Australian Institute of Alpine Studies

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International Mountains Day Function
Re- launch of the *Ecosystems of the Monaro*

Roger Good

On Saturday 11th December last year, sixty work associates and friends of Dr Alec Costin gathered at Jindabyne to enjoy an International Mountains Day dinner and the re-launch of The Ecosystems of the Monaro, that Alec wrote in the early 1950s and was first published by the NSW Government Printer in 1954. This book has been the 'Bible' of mountain ecosystem understanding and conservation since it was first published and as such it was very appropriate that the book be reprinted and re-launched in facsimile format, almost 50 years to-the-day, on International Mountains Day.

The gathering of friends and associates included Professor Frank Fenner, who as one of Australia's most eminent scientists has taken a great interest in research and conservation of the Alps. Professor Fenner provided personal funds to the Academy of Science in the early 1980s for an annual conference on the environment with the Alps Liaison Committee being the first recipient of this funding in 1988, when it held the conference on the 'Scientific Significance of the Australian Alps'. It was an honour to all attending that Professor Fenner wished to and agreed to launch the book. Other noted mountain researchers and special guests were Professor Ralph Slatyer, Dane Wimbush and Colin Totterdell.

On Sunday morning a breakfast for guests was held at the VIP Lodge at Waste Point, followed by a presentation by Alec Costin to guests, KNP staff and a number of interested Jindabyne people, on his 50 years of involvement in the mountains. Many wonderful historic slides of the mountains were shown during Alec's presentation, which displayed the importance of his work (and that of his co-worker Dane Wimbush) to the stability of the mountain ecosystems today.

After Alec's very interesting slide presentation, a ceremonial cutting of a large and tasty 'Alps' cake, took place during an hour of friendly and enthusiastic discussion on all aspects of the mountains.

It was agreed by all present that the International Mountains Day should be celebrated every year in the future with a function that brings all interested people together for the benefit and promotion of the conservation of our scientifically significant mountains and the water catchments within them.

AIAS meeting Jindabyne (Sawpit Creek) January 2005

The Annual meeting this year was held at Sawpit Creek on the weekend of 22-23 January. Unfortunately the timing was not good for Tasmanian participation but hopefully this will be remedied next summer when Tasmania hosts the meeting. The meeting began after lunch on the Saturday with about 40 people attending. Talks in the initial session were on a diverse range of topics - mountain catchments, wilderness, small mammals in the subnivean space, soil chemistry, mountain earthquakes and ice cover on Blue Lake (see Abstracts on page 3). The next session, titled, Plants, Peat and Feet included plant recruitment over altitudinal gradients, water in peat soils, climate change and alpine peatlands, colder plants in a warmer world, summer snowdrifts and alpine vegetation, and the environmental impacts of camping.

Thirty or so attended an enjoyable dinner and socialising session at Banjo Paterson Inn in Jindabyne on Saturday night.

The next morning, not having overindulged, everyone (most) arrived for the fire session with talks on regeneration of snowgums post fire followed by podocarpus regeneration, tree-line dynamics, and regeneration in mountain environments following disturbance. After morning tea, the field trip took us to Rennix Gap to examine the structures for sampling small mammals in the subnivean space (see Abstract), to look at the water flow through a bog, rehabilitation research at Pengilley's Bog, recovery of snowgums and rehabilitation of Guthrie Bog with the field trip finishing up at Charlotte Pass to look (from a distance) at the GLORIA and snowpatch study sites and to relax and enjoy the view

Thanks to the NPWS Education Centre for the use of facilities and to Dan Nicholls, Mary Green and Glenn Sanecki for assistance in making sure everything ran smoothly.

Monitoring the health of catchments and Rivers of the Snowy Mountains

Graeme Enders, NSW Premiers Department

The protection of mountain catchments is a fundamental principle in the management systems for the Australian Alps national parks of New South Wales, Victoria and the ACT. Strongly expressed in plans of management, it is therefore somewhat surprising that a comprehensive and systematic approach to the monitoring of catchment condition (as expressed in relevant water-bodies), and the exploration of adaptive management of catchments in response to such monitoring has not yet (apparently) evolved. Studies have tended to be focussed on acute management issues affecting water quality, e.g. around ski resorts (e.g. NSW DEC/NPWS/UCAN Norris et al.), or have attempted to categorise the nature of alps rivers (e.g. NSW DEC/EPA, AALC). A few studies have examined the relationships between catchment management effects and river health and ecology (e.g. Lisa Simpson/UCAN-Norris et al.). The corporatisation of the Snowy Mountains Scheme in NSW presents an opportunity to expand knowledge and management science in this area, centred on the delivery of agreed environmental flow allocations to certain mountain rivers in Kosciuszko National Park. The key adaptation in management in this case will be in the quantity and timing of flow releases from Snowy Scheme structures, in response to the resultant biological and physical condition of the particular stream. This knowledge resource should prove to be a valuable addition to other catchment studies, and may with some sense of purpose, result in a better understanding of the relationships between catchment condition, river health, and flow management for the Alps National Parks. The AIAS appears to be in a good position to guide the development of a balanced approach.

