World Conservation

Mountain high
Mountains on the agenda

When the United Nations declared 2002 International Year of Mountains, its aim was to celebrate the biological and cultural diversity of our planet’s mountain regions and the human cultures they nurture, and to draw the world’s attention to the importance of these fragile and vulnerable ecosystems on which so many human lives and livelihoods depend.

The international community is responding with a multitude of events and celebrations, in the hope of putting mountains firmly on the world agenda. This special issue of World Conservation is an IUCN contribution to those efforts.

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Centre: Pilgrim to Mt Kailas, a sacred centre for both Hindus and Buddhists in Tibet. Edwin Bernbaum
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1. MOUNTAIN VALUES

For eons mountains have supplied their inhabitants with the resources essential for self-sufficient lifestyles, and the rest of humanity with water, timber, recreation and inspiration. As we enter a period of transformation and changing demands, our challenge is to adapt to these new conditions while preserving both the natural and cultural values of mountain environments.

For the love of mountains

Yolanda Kakabadse

In the Andes of Ecuador where I was born, people consider mountains as gods and goddesses. We grew up close to the nature of the mountains, and aware of the intimate and unbreakable bonds between our environment and our culture, between our pursuit of the practical necessities of life and the spiritual meaning that makes life worthwhile.

The natural and cultural diversity of the Andes spans glaciers, high grasslands (paramo), cloud forests, other montane forests, volcanoes, lakes, market towns and indigenous settlements. As a result, the Andes are the most visited region in the country and a pillar of our tourist industry.

As a major ecosystem representing the complex and interrelated ecology of our planet, mountain environments are essential to the survival of the global ecosystem.

– Agenda 21, Chapter 13, “Managing fragile ecosystems: sustainable mountain development”

We are but one of many countries of the world to be blessed with mountains – and to find them threatened. Therefore I was particularly gratified when, in 1998, the UN General Assembly declared 2002 the International Year of Mountains. This action responded directly to Agenda 21 – the major outcome of the 1992 Earth Summit in Rio de Janeiro – Chapter 13 of which highlights the need for urgent action to achieve sustainable mountain development.

IUCN can be proud of the role it played, before and since the Earth Summit, in getting mountain issues onto the world agenda. But there is still much to do.

The International Year of Mountains is a timely event for the Union and its members, and part of a series of international events in which mountain issues take centre-stage (see box on page 5).

This special issue of World Conservation is dedicated to our mountains, so rich in resources and crucial to life on Earth. It is equally dedicated to mountain peoples – so often the poorest of the poor yet so rich in culture, who face such enormous obstacles to development and prosperity. Perhaps the last hope for many of them, and our great challenge over the next few years, is to make our political leaders and our collective public realize the need to protect mountain environments and cultures, and to develop them equitably, wisely and sustainably.

Yolanda Kakabadse is President of IUCN.
Why mountains matter

Lawrence S. Hamilton

What is a mountain? There are technical definitions, though not everyone agrees with them, and most people would say they know one when they see one. My own operational definition is that a mountain is conspicuous, steep sided, having altitudinal plant zonation, and at least 700 m (2300 feet) in relative relief. This covers a range from Mount Everest to the Scottish Highlands.

An easier question to answer is: Why are mountains so special to us?

First, mountains invariably have deep cultural significance for the people who live in and around them. The world’s major religions have sacred or venerated mountains. Artists, poets, writers, and alpinists have given us ample evidence of their special metaphysical relationships to mountains. And mountains are able to lift the spirits of even the weariest hikers or jaded tourists.

Second, mountains are home to at least one-tenth of the world’s human beings, including the most endangered minority ethnic groups. The cultures of these often marginalized people are being eroded by heedless development. But they are too precious to lose. They add richness to our world fabric, and they harbour priceless traditional knowledge about how to live sustainably in these fragile environments.

Third, mountains are the water towers of the world, receiving the bulk of the planet’s precipitation. Enormous quantities are stored as snow and glaciers, which then feed the watercourses on which we all depend and generate from 60 to 95% of the freshwater of the planet (see page 6). For instance, the Nile and the Indus from their sources in the mountains nourish the life and economies, respectively, of Egypt and Pakistan. Elsewhere, mossy, lichen-draped mountain cloud forests capture moisture which otherwise would not reach the ground.

Finally, biological diversity is very great in the mountains. This species richness is due largely to the extreme heterogeneity of mountain climates and soils, the rapid elevational changes, variable directional aspects, and abundant microhabitats. Moreover, a great share of the world’s endemic species are found in mountains due to the isolated island nature of mountain massifs. They are often the last bastions of wild nature—“islands” in a sea of transformed lowlands, and thus provide a home for much of the world’s remaining biodiversity (see page 8).
Mountains possess other inherent characteristics which call for our special concern and care.

Mountains are dynamic centres of incessant change. They manifest powerful geological processes of vulcanism, surface erosion, uplift, earthquakes, landslides, torrents and rockfalls. Mountain people have to cope continuously with these hazards, as do flora and fauna.

Mountain climates are as variable and extreme as their topography, and the soils thin and fragile. The result is continual stress to their vegetation and fauna, rendering mountain ecosystems vulnerable and slow to recover from disturbance.

