Mountains and Wales, discussing common issues and differences, noting the increase in rural recreates who are not fully engaged with communities and how tourism is seen as an economic answer but is problematic. She noted that Wales has a long history of mediators between community and government agencies – a model useful in Australia.

Key Points

- People go to mountains to be inspired
- Individual sites in mountains need to be looked at in their regional context
- It is important to understand significance of places as a first step before management decisions are made.
- Conservation planning for places does not need to be highly detailed

9. Conflicting Values and Cooperative Management

Olaf Moon presented a paper - Community Defence of a Valued Landscape, shared with. This outlined issues in managing huts in the Kosciuszko National Park. Of the 617 huts, 107 are outside the park, huts are progressively disappearing and 32 have been removed since the agreement with the Kosciusko Huts Association. The KHA provides voluntary caretakers and has prepared plans of management. In Tasmania the Mountains Hut Preservation Society involve the local community in hut management and do not rebuild huts if 2/3 of the fabric is gone.

Jim Russell in his shared paper with Chris Johnston discussed the method and findings of a study in Tasmania to address issues of a rural community, disaffected by the World Heritage listing of South-West Tasmania. The paper outlined responses by the Park Service and changes in the bureaucratic approaches to natural area management with community cultural values being more integrated into the management of natural areas.

10. Mountains of Memories

Neville Gare former manager of Kosciuszko National Park, Noel Gough former Snowy Hydro worker, Neen Pendergast of a local farming family and Stuart Garner, slab hut builder of Adelong, discussed living and working in the mountains – anecdotes and tragedies. Stuart spoke of his family tradition of building slab huts and the difficulty they now have in procuring trees for the craft. Neen noted that the Snowy Scheme changed their lives making living in the mountains much more interesting.

Dianne and Ina Simpson spoke of their family’s five generations of folk dance musical tradition in Corryong area of Victoria. They described the Nariel Folk Festival – as the first folk festival in Australia.
and gave and great performance of their music, with Ian using his self made concertina and also
demonstrating the ‘saw’. Tom Barry from a Jindabyne farming family noted how life in the mountains has
continually improved for families- allowing people more control of their lives.

Results of the General Cultural Heritage Forum

There was overall enthusiasm for mountains from a number of different perspectives but with a strong
emphasis on the importance of community values of the mountain landscapes.

Points made by conference participants on their opinions on key messages, burning issues and
recommendations arising from the conference.

Key messages - Indigenous

- Aboriginal people must have a say be involved in management and the control of land management
- The spiritual nature of the relationship of Aboriginal people to their land is also linked to ownership
- Indigenous people ‘know what they are talking about’
- Aboriginal people must have access to land for cultural practices
- Aboriginal people are needed in senior positions in protected area management

Key messages – General

Integrated approach to mountain values
- Cultural and natural mountain places are one
- There is a diversity and complexity of tangible and intangible values attached to places – both cultural and
  natural places – for both Indigenous and non-Indigenous groups

How to integrate the process
- Small mountain communities / landholders / interest groups must be part of values assessment, planning
  and ongoing management
- There is a need for multidisciplinary discussions in land management
- Cultural places should not be seen as dots on maps but as landscape layers
- The cultural landscape approach can encompass multiple values – natural and cultural
- Parks managers need to understand cultural heritage including social value

Communication
- Should take place in appropriate ways, in appropriate settings, with appropriate people

Burning issues - Indigenous

Decision-making and Control
- Aboriginal people need to control their land
- Aboriginal people need to be involved in land management
- Real partnerships are needed not just lip-service
- There is a need for more employment of Aboriginal people in land management agencies

Indigenous Interpretation
- Let Aboriginal speak for their own culture and heritage
- Cross-cultural interpretation is required
- Prevent non-Indigenous people misrepresenting Indigenous culture

Celebrating Mountains – An International Year of Mountains Conference
Jindabyne, New South Wales, Australia
Burning issues - General

Communication
- Sharing Indigenous issues with non-Indigenous people is vital for the future
- Raise awareness of the cultural / natural history and landscapes
- Inspire means to break down barrier between disciplines
- Interpretation must be based on real European and Indigenous heritage
- Know who speaks for issues and who decides
- Cross-cultural awareness should be undertaken by senior management