Comprehensive Regional Assessment of Wilderness in the Snowy Mountains

Wil Allen, NSW Dept of Environment and Conservation

The wilderness assessment took a lurch forward when in 1997 wilderness was made an integral component of the comprehensive regional assessment of forests. For areas other than the Snowy Mountains this meant large tracks of contiguous timbered land were transferred from State Forests into the reserve system. In the Snowy Mountains however, the CRA assessment only found new wilderness areas within National Park. Six new areas were identified. All Southern CRA identified wilderness was exhibited and a summary produced of the public submissions. Each new area identified in the Snowy Mountains had its own set of issues and its own set of detractors and supporters. The NPWS recommended that four of the six new areas be declared and the Government agreed. This presentation briefly describes the wilderness assessment process used in the mountains and the unique issues that were reviewed in terms of conservation and visitation management.

Home range and activity of the bush-rat, *Rattus fuscipes* and dusky antechinus, *Antechinus swainsonii* beneath the snow

Glenn Sanecki

Radio telemetry was used to investigate changes in home range sizes and activity patterns of *Rattus fuscipes* and *Antechinus swainsonii* in a subalpine heathland at Perisher Creek, Kosciuszko National Park, southern New South Wales, in response to the accumulation of snow during the winter.

We estimated home range area for each animal during the autumn and winter using two methods, minimum convex polygon and 95% and 50% utilisation contours using the kernel method. With both methods, the home ranges of *R. fuscipes* and *A. swainsonii* were significantly smaller ($P<0.001$) during the winter when compared to autumn home range size. Both species were restricted to areas of dense wet heath close to the main drainage line.

Rattus fuscipes showed signs of social interaction during both seasons in contrast to *A. swainsonii* which appeared to remain solitary. In winter, *R. fuscipes* nested communally at a single location, while during autumn it appeared to use a number of nest sites.

There was no significant change in daily activity patterns between autumn and winter in either species. *Rattus fuscipes* remained primarily nocturnal during both pre-nival and nival periods while *A. swainsonii* continued to be active throughout the diel cycle, although there was a slight shift in its peak activity time.

Earthquakes in the Australian Alps

Kevin McCue, Australian Seismological Centre, Canberra ACT 2601

The model of earthquake occurrence known as Plate Tectonics explains why more than 90% of shallow earthquakes occur in narrow continuous bands around the Earth. It assumes that the plates outlined by these active bands are rigid and therefore aseismic, but our experience in Australia clearly contradicts this assumption. That intra-plate Australia suffers earthquakes simply indicates that the stress imposed by the plate driving forces exceeds the strength of our crustal rocks.

The recent great magnitude 9 earthquake off Sumatra ruptured a 1200km long fault along the Australian/Indian and Eurasian Plate boundary. Fracture initiated about 250 km SW of Banda Aceh in northern Sumatra at the fault's southernmost end and propagated north to the Andaman Islands in about 6 minutes. The vertical displacement of the seafloor along the fault averaged about 10m which gave rise to the destructive tsunami.

Small earthquakes up to the size of the 1989 Newcastle NSW earthquake (magnitude 5.6) have been observed in the Snowy Mountains since about 1850 but mapped faults in the region are not longer than about 100 km. Therefore, the largest expected earthquakes should not exceed the largest observed in the last 100 years in Australia, in 1906 in WA, with a magnitude of 7.2. This is the size of the 1995 Kobe Japan earthquake that caused widespread destruction, more than 5000 deaths, and displacement of about 1m on a 30km long fault.

Seismograph networks monitoring the Alps include National Seismograph Network operated by Geoscience Australia. Their seismographs have a spacing of about 300 km in SE Australia, not close enough either to detect small earthquakes or locate the focus of events accurately enough to associate them with particular faults in the Alps. The Crackenback and Berridale Faults are two of a set of large conjugate faults in the Alps which control the structural style and river paths. Environmental Systems and Services (ES&S) Melbourne run more extensive networks in Victoria and NSW but not distributed well enough to monitor the whole Alpine region. Snowy Hydro has had a local area network since the late 1950s to monitor earthquakes in the vicinity of its dams in NSW. The network is now digital with data from two stations telemetered to ES&S who provide automatic detection and an alerting system to Snowy Hydro using information from all their various networks.