Mountain ecosystems are also strongly affected by human impacts on the atmosphere including long-distance transmission of air pollution, acid rain, photochemical smog, and airborne heavy metals (see page 13). Global warming will wreak havoc on mountain flora and fauna, as their habitats are shifted upwards in elevation to an increasingly smaller area.

Mountain “islands” where there is no opportunity for longitudinal migration will be most severely affected (see page 14).

The human communities of mountains are also particularly vulnerable. They are relatively remote from centres of population, wealth and power, which compounds their economic and political marginality.

Mountain ridges are often frontiers between peoples and nations, and tend to be zones of tension or conflict (see page 19). An example is the Siachen Glacier warfare in the Kashmir. They can provide refuge for the lawless, the rebels and the disenchanted members of society, further adding to the tension.

Action for mountains

The ability of mountains to arouse our passion and loyalty can be a real boon in marshalling the support of governments, NGOs, local communities and individual mountaineers for sustainable mountain development. When our sense of sacredness or wonder does not give them enough protection, we can give them secural status as national parks, monuments and preserves. Their use as national borders offers singular opportunities for the establishment of border parks, peace parks and transborder cooperation which have myriads of ecological, economic, social and cultural benefits. Mountains are no less deserving of our commitment than are tropical rainforests, coral reefs, deserts, and the like. This recognition came 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 implementing this chapter.

To be successful this process requires broad public support. This is being fostered by IUCN and its World Commission on Protected Areas (WCPA), particularly in the run-up to the Vth World Congress on Protected Areas (Durban, South Africa, 2003). It is being fostered by a fine journal, Mountain Research and Development, and by an electronic network, the Mountain Forum (see pages 35–38). Mountain Agenda is being guided by an Interagency Task Group led by FAO.

And 2002, the International Year of Mountains, is an opportunity for all of us to renew our commitment to the protection and sustainability of our mountain heritage.

Emeritus Professor Lawrence S. Hamilton is Vice-Chair (Mountains), IUCN World Commission on Protected Areas.

He is also a partner in the ISLANDS AND HIGHLANDS Environmental Consultancy, Vermont, USA.

Mountain calendar

Among the recent and future international events to address mountain issues, either as a central focus or a cross-cutting theme, are:

1992  Earth Summit issues Agenda 21, Chapter 13 on mountains
      IUCN/WCPA Mountain Theme established
1995  Global Mountain Forum founded
2001  World Mountain Symposium (September-October, Interlaken, Switzerland)
      IYM official launch (December, New York, USA)
2002  International Year of Mountains

      International Year of Tourism
      Celebrating Mountain Women (May, Kathmandu, Nepal)
      International Conference of Mountain Children (spring, Uttaranchal, India)
      Mountain Forests in 2002 (June, Foral de Navarre, Spain)
      World Summit on Sustainable Development (September, Johannesburg, S. Africa)
      2nd World Meeting of Mountain Populations (September, Quito, Ecuador)
      Bishkek Global Mountain Summit (October-November, Bishkek, Kyrgyzstan)
      Planetary Garde ’02, Mountains Future (November, Chambéry, France)
      Banff Mountain Summit 2002 (October-November, Banff National Park, Canada)
2003  Vth World Congress on Protected Areas (September, Durban, South Africa)
2004  Convention on Biological Diversity, 7th Conference of the Parties
      3rd World Conservation Congress (IUCN)

For other meetings and activities, and more information and links, see http://www.mountains2002.org/
People throughout the world have always looked to mountains as the source of water, life, fertility, and general well-being. Mountains have been, and in some places still are, worshipped as the home of weather deities and as the source of clouds and rain that feeds springs, rivers and lakes on which societies may depend for their very existence.

In times of drought, the Kikuyu people faced Mount Kenya and asked the god Ngai for rain. The Inca people constructed their temples on the highest peaks over 6000m in the arid Andes. In China, villages traditionally had a temple dedicated to the local mountain deity responsible for clouds and rain.

Soon their appeals may take on added urgency. It is estimated that 35% of the global population will experience water scarcity by 2025, highlighting the importance of mountains as “water towers.”

**Origins**

All of the world’s largest rivers originate in the mountains, where precipitation is much higher than in the surrounding lowlands. This is particularly important when the lower courses flow through semi-arid and arid regions of the tropics and subtropics, which cover almost 40% of the land surface.

Mountain waters captured at high altitudes are carried by streams or groundwater aquifers to the lowlands where the water demand from population centres, agriculture and industry is high. The distance covered can be hundreds to thousands of kilometres.

In humid areas, the proportion of water generated in the mountains can comprise as much as 40–60% of the total freshwater available in the watershed, while in semi-arid or arid areas, this proportion is much higher, from 80% to more than 90%.

**Storage capacity**

High and cold mountains store precipitation as snow and ice. During the summer or dry season, when temperatures rise, meltwater is released precisely at the time when precipitation is at a minimum and water demand, particularly for irrigation, is at a maximum. This seasonally delayed release is indispensable for many mountain and lowland farming communities.

In tropical, subtropical, and mid-latitude mountains only 1% of the global freshwater resources is stored as ice and snow. This supply is vital, however, for filling lakes, recharging groundwater and supporting lowland rivers in the dry season.

A glance at a rainfall map in most areas of the world will show isohyets (lines of equal precipitation) of increasing precipitation looking very like the rising contours of the highlands. The classic example of mountain water supply is the River Nile, which irrigates one of the oldest civilizations in the world at least 3200 km downstream from where the rain fell.