Small local communities
- Their knowledge and heritage values need to be respected
- They need to have role in management of adjacent parks

Interpretation
- Real stories – Indigenous and non-Indigenous need to be told – not myths and fabricated heritage

Integration
- How to really integrate cultural and natural management
- There must be a meeting and crossing of the natural / cultural division in values management
- Project work needs to be more fully planned with a holistic approach

Landscapes
- Heritage studies are needed in regional landscape settings
- Land management agencies should adopt a whole of landscape approach – for both natural and cultural values
- It is not possible to protect Alps for the future until a truly holistic landscape approach is adopted

Resorts
- Resorts should be viewed as potential cultural heritage
- Some resorts are unsuitable and there is an overdevelopment threat to heritage values
- Resorts damage the fragile environment

Recommendations - Indigenous
- Joint Management and Partnerships with Aboriginal people
- Aboriginal ownership of cultural heritage interpretation
- Indigenous ownership of cultural heritage
- Aboriginal employment and responsibility
- Change parks legislation to empower Indigenous people

Recommendations – General
- There needs to be a landscape approach to heritage studies
- Non-Indigenous heritage is important – not to be forgotten
- Huts need to be managed as a group as part of the cultural landscape not singly (AALC)
- Meet with Australia ICOMOS re heritage standards and training (AALC)
• The ski areas are large enough

**Implications**

• More resourcing for parks required
• There should be access to parks without fees
• Training required on cultural heritage for non-Indigenous staff
• Processes of cultural and natural heritage to be integrated

Most of the recommendations were not directed to a specific target or agency.
Recommendations from Indigenous Participants

Rod Mason, Dean Freeman, Paul Mcleod, Phil Mcleod, Pat Davison, Matilda House, Joe House, Joanne Wilmot, Chrissy Grant, Cliff Coulthard, Vida Mcleod, Dianne Strand, Garry Caines, Rachel Puentener

The following recommendations are put forward to this conference to improve Indigenous people's position in regard to issues raised in papers and panel discussions under each of the themes of this conference.

Some of the recommendations should also be applied more broadly that to just mountains.

Mountains of Meaning

Aboriginal Representation
That Aboriginal representation be included in the executive of the AALC to have input into the overall decision making for the Australian Alps. Also that more Aboriginal people be members of each working group.

Access
The designated areas be identified in the Parks to allow for cultural activities to be undertaken by the traditional owners and their visitors

Control
That Aboriginal people be given control and ownership of their cultural heritage and the information and knowledge that can be shared.

Protocols
That appropriate protocols be endorsed or developed with the Aboriginal People to address the involvement of Aboriginal people in consultation, identification, protection and management issues.

Confidentiality
That confidentiality of information be enshrined in legislation and policies in regards to Aboriginal cultural heritage.

Joint Management
To develop joint management type arrangements with Aboriginal people and encourage a genuine Aboriginal voice within the management of the Park.

Exchange Programs
For all relevant agencies to establish an exchange program within or across the Park Services or other organisation to broaden participant's (Aboriginal and non-Aboriginal) skills, knowledge and networks.

Training
That an appropriate training program be developed for Aboriginal communities to be more involved in the management of the Park beside the Park staff.

Aboriginal Employment
That organisational structures and budgets be established to increase Aboriginal employment and cultural activities in the Park Services and tourism industry.

**Mountains for Tourism**

**Traditional Names**
That a traditional naming program within appropriate timeframes be implemented across all State and Territories' Parks and appropriate promotion be given for the name change to be adopted.

**Impacts of Tourism**
That the relevant agency or organisation seek feedback on the impacts of tourism or development form the Aboriginal communities most likely affected as well as any statutory obligations or policy requirements.

**Gate Takings**
That a percentage of the gate takings be negotiated to be channelled into community development programs and cultural activities for the local Aboriginal people.

**Intellectual Property Rights**
That Aboriginal people have control over the interpretation of significant places and that they maintain all intellectual property rights to that information at all times. Aboriginal people also demand that the information be treated respect and sensitivity at all times.

**Research**
The Aboriginal people have complete ownership over the traditional knowledge in regard to bio-prospecting and research into plants used for medicinal purposes.