Earthquakes of magnitude 5 or more in mountain areas

Date	Magnitude	Place
1868, 29 August	5.0	Mt Hotham Victoria
1959, 18 May	5.3	Rocky Plains near Berridale NSW
1966, 3 May	5.0	Mt Hotham Victoria
1982, 5 July	5.4	Wonnangatta Victoria

Earthquakes as small as magnitude 5 can cause structural damage. A magnitude 5 event causes rupture on a fault area of about 1 sq km. For every 10 earthquakes of magnitude 5 or more we can expect one of magnitude 6 or more. Shallow earthquakes of magnitude 6 can cause landslides on steep or unstable slopes, liquefaction in saturated silty sands, and surface faulting of about 10 km length with tens of centimetres of displacement which could disrupt stream flows, and damage pipelines. In the two weeks since the 2004 Sumatran earthquake there were at least 4 (micro) earthquakes detected by the Snowy Hydro seismographs within 30km of Jindabyne, none of which have been reported as felt locally.

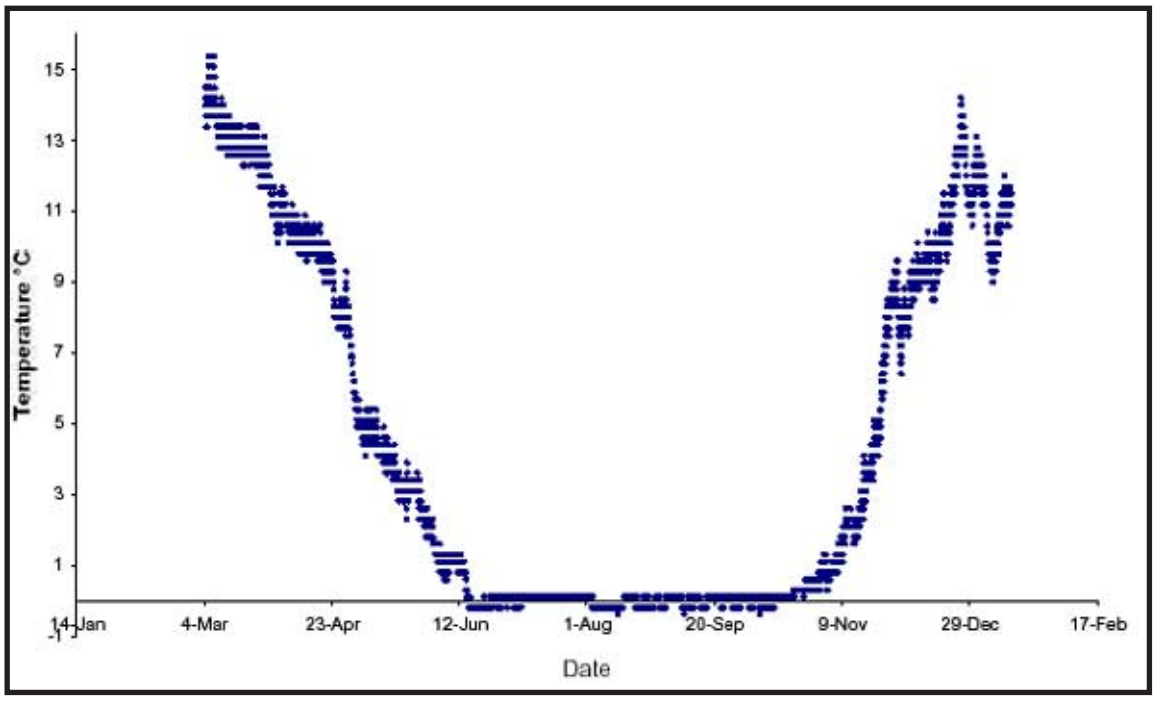
Seismologists hope to be able to compute the focus of the frequent small earthquakes well enough to determine whether any of the faults mapped by geologists are active and measure the strong ground shaking near the epicentre so that engineers can review the design and robustness of critical structures. Alert systems give engineers and emergency personnel rapid advice 24 hrs/day for response and checks of critical structures.

Dynamics of the ice cover on Blue Lake

Ken Green

Blue Lake is the largest mainland alpine glacial lake and the only one fulfilling the ITEX criterion for size. People normally envisage Australian ice forming in the same way as on an Antarctic Lake – slowly freezing from the top down. This probably occurred on lower altitude lakes such as on Diggers Creek at the old Kosciusko Hotel where ice skating was possible on the hard water-ice. However, as with many alpine lakes, only a thin layer of the surface water of Blue Lake freezes. This is then weighed down by snow until the ice is below the hydrostatic layer – the normal water level of the lake. Slush is then formed from snow and lake water which then freezes to form another ice layer. This process can be followed by examining the ice sequence, drilling with an ice corer. Coring was undertaken every three weeks through winter 2004. The sequences of soft and hard ice can be felt while drilling and confirmed once the core is retrieved by identifying the hard ice layers either with a knife or by light – light is transmitted through denser ice but softer layers are opaque. Apart from the initial top layer, very little liquid water freezes so this layer could be identified and followed through the season. Samples of this ice and the softer layers above showed an increasing pH throughout the season. The water was not contributing to the alkalinity which was attributed to a source in the snow deposited on the lake –possibly containing windblown ash from the 2003 bushfires.