**Mediterranean: a legacy of deforestation**

Many of the mountains of the Mediterranean basin have traversed all the stages of degradation from lush climax forest to bare denuded rock. In many places, the process began in antiquity with deforestation to provide fuel for cooking, pottery and tile-making, timber rafters for houses and wooden war galleys for Greek, Roman and Carthaginian fleets. As early as the fourth century BC, Plato is quoted as describing deforestation around Athens: “What remains now, compared to what existed, is like the skeleton of a sick man, all the fat and soft earth wasted away and only the bare framework of the land left.”

Archaeological studies have tended to confirm the sombre view now taken of mountain degradation. Many ancient civilizations whose collapse was formerly inexplicable are now thought to have succumbed to its effects, made even worse by human population pressure.

Medieval navies consumed the forests too. It is estimated that the fleets engaged in the Battle of Lepanto in 1571 needed the felling of a quarter of a...
million mature trees which were taken, more and more often, from mountain slopes. And today mountain forests, guardians of water quality, are exploited without regard to their water conservation role. The result in modern times is impoverished rural populations herding goats to get some return from barren uplands, with lowland industrial plants working short time and uneconomically because of irregular supplies of cooling and process water. Even the provision of drinking and sanitation water for tourism infrastructure becomes so expensive (sometimes requiring desalination plants) that it forms a brake on development.

Needed: management and monitoring

In general, mountains to date have been treated as a resource to be used with little restriction. There has been inadequate hydrological monitoring and poor dissemination of the little information that does exist. This, together with an inadequate knowledge of mountain hydrology, insufficient consideration of highland-lowland interactions, and poor basin water resource management, can result in serious degradation not only of water quantity and quality but also of mountain ecosystems and biodiversity.

There is a great need to improve the current monitoring and management of mountain water resources. There is also a great need for increased public awareness that mountains truly are the “water towers of the world.”

Bruno Messerli is Professor of Geography, University of Berne, Switzerland, former President of the International Geographical Union and co-leader of the Programme on Mountain Ecology and Sustainable Development of United Nations University.

Mount Kenya: vital water for a semi-arid region

Mount Kenya (5199m), the second highest mountain in Africa, provides water to over two million people. Rivers originating from its glaciers flow through the moorland to the forest belt, where rainfall is highest, to recharge river and groundwater aquifers. Some 90% of the dry season flow of the Ewaso Ng’iro River is produced in Mount Kenya’s alpine zone, moorland, and montane forest belt (above 2400m).

On the lower slopes and at the foot of the mountain, both the population and the cultivated area have more than tripled over the last 20 years. River water abstractions for irrigation have increased to ten times that which is legally permitted, and the average dry season flow of the Ewaso Ng’iro River and its tributaries from the Aberdare Mountains decreased from 9m³/s in the 1960s to 1.2 m³/s in the 1980s.

Consequently, the unique wildlife ecosystems of the Samburu and Buffalo Springs game reserves in the lowlands suffer during the drought period, as the river now dries up. This is bad for tourism, the primary source of foreign exchange in the region. Nomadic pastoralists and their livestock, and the wildlife living in the lowlands, are drastically affected by the resultant water shortage and forced to move upstream in the search for water and grazing land. As a result, conflicts with farmers are increasing.

Changes in land use also have an impact on river flow and water quality. Removal of vegetation cover and intensified land use on the slopes of Mount Kenya have led to increased surface runoff during heavy storms, causing erosion and pollution of the surface water. Previously unknown flash floods have been recorded in recent years, inundating old farmhouses and tourist lodges. As a result, there is less water stored in the mountains to feed the rivers during the dry seasons.

Fortunately, Mount Kenya National Park and adjacent Forest Reserve provide some protection to this valuable resource.

– Hanspeter Liniger and Francis Gichuki, Professors at the Universities of Berne, Switzerland, and Nairobi, Kenya, respectively.
Throughout history, as we watched our lowlands become permanently altered by commercial agriculture, industry, infrastructure and urban settlement, we humans have raised our eyes to mountains, both for inspiration and as the last stronghold of nature.

Today, even after centuries of increasing flatlander-exploitation and impoverishment, mountain ecosystems remain repositories of great genetic, species and ecosystem diversity.

Mount Kinabalu in Sabah, for instance, is estimated to have 4000–4500 species of plants, which is about one-quarter of all the native species in the USA (see page 12). The richness of the fynbos of South Africa is renowned (see page 16). Moreover, species endemism is particularly high in mountains owing to geographical isolation. That faunal biodiversity correlates well with plant diversity is demonstrated by BirdLife International’s recent maps of endemic limited-range birds.

Much scientific and popular concern to slow species extinctions have focused on 25 ‘hot-spot’ areas in the tropics. Sixteen (over half) of these are either mountains or have at least half their area in mountains. For example:

➤ the uplands of Madagascar
➤ Andean slopes of Western Amazonia
➤ Eastern Himalayas (Nepal, Bhutan, and neighbouring Indian states plus China’s Yunnan)
➤ the uplands of the Philippines
➤ the eastern arc montane forests of Tanzania
➤ mountains of Central America
➤ Brazil’s Atlantic Forest

This richness in biological diversity is due to the altitudinal zonation of life forms on these 3-D landforms, their different directional exposures, their soil variability and abundance of micro- and mesohabitats which are characteristic of mountains. Other factors are light intensity and quality change, rainfall variability and natural disturbance regimes.