**Mountains for the Future**

**Recording of information**
That Aboriginal people have ownership over the information used for site recordings.

**Access to Information**
That traditional owners who have the knowledge of cultural heritage information to be members of an Aboriginal Advisory Board to be established to develop protocols in regard to access to information and records.

**Conference Issues**
That all future conferences with Indigenous input give prominence to Indigenous speakers at the beginning of the conference to acknowledge and pay respects in a practical way and set the scene for the conference.

That an appropriate time slot be incorporated into the program to allow Indigenous participant to address any issues raised in the conference.

That an appropriate time period be provided for Indigenous participants to report back any issues or recommendations to the conference.
Outcomes Of The Mountains For Tourism Forum

Compiled by Karen Civil

Over the last few days we have heard a great range of stimulating and thought provoking presentations encompassing:

- Tourism and Recreation Management
- Social and Economic Benefits of Recreation and Tourism
- Sustainable Ecological Tourism
- Managing Visitor Impacts
- History of Recreation in the Alps
- Interpretation and Education
- Indigenous Tourism and Social Values

Key Messages

The importance of cooperation, consultation and collaboration

- sound management requires finding common ground (and common language) between different groups
- ‘give and take’ and willingness of land users and managers to work together are necessary to achieve outcomes
- the future is in partnerships between user groups and land managers
- consultation fosters ownership
- Tourism operators can and are willing to contribute to park management

Local involvement

- Involvement of local community in tourism process in parks
- Govt land managers need to consult with a broader range of groups to become better aware of the values and aspirations that need to be recognised in decisions about management
- Need to allow time to develop ground-up community involvement
- Recognising abilities and requirements of different stakeholders to work within a framework is important

Understand the basis and values for the tourism product

- Importance of Koori culture in the development of mountain tourism
- The role of cultural heritage in tourism and the extent of the discipline surrounding it
- Identify and promote key values/ environmental and cultural attributes
- For small communities, innovative packaging of quality tourism experiences is the best way to attract market to the region
- Values of tourism are dependent on the biophysical and cultural characteristics of mountains
- Mountains are special places for spiritual, social, cultural and personal well being and are highly valued
- Tourism is a positive phenomenon for mountains – not a problem to be managed – bringing economic benefits to the community and impetus for conservation
The value of good interpretation and education
- For visitors learn/understand and respect this is a unique place they are visiting; and
- To minimise impact

Diversity of experiences
- When planning tourism, think about and act on the diversity of experiences desired
- Diversity of opinions
- The key to managing successfully is to target to the specific group

Key Issues

Managing for a range of sustainable uses
- How can the needs of different user groups be accommodated without threatening the resource or quality of experience?
- What sort of tourism opportunities are going to be acceptable, sustainable and viable in any given area?
- Managing for a range of sustainable visitor experiences

Tourism can be a positive phenomenon for the mountains – economic benefits to community and impetus for conservation

Integration and partnerships
- Future sustainability of tourism requires an holistic approach that engages the custodians, tourism operators and the communities
- How can we better integrate the needs of communities and those of protected areas?
- How do we develop planning processes that are respectful of different forms of knowledge, that create ownership and lead to learning?
- Some of the answers may be in:
  - Regional approaches to protected areas and tourism
  - Engaging the community – beware of ‘experts’ dominating discussion which can marginalises community engagement
  - Mutual respect
  - Local communities benefiting from sustainable tourism is critical
- What benefits or social-psychological rewards accrue to individuals participating in mountain based recreation

Commercial opportunities
- How to generate revenues to develop, restore, research and maintain national parks
- Consistent approach to commercial operators
- Access issues impact adversely on commercial operators (ie access not equitable)
- Although the tourism industry demands more access this might not be the best way for its businesses to increase/expand. How can they become more targeted?
- Pursuing good environmental management can offer a competitive advantage in the tourism market place
- The tourism industry has a role in contributing to the effective management of sustainable tourism in mountain environments.
- Sustainability requires profitability

Research and Monitoring
- With continuing increases in visitor numbers, monitoring of numbers is essential. This will assist in relating other issues to visitor pressures
Management
- Development of environmental management plans with stakeholders – establish and agree capability levels
- Mountains are very sensitive and dynamic environments and require active management to achieve sustainable use outcomes
- Leadership /willingness to implement agreed planning – need for outcome focus (the wheels of bureaucracy are too slow – no one takes ownership; risk averse managers

Handling climate change
- Need for forward planning to cope with climate change
- Need to manage to minimise impacts that increasing non-winter use will bring

Research
- Recognising the value of good quality information to support management decisions and the need to know your visitors and the experiences they are seeking:
  - Research is needed into specific user group values
  - Initiate a research and development centre on communities and protected areas
  - Develop a multifaceted strategy to pass on the valuable research and information to the broader community and engage the broader community
  - Encourage industry to conduct research and tap into other institutions and grants programs which support community and commercial interests (greater ownership).