A Tinytag data logger was anchored in Blue Lake at a depth of 110cm below the surface in March 2004. Despite it sitting beneath 2.2 metres of ice over winter it came out intact and with readings for the entire period (see chart).



Other aspects of the work on Blue Lake ice include recording the date of ice breakup as a measure of global warming. It appears that the ice might be breaking up earlier with passing years but: there seems to be a good correlation with date of breakup and date of snow thaw so that ice dynamics may be just reflecting the 30% or so decline in snow precipitation. The final aspect of the work on Blue Lake ice is the snow algae which was found for the first time on Australian lake ice in 2002 and in 2003 was recorded for the first time in association with a dinoflagellate.

Alpine plant recruitment processes over altitudinal gradients

Susanna Venn

Theory predicts that plants which grow at the extremes of an environmental gradient are likely to show reduced rates of recruitment when compared to their counterparts in more favourable habitats. In an alpine landscape, low seed viability and germinability, and low seedling establishment is predicted in plant communities which grow at the higher, harsher end of an altitudinal gradient. One mechanism which may act to reduce such high rates of seedling mortality in high altitude areas may be the role of plant-plant interactions.

At the harsher end of the gradient, several studies have shown that positive plant interactions dominate, essentially facilitating survival and growth of neighbouring plants. Neighbours can provide protection from wind and increase soil surface temperatures. Alpine plants can therefore 'nurse' each other by providing a buffer against the physical extremes of the abiotic environment.

In this paper I will introduce these ideas and present some results from recent field experiments which highlight the importance of positive and negative plant interactions across an altitudinal gradient in Victoria.

Size/age distribution and vegetative recovery of *Eucalyptus niphophila* (snowgum, Myrtaceae) on year post fire in Kosciuszko National Park

Catherine Marina Pickering and Kristy Barry

Size/age distribution and vegetative regeneration was examined for 50 *Eucalyptus niphophila* Maiden & Blakely in each of eight subalpine sites in Kosciuszko National Park one year post the January-February 2003 bushfires. Trees were generally large and mature, with an average of 2.5 trunks, lignotuber diameter of 54 cm and largest trunk diameter of 18 cm, with a few larger/old trees at all sites. Converting the diameter of largest trunk into rough age estimates using an existing regression formula gave minimum (~29 years), maximum (~186 years), median (~58 years) and average ages of ~64 years. No trunks <2.5 cm diameter (or ~29 years) were present post fire while for those trees present post fire 96.5% had lost all existing leaves. Nearly all trees (95%) had lignotuber regeneration, but only 4.25% of trees had epicormic shoots on trunks and stems. Size/age was correlated with some but not all measures of regeneration. In the future existing trunks could senesce, with nearly all regrowth from the lignotubers. This could result in a change from open woodlands with large/old trees with a few trunks to closed woodlands of lower growing trees with a mallee form. The extent of shoots from the lignotuber is likely to be affected by grazing of rabbits and hares and possible low temperatures.

Podocarpus regeneration after fire at the Cobberas

Arn Tolsma, Arthur Rylah Institute for Environmental Research

Populations of Mountain Plum-Pine (*Podocarpus lawrencei*), ranging in size from around 10 m^2 to 3000 m^2, were assessed at five peaks on the Cobberas Range, eastern Victoria in March 2004. The aims were to determine the extent of damage to the populations from the 2003 fires, the mode and success of regeneration, and any threats that might act upon that regeneration.

The proportion of each population killed varied substantially, ranging from zero to 95%. The total proportion killed at each of the five peaks ranged from 2% to 63%, with an overall average of 28%. Podocarpus did not carry fire with the same intensity as adjacent shrubby vegetation, but it was sufficiently sensitive to fire that burning of the bark at the base of the trunk caused plant death.

Regeneration of scorched plants was occurring, albeit at low levels, through resprouts on the trunks and branches, and occasional root resprouts. Sprout location was directly related to the intensity with which individual plants were burnt or scorched. Low numbers of seedlings were present, ranging in size from around 2 to 6 cm.

Fire management plans to protect the remaining populations are recommended, along with continued rabbit control. Weeds do not currently pose a threat. However, periodical monitoring of weeds and other factors that might affect on-going regeneration success is recommended.

The impact of climate change on the distribution, function and condition of alpine peatlands on the Bogong High Plains, Victoria

Andrea White

The aim of my PhD project is to explore the potential impacts of climate change on the condition, function and distribution of peatlands on the Bogong High Plains (BHP). Ecological models will be used to describe the current distribution of the peatlands, and also to make predictions of distribution changes under a number of different management and climate change scenarios.

The process of degradation at the level of individual peatlands, and the way in which this contributes to degradation of the catchment, will be investigated. This will be carried out using aerial photo interpretation and field investigations.