On relatively high mountains in the tropics, vegetation may range from sub-montane tropical rainforest to dry montane tropical forest, boreal forest, alpine heaths, cloud forests, grasslands, tundra and permanent ice fields. Each has its own assemblage of plant and animal species, even the ice fields. But wherever mountains come under human use, the flora and fauna may be drastically altered by agriculture, forestry, water management, mining and infrastructure.

Food and medicine

Mountains supply us with abundant natural resources, among which we can count the genetic diversity of their rare or unique species. For instance, we have taken some of our most important current food staples from mountain storehouses. Potatoes come to us from the Andes; the current International Centre for Potato Research, including the conservation of priceless genetic material, is located here. We secured coffee originally from the Ethiopian Highlands; it is now grown in uplands throughout all the continents in a wonderful array of varieties – as is maize, barley and wheat.

Our mass-produced, commercial agricultural crops periodically need fresh infusions of genetic material from their wild relatives. New technologies in plant and animal breeding have increased the value of our genetic storehouses, rather than reducing our reliance. The only known stands of the most primitive wild relative of corn or maize are found on a 2880m mountain in Sierra de Manantland, Mexico. The former Soviet Union has established a reserve to

The bearded vulture Gypaetus barbatus is identified with mountain ecosystems throughout Europe, Africa and Asia.

The snow leopard Uncia uncia of the high mountains of Central Asia is threatened by poaching, loss of prey, conflicts with herders and habitat destruction.
produce the wild relatives of wheat and fruit trees high in the Caucasus Mountains.

A long list of medicinal materials are derived from high wildlands, and these provide actual and potential benefit to all humankind. The importance of wild plants for local subsistence (food and medicine) is well illustrated by the annual fair in Dali, Yunnan (China), where as many as 574 species of medicinal and food plants are brought for trading by mountain people.

Animal products of many kinds are also part of the diverse mountain economy. And some of the world’s most interesting and rare mountain animals are the basis for much of the nature-based tourism in some areas; for example, the mountain gorilla in Rwanda/Uganda/DR Congo, the resplendent quetzal in Costa Rica and Guatemala, and the spectacled bear in the Andes.

We need to know more about these banks of biological wealth, and about the potential for a sustainable flow of benefits. We can learn much about this from traditional mountain peoples who have had a long association with, and dependency on, these natural resources. Mountains contain exciting possibilities for new products for humankind.

Moreover, there is an ethical imperative not to destroy the wonderful diversity of life on Earth. All countries have an obligation to stop and think of better, more responsible, and sustainable ways to pursue mountain development. The Convention on Biological Diversity, signed by almost every nation, recognises this responsibility, and mountain biodiversity will be the focus of the Conference of the Parties at its meeting in 2004.

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**CULTURE** Fountains of inspiration

Edwin Bernbaum

As the highest features of the landscape, mountains tend to become associated with the highest ideals and aspirations of societies around the world, both modern and traditional. In particular, they highlight cultural and spiritual values and beliefs that deeply influence how people view themselves and their environment.

Mountains in general awaken a sense of wonder and awe that sets them apart as places of evocative power and significance. Certain peaks are singled out as traditional sacred mountains with well-established networks of myths, beliefs, and religious practices. Many mountainous areas that may or may not be revered in themselves contain sacred sites such as temples, springs, and groves.

**Home to the gods**

People revere mountains for a variety of reasons. One especially widespread view sees the mountain as a sacred centre. Hindus and Buddhists regard Mount Kailas in Tibet, for example, as a physical manifestation of Mount Meru, the cosmic axis around which the universe is organized. Many religious traditions look up to mountains as abodes of deities or as deities themselves. The ancient Greeks viewed...
Mount Olympus as the fortress of Zeus and the Olympian gods. For native Hawai’ians today, Kilauea represents the physical body of the goddess Pele.

Mountains may also take the form of places of worship, viewed as altars, shrines, temples, and cathedrals. Here a deity does not necessarily reside in or on the peak, but rather the mountain provides a special setting for making contact with a divine presence through prayer, ritual, or contemplation. This is particularly true of Western monotheistic religions such as Christianity and Judaism.

Symbols of the transcendent

Many mountains are viewed as manifestations of the other world – earthly paradises, abodes of the dead, ancestral beings. East Africans traditionally bury their dead facing sacred mountains like Kilimanjaro and Mount Kenya. Maori tribes of New Zealand consider themselves descended from divine ancestors who froze into peaks such as Tongariro and Aoraki.

Mountains play a particularly important role as sources of diverse blessings. Curanderos or traditional healers draw their curative powers from Andean peaks such as Ausangate in Peru. Elderly women climb Tai Shan in China to make offerings to have grandchildren. The Hopi of Arizona depend on the rain-bearing Katsinas of the San Francisco Peaks for their very existence.

Mountains are also revered as places of spiritual revelation and transformation. Mount Sinai occupies a prominent place in the Bible as the site where God reveals the Ten Commandments to Moses. In China, mountains are regarded as such ideal places for spiritual transformation that the Chinese expression for embarking on the practice of religion means literally “to enter the mountains.”