Management
- Management for sustainable tourism in mountain environments is integrated with local community, based on best available information, uses new research in an adaptive manner, recognises and appreciates indigenous culture and is sufficiently resources to be effective
- Visitor monitoring in alpine areas continue at regular intervals (eg 5 years)
- Improve links with regional tourism, state agencies, commercial operators to strategically plan for tourism to avoid ‘honey-pot’
- Need big picture vision for summit area, not piecemeal solutions that are operationally/fiscally advantageous for a period of time
- Professional/certified operators
- Manage product quality
- Alps management agencies recognise emerging recreation trends eg mountain biking and take steps to meet the needs of these users

Partnerships with traditional owners (land management agencies and CHWG)
- Park managers need to engage/partner Koori cultural tourism product
- In Victorian context, Alpine resorts need to establish meaningful engagement with traditional owners
- Involve Aboriginal communities more in the planning and development of tourism infrastructure in parks – leads to more cultural sensitive tourism

Partnerships with industry
- Build partnerships to build capacity (and ownership) in research and the management of recreation and tourism in the Alps
- Resorts to be incorporated into the AALC network with respect to programs (ie the 6 key messages for visitors)
- Park managers need to engage and partner with commercial operators
- One licence system for operators within resorts/park (Resort Management Boards and land management)
- Establish and maintain effective linkages with the tourism industry, community to ensure sustainable management in parks
**Information/Communication**

- Improve the dissemination of information to the community and industry
- The Australian Alps program, Alps and other government agencies and CRCs have large body of knowledge, research data and contacts. We need to provide ways for the tourism industry and broader community to tap into this.
- The conference has been great – now we need to continue what has been started here:
  - use some of the issues as subject of future workshops
  - use the conference as a source of information to feed into other processes (eg Kosi Plan of Management, ISC, Community Forum)
  - feed into Alps Call for Projects process and Alps Strategic Planning process
  - CRC has project to support tourism business planning through system which provides access to latest information – adapt this to provide access to information to support sustainable tourism
  - Create a Centre for Excellence in Mountains – involving CRC, Alps, Institute Alpine Studies, others?
  - Future conference should have more community involvement.
  - Alps national parks seen as an ‘Icon’ landscape like the GB Reef
Outcomes Of The Mountains For The Future Forum

Compiled by Roger Good

Key Messages and Recommendations

The Australian Alps are arguably one of the most researched biophysical environments in Australia with over 2500 research and technical papers having been published on this research. Research on features and processes of the natural environment have dominated over the many years of research endeavour in the Alps but increasing interest in the history, tourism, recreation and social and economic aspects has seen a commensurate increase in research work addressing these issues over the past 20 years or more. The establishment of the Cooperative Research Centre for Sustainable Tourism (Mountains program) and the Australian Institute of Alpine Studies indicates the scientific significance of the Alps and the recognition of the need for continuing research to provide a basis for sound ecologically based management of the fragile and sensitive mountain ecosystems and catchments, while providing for ecologically sustainable and appropriate recreation and tourism.

As the Alps are biologically significant and hold many values which need protection and conservation, these have been and must remain the bases for management of the region and the establishment of the Alps Parks, hence the natural sciences will always underpin the majority of other values and natural area conservation and protection.

Key Messages

While much research and scientifically based management has been undertaken much is still to be done to ensure that the increasing pressures being put on the resources and values of the Alps do not eventually lead to the degradation of the very features and values that attract people to the Alps. A long-term commitment to research and monitoring of the impacts of external pressures on the Alps ecosystems must be made by the management agencies.