The mossbeds of the BHP represent a rare and restricted vegetation type (McDougall 1982). They also provide critical ecosystem services, and are of major importance to overall catchment health. It has been postulated that the mossbeds have contracted a great deal since European settlement (Costin *et al.* 1959, Wimbush 1970), with some suggesting that up to 50% of mossbeds have disappeared, being replaced by other vegetation types. The extent of humified peat (peat that has been exposed to oxygen and is in the process of decomposing) indicates that mossbeds have contracted in distribution (Costin *et al.* 1959). There is also indication that there has been some recovery of mossbeds since grazing pressure has been reduced in the BHP (McDougall 2003), and also by the results of exclusion experiments carried out in Rocky Valley (Wahren *et al.* 2001).

The models developed in this project will aid in the development of decision support systems for the management of the BHP, and will help to set management priorities and constrain activities. Estimating the impact of management and climate change scenarios will form the basis of planning for the mitigation of these impacts.

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Water movement and storage in peat soils

Sam Grover

Bogs have long been considered an important component of the catchment hydrology in the Alps. However there has been little research on how bogs actually function. The hydraulic conductivity and water retention properties of bog peat and dried (humified) peat provide some insight into this question. These results suggest that the change from bog to dried peat will substantially alter catchment hydrology.

Annual variation in the distribution of summer snowdrifts in the Kosciuszko alpine area, Australia, and its effect on the composition and structure of alpine vegetation

Tobi Edmonds

Australian alpine ecosystems are expected to diminish in extent as global warming intensifies. Alpine vegetation patterns are influenced by the duration of snow cover including the presence of snowdrifts in summer, but little quantitative information exists on landscape-scale relationships between vegetation patterns and the frequency of occurrence of persistent summer snowdrifts in the Australian alps. This information is required to enable spatial models of global warming impacts to be developed.

We mapped annual changes in summer snowdrifts in the Kosciuszko alpine region, Australia, from Landsat TM images and modelled the frequency of occurrence of persistent summer snowdrifts from long-term records (1954–2003) of winter snow depth. We then compared vegetation composition and structure amongst four classes that differed in the frequency of occurrence of persistent summer snowdrifts.

A curvilinear relationship existed between annual winter snow depth and the area occupied by persistent snowdrifts in the following summer (r^2 = 0.9756). Only 21 ha (0.42% of study area) was predicted to have supported summer snowdrifts in 70% of the past 50 years, whilst 440 ha supported persistent summer snow in 10% of years.

Mean cover and species richness of vascular plants declined significantly, and species composition varied significantly, as the frequency of summer snow persistence increased. Cushion plants and rushes were most abundant where summer snowdrifts occurred most frequently, and shrubs, grasses and sedges were most abundant in areas that did not support summer snowdrifts.

Synthesis and applications: Results demonstrate strong regional relationships between vegetation composition and structure and the frequency of occurrence of persistent summer snowdrifts. Reductions in winter snow depth due to global warming are expected to lead to substantial reductions in the extent of persistent summer snow. As a consequence, shrubs, grasses and sedges are predicted to expand at the expense of cushion plants and rushes, reducing landscape vegetation diversity. Fortunately, few vascular plant species appear to be totally restricted to areas where summer snow occurs most frequently. The low occurrence of *Coprosma niphophila* seems to indicate a decline in the area of snowpatch feldmark as *C. niphophila* is one of the key species of that alliance.

Camping in KNP: Is there a lasting environmental impact?

Andrew Growcock

Within the Kosciuszko National Park, backcountry camping is a popular activity often undertaken in remote backcountry areas. In managing these backcountry areas, the New South Wales National Parks and Wildlife Service has a two-fold objective: (1) to preserve and enhance the capacity of natural ecological processes and systems to evolve and (2) allow for suitably equipped and experienced visitors to enjoy challenging recreational experiences in a natural setting. Such objectives reflect the duel mandate which is found in many protected areas around the world.

In managing these backcountry areas, the current strategy in Kosciuszko National Park when considering camping is to disperse use: camping is permitted in most areas without focusing on specific sites. Like many recreation activities however, backcountry camping has the potential to have a number of adverse impacts upon the environment. In mountain areas, where the environment is often slow to recover, these can be of great concern.

This study examined the impact of short term backcountry camping on two vegetation communities that are likely to receive frequent use in the alpine and subalpine zones of Kosciuszko National Park during the

non-winter period. In undertaking this study, data on visitor use were assessed to provide information on group sizes and visitation patterns while experimental campsites were established to assess how intensity of use influenced the amount of impact.

Results from this study indicated that (1) most groups going camping in the alpine area were small (4 people or less); (2) visitation was concentrated around major public holidays and weekends during the summer; and (3) small groups (four people or less) did not have a measurable effect on alpine and subalpine vegetation after one year when camping for short periods of time (one and three nights). Specifically, this study found that: (1) there was an immediate reduction in the height of vegetation; (2) short term increases in dead material cover occurred after camping; (3) impacts were no longer evident one year after camping; (4) there were few differences in the level of impact between areas under tents and within cooking and activity areas; and (5) there was no difference in the impact of camping on alpine and subalpine vegetation. Such results suggest that the current policy of dispersed camping in these areas is generally effective.