Because of their varied topography and isolation, mountains harbour many traditional societies attuned to the diverse environments that sustain them. These societies have preserved storehouses of knowledge and practices ranging from the uses of medicinal plants to ways of living in harmony with the natural world.

Symbols of cultural identity

Mountains function as important symbols of communal and cultural identity. At intratribal gatherings Maori ritually identify themselves by first stating their tribal mountain, followed by their river, or lake, and then their chief. The perfect cone of Mount Fuji has come to symbolize the quest for beauty and simplicity that lies at the heart of Japanese culture.

Mountains also embody cultural values and ideas essential to the vitality of modern societies. William O. Douglas, a United States Supreme Court Justice, wrote: “A people who climb the ridges and sleep under the stars in high mountain meadows, who enter the forest and scale peaks, who explore glaciers and walk ridges buried deep in snow – these people will give their country some of the indomitable spirit of the mountains.”

Wellsprings of poetry and philosophy

Mountain peaks and ranges such as Fuji and Huang Shan have long inspired artists and poets in East Asia. Interest in the European Alps for scientific, artistic, and mountaineering reasons developed as philosophers and writers such as Jean-Jacques Rousseau, Johann Wolfgang von Goethe, and Percy Bysshe Shelley began to extol their spiritually uplifting qualities. In the United States John Muir, a major figure in the genesis of the American environmental movement, worked to preserve pristine mountain environments as places where society needs for spiritual and physical renewal.

For many people, both modern and traditional, the ‘environment’ is not just the natural environment. It includes cultural and spiritual aspects that make it meaningful – a source of life in its deepest and broadest sense. People who perform rituals to draw water from a sacred mountain, for example, do not view the water and mountain simply as physical parts of the ecosystem needed to grow their crops, but as essential components of a larger system of meaning that sustains them spiritually, culturally, and physically.

For assurance of long-term success, conservation programmes and messages need to be grounded in deeply held values and beliefs. The inspirational value of mountains, in particular, has played a key role in the establishment of the modern environmental movement and is one of the most effective tools for galvanizing public support for the preservation of parks and protected areas throughout the world.

Edwin Bernbaum of Berkeley, California (USA) is Director of the Sacred Mountains Programme of The Mountain Institute. Visit http://www.mountain.org/
WORLD HERITAGE  Mountains galore

Jim Thorsell

One-third of all Natural World Heritage sites are in mountain areas, making mountains the best-represented biome on the prestigious World Heritage List. In just the past two years, seven new mountain sites were inscribed, bringing the total number of mountain areas on the list to 52.

Among the recent additions were Kinabalu Park in Sabah, Malaysia; Gunung Mulu National Park in Sarawak, Malaysia; and Drakensburg in Natal South Africa.

In December 2001 the World Heritage Committee inscribed the first Natural World Heritage site in the Alps, the internationally outstanding Jungfrau-Aletsch-Bietschorn area of Switzerland.

As a contribution to the International Year of Mountains (2002), the World Heritage Committee is supporting a project proposal to conduct a global overview of existing and potential mountain areas on the World Heritage List. This is being conducted under the auspices of an IUCN member, the Banff Centre for Mountain Culture (see page 37) by WCPA Vice-Chair for Mountains Larry Hamilton and myself.

In this review we will be assessing the extent of the coverage of the world’s mountain protected areas under the Convention. Our work will be greatly facilitated by the new mountains database at UNEP-WCMC with the support of UNEP and UNESCO.

Jim Thorsell is IUCN’s Senior Advisor – World Heritage.


Visit UNESCO’s World Heritage Centre website at: http://www.unesco.org/whc

uKhahlamba-Drakensburg in Natal South Africa

This 242,800ha park has exceptional natural beauty in its soaring basaltic buttresses, incise dramatic cutbacks, and golden sandstone ramparts. Rolling high altitude grasslands, the pristine steep-sided river valleys and rocky gorges also contribute to the beauty of the site. The site’s diversity of habitats protects a high level of endemic and globally threatened species, especially birds and plants.

This spectacular natural site also contains many caves and rock shelters with the largest and most concentrated group of paintings in Africa south of the Sahara, made by the San people over a period of 4000 years. The rock paintings are outstanding in quality and diversity of subject and in their depiction of animals and human beings. They represent the spiritual life of the San people who no longer live in this region.

Jungfrau-Aletsch-Bietschorn of Switzerland

Jungfrau-Aletsch-Bietschorn area in Switzerland (54,000ha). The scenic splendour of the JAB area is world-renowned, and thanks to protection measures dating from 1933 it remains one of the most undisturbed natural areas in the Alps. It features extensive glaciation and rugged topography, and contains the largest glacier in Europe in terms of both area and depth, the Aletsch.

For its record of productive scientific research on geology, geomorphology, climate change, biology and atmospheric physics, the JAB is unsurpassed in Europe. It hosts a wide range of species typical of the Alps, and is surrounded by outstanding historical monuments and a harmonious cultural landscape.
2. UNDER SIEGE

From development to climate change to war, human activities are leaving a deep imprint on mountain ecosystems, species and human communities. In this section we will look at some of the pressing problems facing mountain communities as a result of human activities, and consider some responses.