A clear statement must be articulated as to what managers want or desire the Alps region and Alps Parks to be in 20, 50 and 100 years. The Alps and the Alps Parks particularly must be managed conservatively and sustainably to ensure that these stated goals are achieved without further degradation of the alpine ecosystems.

A balance must be found, through appropriate research, between development for tourism and recreation and that of the primary landuse of the Alps, - that of conservation and the protection of the significant water catchments.

Based on scientific research, management models must be developed to further assist managers. The much quoted models such as ‘carrying capacities’ and ‘limits of acceptable change’ must be replaced by ‘catchment threshold models’ which assess and predicted the point where external impacts will result in unacceptable levels of change in the alpine ecosystems. The other models recognise the detrimental impact levels after they become evident; the degradation often being irreversible at that time.

All research must be undertaken as a structured program to avoid duplication, waste of time and resources and to continually accumulate knowledge to assist management.
All research must be undertaken collaboratively and cooperatively between the management agencies, Universities, CSIRO and other external research institutes.

Adaptive management must be undertaken at all times to ensure the results of research can be readily utilised and management strategies can be readily changed to accommodate new knowledge.

The Alps catchments are the most significant in the country and hence catchment stability and functionality must be recognised as priority concerns for research and management.

The Alps have many natural and biophysical values of national and international significance and a full understanding of their role and function within the alpine ecosystems must be pursued.

The precautionary principle must apply at all times in management of the Alps ecosystems.

**Key Issues**

Many pressures are being placed upon the natural resources and values of the Alps and predicably more will arise in the years ahead. The pressures and the impacts are evident across all mountain landscapes but most evident and detrimental in the alpine and subalpine zones. Several major research and management issues are identified which planning and management need to consider and address where possible in the short-term.

**Climate Change**

While management cannot influence any predicted climate change, research and monitoring of the impacts of global warming need to be implemented to enable adaptive management to ameliorate the impacts where possible. Long-term monitoring will be required and should be implemented as part of the global monitoring program currently being established.

Strategies need to be developed to address the impacts of climate change on the biota, particularly the alpine zone biota as well as the impacts on the recreational winter sports industries. The response to a decline in snow cover will predicably lead to an increase in artificial snow-making, with flow-on consequent impacts on the flora and fauna. Similarly, cloud-seeding to increase precipitation and to ameliorate the impacts of reduced snow and or total natural precipitation, could also have as yet, unidentified consequences for the catchments and the native biota.

**Catchment Stability**

The importance of mountains as the ‘water towers’ to a large proportion of the world’s population has long been recognised and the Australian Alps catchments are similarly, just as significant to the Australian population and its health and well-being.

The maintenance of a stable soil and vegetative cover over the mountain catchments is paramount to their protection and functionality. The soils and groundwater communities of the Alps catchments play a major role in the control of flows in the streams and rivers arising in the Alps and hence any pressures likely to lead to degradation of the soils and groundwater communities must be removed or ameliorated to acceptable levels.

Domestic stock grazing was the greatest threat and impact upon catchment stability and functionality up until the 1950s and 1960s and while still occurring in parts of the Victorian section of the Alps, has declined and is being replaced by the pressures and impacts of expansion of development for tourism and recreation. These developments are driven by commercial forces and are increasing rapidly and possibly beyond the capacity of current management strategies to effectively control. In any development program within the Alps, management must ensure that the overriding objective of catchment management is conservation of the core natural values which provide the ecosystem services.

**Fire Management**

Many pressures are evident in the Alps but uncontrolled wildfire and poorly planned and implemented prescribed burning is the greatest threat to catchment stability, water yield and biodiversity. Fire is the greatest threat as it can impact very large areas and many values in a single event over a very short
timespan. Prescribed burning is seen as a major tool to the reduction in the number of wildfire ignitions and the lowering of wildfire intensities. This is only acceptable when soundly planned on a scientific basis and effectively implemented. It would appear that the latter is the not always the case as many wildfires in the Alps are attributed to prescribed burns that have escaped control lines or burnt at intensities beyond those planned.