Alpine treeline dynamics: Interactions between fire, soil fertility and vegetation

Libby Rumpff

This research aims to investigate interactions between fire, soil and vegetation across transitions from sub-alpine vegetation communities (dominated by the Australian snowgum, *Eucalyptus pauciflora*) to alpine vegetation communities in the Victorian Alps.

Current interest focuses on the effects of global warming on alpine treeline dynamics. If it is assumed that tree species at the tree-line are at some sort of climatic limit, then it is probable that this ecotone may respond to a shift in climatic conditions. The rate at which treelines may migrate is of global concern, given that this has important implications for carbon storage reserves and also the long-term future of alpine vegetation. However, migration rates are inherently difficult to predict in the short-term as a greater understanding of the relationships that influence current treeline position is required.

This study aims to examine the variability in soil resources and properties over the treeline, with focus given to the changes in soil fertility over the transition to alpine vegetation. The capacity of the soil to deliver nutrients to plants may be affected by changes in nutrient content, soil moisture, soil depth, soil temperature, pH and biological activity. Each (or all) could be expected with a change in microclimate associated with the shift to treeless vegetation. The aim is to determine whether tree growth/establishment in alpine environments is limited by a reduction in soil fertility in alpine vegetation communities.

It can also be expected that resource use will vary between vegetation types (and species) over the transition zone, and perhaps the patterns of distribution of vegetation may reflect the pattern of resources. Hence, this research will also investigate the case for 'positive feedbacks' between soil and vegetation, whereby plants modify the environment to benefit their own survival. This will be achieved through analysis of nutrient (N) and litter cycles within each vegetation community, in conjunction with a study of soil fertility under isolated *E. pauciflora* in (predominantly) treeless vegetation communities (tree outposts). It may be that alpine plant species may have a competitive advantage over the tree species *E. pauciflora* with regard to the ability to access and utilise resources in a resource poor environment.

This study will also examine soil-vegetation relationships over treelines that were burnt in the 2003 fires, and those that remained unburnt. The 2003 fires provided the opportunity to examine treeline dynamics following disturbance (i.e. does fire create the opportunity for tree seedlings to establish beyond the treeline?), and also to monitor the response of soils and vegetation in both communities dominated by *E. pauciflora*, and by treeless vegetation types. In the years following the 2003 fires, vegetation (and soil) succession can be explained in detail, and a greater understanding of how disturbance and soil-vegetation feedbacks affect tree-line dynamics may be obtained.

fungal news

Snowbank-associated Myxomycetes in Australia

Dr. Steven L. Stephenson, Department of Biological Sciences, University of Arkansas

The myxomycetes (plasmodial slime molds) are a group of fungus-like organisms usually present and sometimes abundant in terrestrial ecosystems. However, most species tend to be rather inconspicuous or sporadic in their occurrence and thus not always easy to detect in the field. Moreover, their fruiting bodies, which are usually no more than a millimeter or two in height, are relatively ephemeral and do not persist in nature for very long.

One group of myxomycetes is restricted to alpine areas of mountains, where they are found fruiting along the margins (usually no more than a meter and often much less) of melting snowbanks in late spring and early summer. The species that occupy this rather special and very limited habitat are usually referred to as "snowbank" or "nivicolous" myxomycetes. They constitute a distinct ecological group, since they produce fruiting bodies only during the relatively brief period of time when the special microenvironmental conditions associated with the margins of melting snowbanks and apparently required for their growth and fruiting exist. During the remainder of the summer, the species of myxomycetes found in these alpine areas are very much the same as those collected at lower elevations in the same regions.

For the past three years, thanks to funding provided by a grant from the Australian Biological Resources Study (ABRS) Participatory Program, Steve Stephenson from the University of Arkansas in the United States has been studying the myxomycetes of Australia. His ultimate objective is to produce a monograph on the group as part of the series on the fungi of Australia. During the period of mid- to late October of 2004, Stephenson and John Shadwick, a research assistant from the University of Arkansas, searched for snowbank-associated myxomycetes in the mountains of southeastern Australia. Most of their fieldwork was carried in the high-elevation region around Mt. Kosciuszko in southern New South Wales, but trips also were made to Mt. Buller and Mt. Hotham in northern Victoria. Snowbank myxomycetes were found to be quite common at some study sites, and about 300 specimens were collected. These specimens appear to include a number of species, especially in the genus Lamproderma, not previously known to occur in Australia. Interestingly, a few specimens of snowbank myxomycetes were collected on the summit ridge of Mt. Kosciuszko at an elevation of about 2226 m, whereas a number of other specimens were collected at elevations below 1700 m on the slope below Eagle's Nest and along the road to Charlotte Pass.