ENCROACHMENT Danger in the clouds

Sampurno Bruijnzeel and Lawrence S. Hamilton

In the Talamanca Mountains which cross the border of Panama and Costa Rica, a large trans-border Biosphere Reserve, called La Amistad (Friendship) has been created. This 1.1 million hectare area includes the largest tract of cloud forest in Central America.

La Amistad contains roughly 10,000 higher plant species, 400 bird species, 250 reptile and amphibian species and many species of mammals, including six species of tropical cats. More than one-third of the plant species are found nowhere else on Earth.

Yet this treasure house of biological diversity is under assault, even though it has Protected Area status. The rugged terrain, high rainfall and poor soils once discouraged forest conversion to other land uses, when better land was still available.

But with population increases and the loss of fertility of previously farmed land on lower slopes, colonists are rapidly moving up the mountain slopes into the montane rain forest, mostly for grazing but also for fruit and vegetable production.

Illegal drug production is best carried out in remote areas, and cloud forests in Colombia and other Andean countries are under assault from this extremely lucrative activity. Similar processes are at work in mountain areas around the world.

The rate of cloud forest loss must be slowed or even halted. With few exceptions, the land uses that replace or impair cloud forests are not sustainable, economically marginal at best, and/or illegal.

Indicators of change

Unfortunately, we still know too little about how cloud forests function to ensure their long-term conservation. Monitoring programmes are crucial for these often stressed, slow-to-recover ecosystems, and should include changes in weather, air and precipitation quality, and levels of ozone and UV-B radiation.

Moreover, the use of indicator species can reveal even slight environmental changes. For example, the dramatic crashes in cloud forest amphibian populations in Costa Rica since the 1970s following changes in the regional climate suggest that these species could serve as effective bio-indicators. Epiphyte communities living on the exposed branches of the upper canopies of cloud forests may be equally suitable.

The more we discover about the cloud forest ecosystem, the better we can raise awareness among communities that live with these unique assemblages of life; the better we can influence decision-makers in national capitals and international forums; and the easier it will be to design effective conservation programmes to protect and sustainably manage cloud forests. This work will require the cooperation...
of researchers, communities, decision-makers and conservation and development practitioners.

The Tropical Montane Cloud Forest Initiative is bringing them together to combine and integrate their understanding, awareness, policy, and hands-on experience. It involves IUCN’s Forest Conservation and Wetlands and Water Resource Programmes, the Mountain Theme of IUCN’s World Commission on Protected Areas, the UNEP World Conservation Monitoring Centre, UNESCO’s International Hydrological Programme, WWF’s Forests for Life and Freshwater Programmes, the Vrije Universiteit Amsterdam, The Netherlands Committee for IUCN and NGO representatives from Africa, Latin America and Asia.

Europe and North America offer the world a fine example of how not to develop if you care about mountain ecosystems.

Air pollution connected with burning of fossil fuels and a complex of industrial technologies has been regarded as a serious environmental problem in mountain ranges on both continents since the 1970s. One of the most striking examples is Central Europe, where all mountain ecosystems have been affected.

The most visible evidence, obvious to anyone who has lived here for the past several decades, is the dramatic, large-scale decline of the region’s forests. Its signs are unmistakable: retarded tree growth; decreasing foliation and fertility; and greatly reduced natural regeneration. Look more closely and you will see greatly impaired photosynthetic and mycorrhizal processes, soil chemistry, and nutrient and water balance.

Mountain forests are particularly vulnerable, because their structure is markedly simpler than that of lowland forests, and their microclimates more extreme. The degree of forest damage increases with increasing altitude. Once weakened, these forests are even more sensitive to extreme weather episodes and insect outbreaks.

Coniferous stands are much more impaired than mixed and deciduous forests, and decline is quicker in non-native than in native stands.

**Reduced diversity**

The damage can also be seen in the decline in plant species diversity and reduced fauna (both invertebrates and vertebrates). Decaying forests and newly formed clearings offer conditions for penetration of some species from alpine and subalpine vegetation belts, and gradually forest species are replaced by open-habitat species.

Alpine, subalpine and montane meadows suffer from the input of elements that increase their nutrient level (especially nitrogen). Plant composition is changed in favour of nitrogen-loving species, and the diverse native plants of nutrient-poor mountain meadows tend to disappear.

Water ecosystems, both running and stagnant, are affected by ‘acid rain’ as well. Increased eutrophication and water acidity negatively influence populations of aquatic plants, invertebrates, indigenous fish and amphibians, and especially their sensitive development stages.

**Is restoration possible?**

How are we to restore the air-polluted mountain environment? We must, of course, start by reducing air pollution to remove the cause. Then we must try to repair the damage.

We know a great deal more about restoration of forests than of other habitats. Key approaches include...
conservation of natural tree populations, gradual re- 
construction of native stands, and restoration of de- 
stroyed areas in close-to-nature species composition 
and with respect to ecological conditions. 

Restoration methods combine artificial planting 
with natural regeneration, support the planting of 
young trees under the protection of heavily damaged 
or dead ‘mother’ stands and the establishment of new 
forest groups (biocentres) which are gradually en- 
larged. Stabilization of the upper timberline by layer- 
ing is also successfully used. 