A full appreciation and understanding of fire ecology by managers must be a priority if fire management planning and its implementation are to continue to improve. Fire management should therefore be a management priority and should be implemented on an understanding and recognition that:

- recurrent high intensity wildfires are inevitable and cannot be prevented from occurring.
- prescribed burning for hazardous fuel reduction is a legitimate and acceptable program but only when implemented following an assessment and quantification of the actual hazard and risks existing at the time, together with a knowledge of the fuel complex planned to be burnt.
- an understanding of the vegetation and its response to particular fire regimes, particularly that of regular low intensity wildfire.
- a recognition that much of the subalpine eucalypt woodland that dominates the alpine landscape is in a young age class such that any fire should be excluded from it for at least another 50 years.
- A recognition that catchment stability is paramount at all times.

**Introduced Species – feral animals and introduced plants**

- As with wildfire, feral animals and introduced plant species have been and remain a major management issue for which additional research and management planning is required.
- While feral animals and introduced plants are recognised as direct competitors with, and threats to the survival of populations of many native plant species together with the destruction of native animal habitat, it is the potential that they provide for the introduction of exotic diseases and pathogens which is of greater concern in terms of management. Little can be done if an exotic disease or pathogen becomes widely established across the Alps, but if such a disease was a threat to agricultural production eradication programs could be implemented in the Alps which would or could include the destruction of infected native animals and plants.

**Tourism and recreation**

- Tourism and recreation in the Alps is significant and are important uses of the natural values of the Alps from which much pleasure, inspiration, education and community well-being is gained. Unfortunately the increasing numbers of tourists and recreational users, particularly of the Alps Parks have the potential to threaten and impact the very features of the Alps which provide for their enjoyment, etc. Recreational use in some areas and sites has already reached levels of impact and degradation exceeding that of the impact of the many years of domestic stock grazing, which itself was considered in the 1950s and 1960s to be a disaster for the alpine biota and catchments.
- A well planned integration of tourism and recreation research and management, with that of natural area conservation and protected area management is now essential and should be further pursued through cooperative arrangements with tourist organisations and research institutes such as the CRC for Sustainable Tourism, CSIRO, and Universities. Without such cooperation and collaboration, tourism and recreation will continue to increase with consequent decline in the natural values of the Alps.
- Tourism and recreation can exist in harmony with natural area conservation and protection but only through effective integration and management of both, recognising that tourist numbers can be infinite if not controlled, while the natural values of the Alps are finite. As with all other external factors operative within protected natural landscapes, the external factors must always be recognised as secondary to the conservation and protection of the natural features and values.

**Recommendations**

- A clear statement be made as to what is the desired /required outcome of Alps research and management programs in 50 to 100 years time.
A firm commitment to continuing research and monitoring be made by the Alps management agencies.

Fire research relevant to the management of the alpine landscapes and catchments be restored to the levels evident in the 1970s when alpine area fire management research and implementation programs were at the forefront of ecologically based fire research.

As mountainous areas around the world are recognised as the first sites to quantify predicted climate change impacts, appropriate research and monitoring should be established in the Australian Alps, as a priority program. This should be as part of the global climate change monitoring program (GLORIA).

An holistic landscape and catchment approach to should be taken in management to ensure conservation and protection of the Alps natural values and the eco-services they provide.

All management planning must recognise and acknowledge that the natural values underpin all other Alps values and hence protection and conservation of these core values must be the paramount priority for research and management.

Strategies for the effective integration of tourism and recreation be developed cooperatively with tourism agencies to ensure the very core natural values which attract tourists and recreational users to the Alps are not degraded – the principles of ecologically sustainable development, conservative and adaptive management and precautionary principles, must be followed.

Specific visitor control strategies such as ballot systems etc for high use areas of the Alps be developed and implemented as soon as practical to reduce the total numbers of visitors / users, the timeframes for visits, and the increasing rate of use and consequent degradation of sites of high public demand.

A greater commitment be made to feral animal and introduced plant control and eradication, and research upon which planning for such can be made.

Strategic plans for the integration of alpine area feral animal control programs into strategic State and Commonwealth programs in the event of a major disease outbreak for which feral and native animals may be or are vectors for spread.