In the Northern Hemisphere, certain species of macrofungi are restricted to alpine snowbank habitats, but few examples appear to occur in similar situations in the Southern Hemisphere. However, Stephenson collected the fruiting bodies of a cup fungus (apparently a species of Peziza) from several of the localities that also yielded specimens of snowbank myxomycetes.

Other Abstracts

A technique for using hair tubes beneath the snowpack to detect winter-active small mammals in the subnivean space

Glenn Sanecki and Ken Green
European Journal of Wildlife Research

The study of winter-active small mammals beneath the snowpack has proved challenging for researchers because of the relative inaccessibility. We present a technique using hair tubes that permits the detection of small mammals active in the subnivean space. Hair tubes are cylindrical or funnel-shaped structures containing suitable bait and an adhesive surface that harvests hairs from small mammals as they attempt to reach the bait. Hair tubes eliminate many of the difficulties often associated with live trapping and permit the expansion of systematic sampling to larger scales than allowed by conventional live-trapping methods. The technique was used successfully to detect five small mammal species in the subnivean space in Kosciuszko National Park (KNP) in southeastern Australia. These included the common bush-rat, *Rattus fuscipes*; the dusky and agile antechinus, *Antechinus swainsonii* and *A. agilis*; the broad-toothed rat, *Mastacomys fuscus*; and the mountain pygmy possum, *Burramys parvus*. Although hair tubes have a number of limitations, such as not providing a measure of abundance or allowing the identification of individual animals, we believe that these limitations are balanced by the fact that the technique can be used at any spatial scale. Hair tubes are particularly suited to studies of animal distribution at the landscape scale, because many hair tubes can be deployed and dispersed over large areas, and monitored on a regular basis by a small team of researchers. The technique also makes use of readily available, low-cost materials and could be easily adapted to a range of conditions and different target species.

Drought-related dieback in four subalpine shrub species, Bogong High Plains, Victoria

John W. Morgan, Department of Botany, La Trobe University, Bundoora VIC 3083
Cunninghamia 8: 326-330.

Subalpine shrubs on rocky slopes on the Bogong High Plains, Victoria, were observed to be severely desiccated over the summer of 2002/03 after a 50 day period when only 1.2 mm of rainfall was recorded. Moderate to severe canopy dieback was noted in shrubs growing on rocky north- and west-facing slopes. Four shrubs were assessed for their drought tolerance on west-facing slopes at Basalt Hill and this was related to local soil depth and shrub canopy area. Soils were rocky and uniformly shallow across the site (mean depth = 11.32 ± 0.69 cm). *Prostanthera cuneata* was the most drought tolerant species (as evidenced by the least amount of canopy dieback observed) followed by *Hovea montana*, *Pimelea axiflora var. alpina* and *Epacris glacialis*. All *E. glacialis* plants (n = 16) had died at the study location whereas no *P. cuneata* plants (n = 45) had canopy dieback that exceeded 60%. The amount of dieback observed was not significantly associated with either local soil depth at the site or shrub canopy area. Hence, very small plants were not more susceptible to drought nor were shrubs found on the shallowest of the soils at the site. This suggests that drought effects are possibly dependent on local influences such as topography, drainage patterns and competition intensity. Drought has only rarely been considered a major factor affecting the abundance and distribution of subalpine shrub species in Australia but this study suggests that it should be added to the list of abiotic factors governing the local dynamics of subalpine vegetation. In particular, the high mortality of *E. glacialis* observed in the study area suggests that non-equilibrium dynamics are likely to be the 'norm' for some shrubs in subalpine areas.

Global Warming And The Threat To Sagarmatha National Park

Many of you will have read the alert concerning Sagarmatha National Park (SNP) and Mt Everest via the MF transmission sent on 17th November 2004 by Salima Khatoon for Mountain Forum. The same message provides linkage with reports published by BBC News, The Independent (London) E-mail Newsletter, and Environmental News Network. In essence, these reports explain that a formal delegation of very distinguished environmentalists is presenting to UNESCO a petition to request that SNP be placed on its World Heritage in Danger List. The primary threat is related to melting snow and glacier ice that is causing rapid formation of unstable glacier lakes that could burst out at any time endangering "the lives of thousands of people and destroying the environment".

This is an eminently important step that is being taken by a large number of environmentalists, mountaineers, researchers, and consultants. Nevertheless, it runs the risk of substantial misrepresentation. Furthermore, it may deflect attention from equally important challenges to the integrity of SNP, as well as many other mountain areas throughout the world. For Nepal, and especially SNP, these include:

* severe damage to the upper timberline belt vegetation and alpine meadows by large numbers of trekkers and porters
* an excessive number of mountaineering expeditions permitted by His Majesty's Government
* inefficient park management
* environmental damage perpetuated by the Nepalese military
* the Maoist Insurgency in general
* over-dramatized reporting that risks undermining the credibility of environmentalists. For instance, the prediction in the current group of reports that "even the world's highest mountain, Everest, could one day be nothing but a rock" would require about 20 degrees C of climate warming