But what about the wildflower meadows? Restor- 
ing the diversity of these areas requires special man- 
agement procedures, some of which are simple 
enough, such as mowing and removal of plant 
biomass at the appropriate time of year. But restor- 
ing habitats and watercourses above the timberline is 
a much more complicated proposition, and efforts so 
far have had controversial results. 

For the most part, restoration of fragile mountain 
habitats is a difficult and expensive undertaking with 
an uncertain outcome. The rest of the world would 
do well to learn from Europe’s example and simply 
prevent air pollution damage in the first place. 

Jiri Flousek is Deputy Director of Krkonose National 
Park, Czech Republic. Visit http://www.krnap.cz/

CLIMATE CHANGE Can we cope? 

Martin F. Price 

Climate change is now accepted as a reality by most 
scientists and by a significant proportion of policy- 
makers in governments around the world. Since 
mountains cover nearly a quarter of the Earth’s land 
surface, climate change is clearly of concern to the 
hundreds of millions who live in mountain areas. Yet 
climate change in mountains is of vital importance to 
the entire global population. 

Disappearing glaciers; changing rivers 

At the global scale, one of the best pieces of evidence 
for climate change is the retreat of glaciers, because 
this process ‘integrates’ the effects of gradual warm- 
ing and changes in precipitation over long periods. 
Except for some glaciers near coasts, the phenomenon 
is worldwide. Kilimanjaro has lost 82% of its icecap 
since 1912. In Europe, both the Alps and the Caucas- 
sus have lost half their ice in the past century. New 
Zealand glaciers have shrunk 26% since 1890. In the 
thousands of glaciers in the Tien Shan of Central Asia, 
22% of the ice volume has disappeared in the past 40 
years. Monitoring this phenomenon can provide on- 
going evidence of the rate of climate change and is 
also essential to plan the allocation of water from the 
many glacier-fed rivers, of vital importance both for 
human communities and for the survival of many 
populations and species. 

Changing ecosystems 

Mountains are centres of biodiversity for a number of 
reasons, including their range of altitudes, their di- 
versity of habitats at all scales, their isolation, and past 
evolution and migration. 

This rich heritage is protected by a disproportio- 
nately high percentage of the world’s protected areas. 
Yet many of these are ‘islands’, either literally or figu- 
ratively – surrounded by ecosystems changed beyond 
recognition by human activities. Many species will be 
edangered as changes in temperatures, precipitation, 
frost frequency and other climatic factors mean that 
the conditions necessary for continued growth and 
reproduction disappear. In some cases, populations 
may be ‘metastable’, persisting until a serious envi- 
ronmental perturbation – such as fire, landslide, 
flood, or windstorm – pushes them beyond the point 
of no return. 

For species living on the uppermost slopes of 
mountains, climate change may mean that as the suit- 
able habitat space moves upwards there is nowhere 
higher to go; and that there is also increasing com- 
petition from species migrating from below. The picture 
is further complicated in many of the mountains of 
developing countries, where population growth and 
economic forces will also lead to cultivation and
Mountain climates vary significantly over very small distances; there are very few regions for which we have data which can reasonably describe them, and the interactions between climates, species, and economic activities are very complex. It is therefore remarkably difficult to predict likely scenarios, let alone their possible timeframes.

In many mountain regions, climate change will not be the driving force of change for some time, if ever; it will be added to other forces such as land use change and air and water pollution, compounding the challenges of deciding how to manage in an uncertain world.

Nevertheless, climate change is undoubtedly taking place, and mountain ecosystems and the people who depend on them will be directly affected. Mountain climates are not as attractive as they used to be, and the dangers of travelling through them are increasing. Such uncertainty points to the need for mountain people to develop or maintain multifunctional economies and flexible approaches to their use of their landscapes. For conservation agencies, cooperation and flexibility should be keywords.

**Winners and losers**

As with all aspects of climate change, there will be not only ‘losers’ but also ‘winners’ among mountain biota. Some species will become more abundant – and these may well include species that are currently endangered. Trees may grow better and at higher altitudes.

Yet we have to assume that many mountain ecosystems in future decades and centuries will be different from those today – as paleo-ecological research shows, every species responds differently to change in climate. The survival of many species depends not only on the climate, but also on other species, vital for pollination, seed dispersal, food, etc.

Another factor to consider is the different generation times of different species. For instance, in a forest ecosystem, disease-causing insects may be able to adapt more quickly to new climatic conditions than trees, leading to increased pressures and, in some cases, death. All of these interlocking issues imply the need for continued research to increase our understanding of species population dynamics and conservation biology at the landscape level. The biosphere reserve model developed by UNESCO may be of particular relevance. Already 163 biosphere reserves are in mountain areas. Yet it seems probable that in situ conservation may be impossible for some mountain species. In a few decades, they may only exist in gardens, zoos, or genebanks.

**Living with uncertainty**

Changes in the availability of water, and also the relative proportion of precipitation falling as snow or rain, will affect mountain people at least as much as changes in temperature. However, the changes in the frequency of extreme events – such as avalanches, heavy snowfalls, floods, droughts, and frosts – predicted by climatologists will probably have more serious impacts than changes in average conditions. In addition to changes in plant communities of all types, from forests to alpine tundra, many mountain landscapes seem likely to become more unstable, threatening residents, tourists, and those in transit on roads or railways.