Some Identified Research Needs

- Monitoring of key indicators of predicted climate change
- Increased water monitoring in key streams using the status of aquatic ecosystems to establish the pressures, thresholds and impacts caused by recreation and management programs.
- Studies of ecological processes in the landscape / catchment context
- Monitoring to quantify changes in biodiversity and ecological integrity
- Development and implementation of simple cost-effective methods to evaluate vegetation condition and appropriate fire regimes for the many vegetation communities of the Alps.
- Survey and mapping of weed infestations and monitoring of the rate and extent of spread of populations.
- Assessment of the potential for the introduction of exotic diseases and the potential for impacts on native flora and fauna, together with the development of a risk management plan.
- Increased studies of invertebrates and their role as the primary grazers
- Further detailed mapping of geology and periglacial features together with additional radiometric dating of these features.
- Additional detailed studies of groundwater communities and humus soils and their role in catchment hydrology, water quality and water yield.
- Monitoring of the responses of key native species, communities and ecosystems to management programs.
Final Forum Issues

- Boundaries
- Bio-regional approach
- Fire management
- Common ground and common language
- Partnerships - traditional owners-local communities
- Broad participation (=time)
- Many stakeholders in tourism
- Packaging of quality tourism
- Value of good interpretations
- Tourism for diversity of experiences
- Tourism for range of sustainable uses (and reel to profitability)
- Integration between local communities and protected areas
- Competitive advantage of good environmental management
- Monitoring (Visitor impact)
- Active management of dynamic events
- Climate change
- Info to support management decisions
- Community engagement
- New recreation trends
- Resorts and relationships with park management
- Identification of broad range of cultural heritage values (and layering)
- Indigenous cultural landscape
- Break down culture versus nature
- Aboriginal control (management interpretations)
- Aboriginal employment
- Holistic view of landscape
- Joint management models
- Heritage standards and training (for park managers)
- How much development?
- Parks access for Aboriginal people
- Cross - cultural interpretations (and interpretations of real heritage)
- Single Park (and unifying name for park)
- Access for Aboriginal people for places on pastoral land
- Role of CRC in responding to recommendations
- Education/interpretations critical and runs through all themes (*resources)
- Sustaining tourism? Sustainable tourism?
- Sustaining communities
- Sources for funding shouldn’t just be government
- Are cultural and natural values clashing (weeds, uses) need to be well managed to not clash
- Improve ways of integrating values
- Mining in National Parks (government shouldn’t override Aboriginal community views)
- New commonwealth heritage system. Alps nomination for natural list??
- Conservation outside protected areas also!
- Biosphere reserve – greater emphasis (take care in how term is used)
- Snowy River (flows, water)
- Renaming features
- Role of arts and festivals in finding common ground
- Conservation corridors (continental scale)
- Less fragmentation of landscapes throughout Australia
- Nepal –establish bio-geographical boundaries instead of admin

Key Recommendations

- Information archive – availability of information to managers and community
- Management funding be appropriate to the value of the mountains and catchments
- A clear vision of what we want of mountain parks and catchments be articulated
- That landscape level management issues be well founded and objectives not watered down
- Remove inappropriate mountain impacts (eg grazing)
- Need to manage for a range of tourism opportunities
- Monitoring is essential (impacts)
- Leadership with an outcome focus
- Recognise good quality info – research and development centre for the Alps to also make information available
- Encourage industry to help
- Use and resource Indigenous people
- Alps Management agencies to recognise trends in recreation
- More meaningful engagement of Indigenous peoples in alpine resorts
- Resorts to be brought in to alps
- Licence system across alps and resorts
- Continue and use momentum from conferences – ie works program
- Create centre for excellence in mountains
- More conferences such as this with community involvement
- Reinforce indigenous peoples rights, roles and attachments with mountains
- Recognise resorts/tourism heritage
- Indigenous ownership of cultural and interpretation of that
- Landscape approach to heritage
- Huts managed as a group
- ICOMOS and alps staff – training
- Aboriginal employment
- Do not forget indigenous heritage
- Additional items
  - Recommendations from M.P.A. (note the “M” is what was recorded)
  - Consider an indigenous park name
  - Education and interpretations be better resourced to help change communities
  - Consider centre for excellence for mountain management
  - Don’t just rely on government funds – seek alternative / philanthropic funding
  - Indigenous involvement in the future management of the Snowy River
  - Off reserve conservation critical (biosphere reserve system?)
  - Simple clear communique from the conference in addition to the recommendations
  - Traditional name for the Snowy when it flows again