Over the last five years or so there has been a growing trend in the news media to focus on the dangers of glacial lake outburst floods (GLOFs or the Icelandic 'jökulhlaup') and Imja Lake in the Khumbu is one of the newly formed glacier lakes that has attracted a lot of attention. The fact that Imja Lake has been carefully researched since 1985 (with many relevant publications) has been subsumed within statements in the current group of reports such as: "At an altitude of over 4,000 m [actually slightly over 5,000 m], the crew found a vast lake, which according to their maps [which maps?], had not been there a few decades before." The site of Imja Lake was photographed in 1956 by Prof. Dr. Fritz Müller, member of the Swiss expedition to Everest and Lhotse; in 1963 from the summit of Ama Dablam by Dr. Barry Bishop, National Geographic Society; and subsequently by many Japanese and United Nations University research teams. This widely published history and careful survey appears to have escaped the notice of the current group of environmentalists and film makers.

It is to be applauded that the distinguished group of environmentalists who are presenting their petition to UNESCO emphasize the urgent need for the careful survey of unstable glacial lakes and repeat monitoring of Himalayan and Peruvian glaciers. I made the same plea in an ICIMOD publication in 1986 but did not have the political clout to cause much of a reaction. At least ICIMOD has recently taken a good first step in publishing two large glacier inventories (Nepal and Bhutan, resp. Mool et al., 2001a, 2001b). Nevertheless, a methodical scholarly approach is needed, in contrast to an over- dramatized rush for consulting contracts; this should include the collection, replication, and archiving of photographic images as a basis of the study of glacier and lake change.

These and other relevant topics are discussed much more extensively in my recently published book Himalayan Perceptions: Environmental change and the well-being of mountain people (Ives, J.D., 2004, London and New York:Routledge).

It would also be of great interest to learn what the Friends of the Earth and associated members of the group presenting the petition to UNESCO think can be done to 'save Mt Everest from global warming.'

Refs. Mool, P.K., Bajracharya, S.R. and Joshi, S.P. (2001a): Inventory of Glaciers, Glacial Lakes, and Glacial Lake Outburst Floods, Nepal, Kathmandu, ICIMOD.

Mool, P.K., Wangda, D., Bajracharya, S.R., Kunzang, K., Gurung, D.R. and Joshi, S.P. (2001b): Inventory of Glaciers, Glacial Lakes, and Glacial Lake Outburst Floods, Bhutan, Kathmandu, ICIMOD.

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FROM THE WEB

Back from the dead, the mountain mouse not seen for 40 years
Luke Harding in Berlin
Tuesday 7 December 2004
The Guardian

It was last seen 42 years ago and was believed to be extinct. But the Bavarian short-eared mouse – a unique species of rodent that lives in a remote part of the Alps – has made a surprise comeback. A German zoologist last spotted the extremely rare mouse in 1962, after discovering the species in Bavaria. Zoologists have been fruitlessly searching for the mouse, known as Microtus bavaricus, ever since.

Yesterday, however, it emerged that the species was not extinct after all but was still alive and well and living in the Austrian mountains. An Austrian scientist, Friederike Spitzenberger, stumbled upon the species in one of her "living traps".

Yesterday Dr Spitzenberger, who works at Vienna's Natural History Museum, said the mammal looked very similar to other rival kinds of mouse. But it was, in fact, a unique species that had evolved 10,000 years ago at the time of the last ice age, after becoming stranded in the Rofan mountains, just across the border from the German Alps.

"Technically it's not a mouse at all but a vole," Dr Spitzenberger explained.

"All the voles look like sausages with four legs. They all have tiny ears and short tails. You have to look at their teeth to tell them apart. But the only real way to tell is to examine the genetics."

She added: "The mouse is extremely rare. Probably only a few hundred of them exist. We now have to make sure that they don't die out."

Dr Spitzenberger said she found the mouse in August in an isolated spruce forest full of brooks. But it was only after examining its chromosomes and comparing its DNA with that of a stuffed museum specimen that she was able to identify it as the lost species.

There were only a handful of indigenous species living in central Europe, most of them "remnant" populations that got separated from the evolutionary mainstream.

"We have a very diverse number of mammals and birds," the scientist said. "But because of the intense management of forests, several of them are in danger."

What were the mouse's prospects now? "I'm optimistic," she said.

India Hopes to Breed Endangered Tibetan Antelope

Conservationists in the Indian Himalayas want to set up a program to breed an endangered Tibetan antelope that is slaughtered in huge numbers to make super-fine shahtoosh wool. Even though the Convention on International Trade in Endangered Species banned this trade in 1979, families who have been living off this business for generations continue to slaughter and produce.

For more details please follow the link below. http://www.enn.com/today.html?id=258

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Your comments on the content or contributions for future issues are most welcome. Please contact Dr Ken Green, PO Box 2228, Jindabyne NSW 2627, email: ken.green@environment.nsw.gov.au.
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