These trends may have serious consequences for the increasing proportion of mountain people – including the managers of many protected areas – who are coming to rely on tourism as a major source of income, as tourists develop perceptions that mountain landscapes are not as attractive as they used to be, and that the dangers of travelling through them are increasing. Such uncertainty points to the need for mountain people to develop or maintain multifunctional economies and flexible approaches to their use of their landscapes. For conservation agencies, cooperation and flexibility should be keywords.

Mountain climates vary significantly over very small distances; there are very few regions for which we have data which can reasonably describe them, and the interactions between climates, species, and economic activities are very complex. It is therefore remarkably difficult to predict likely scenarios, let alone their possible timeframes.

In many mountain regions, climate change will not be the driving force of change for some time, if ever; it will be added to other forces such as land use change and air and water pollution, compounding the challenges of deciding how to manage in an uncertain world.

Nevertheless, climate change is undoubtedly taking place, and mountain ecosystems and the people who depend on them will be directly affected. At the same time, mountains are also key locations for understanding what is happening to our world; monitoring and research focusing on mountain glaciers, hydrological systems, and sensitive species are of vital importance to us all.

Martin F. Price is Director of the Centre for Mountain Studies at Perth College, UHI Millennium Institute, Scotland, UK, Chairman of the European Mountain Forum, and a member of WCPA. Visit http://www.mtnforum.org/regions/europe.htm
Regional perspectives on climate

The future of the fynbos

The fynbos vegetation of South Africa’s Cape Province forms a major part of one of the world’s six floral kingdoms: the Cape Floral Kingdom. At least 5600 of its 8000 plant species are endemic to the region.

Research into the likely effects of climate change suggests that over the next 50–100 years the northern part of the fynbos may disappear, and many drought-sensitive plants will go extinct. With a hotter and drier climate, fires may become more frequent and extensive; if they occur before plants are old enough to set seed, local extinctions could result. Also, alien woody plants may grow better and spread. This was a causal factor of the major fires of January 2000 which led to the loss of both fynbos ecosystems and property.

However, the mountainous terrain of much of the region means that there are many habitats in which plants could survive, and that migration to higher altitudes should be possible if changes in climate do not adversely affect the insects, rodents and birds on which many plants depend for pollination and seed dispersal. Also, southern coastal fynbos may experience less extreme climatic changes due to the moderating effects of the ocean.

The protection of targeted lowland areas of fynbos may help to minimize extinctions, but it appears likely that much of the western-coastal and inland lowland fynbos and its species are increasingly threatened.

– Guy Midgley, Research Fellow, Conservation International, and Scientist, National Botanical Institute, USA.

Alpine plants as early warning systems

Since the mid-19th century, botanists have visited some of the highest peaks in the Alps, making exact records of the plant species found, and their altitude.

In the early 1990s, botanist-mountaineers from the University of Vienna revisited 30 of these peaks to make comparable measurements. The pilot study found that species richness had increased significantly on two-thirds of the summits, providing clear evidence of global warming. Subsequently, in 2001 an observation network called GLORIA (Global Observation Research Initiative in Alpine Environments) was launched with the support of the European Commission.

The network is based on three principles: that mountain summits are distributed across all parts of the world; that their ecosystems are particularly sensitive to climate change; and that they are comparable. The network uses a standardized sampling design to record the plant species, and their number and location, on the highest 10m of sets of four mountain summits with minimal human or grazing disturbance within different regions; currently it covers 18 sites in all parts of Europe.

Though the methodologies involve precise and replicable measurement, they are relatively simple and inexpensive, as it is recognised that future measurements will be made over decades or even centuries, and significant changes in patterns of species may take decades to become evident.

– Michael Gottfried, Department of Conservation Biology, Vegetation and Landscape Ecology, Institute of Ecology and Conservation Biology, University of Vienna, Austria.
Tourism is the fastest growing industry in the world, and mountain tourism accounts for a large proportion of this growth.

Mountains attract people for their scenic beauty, their biological and cultural diversity, and their prospects for adventure. They are places where skiers gather in lavish resorts, hikers and trekkers pursue new challenges, rafters and kayakers brave dangerous rapids, nature lovers explore diverse meadows and forests, culture-oriented tourists study enduring cultures, and pilgrims seek religious inspiration.

But there is a flip side to these attractions. Mountain ecosystems are fragile and easily damaged. Difficult access leaves local communities isolated, impoverished and lacking services. Avalanches, floods and earthquakes ravage villages at regular and unpredictable intervals, destroying their resources and infrastructure.

Demand and transformation

Sadly, the very development that promises to bring economic and social improvements to isolated communities can turn against them. The Nepalese Himalaya offer one example of how local people can respond to the destructive pressures of tourism.

Tourism started to become a significant activity in Nepal in the 1950s, resulting in the construction of hotels and lodges for the growing numbers of visitors. Most of these facilities were built in the Annapurna and Everest regions in the last 20 years.

The impact on local communities has been profound. One notable effect was the depletion of forests to meet the tourism industry’s demand for firewood and timber, leaving local people with a firewood crisis.

The initial response to the crisis was to introduce alternative energy sources, including micro-hydropower and kerosene. But this did not lead to an immediate reduction in demand for firewood and timber, partially because local people could not change their habits so quickly. This was an important lesson: simply providing alternatives is not enough. People must be motivated to use them.

The best solution

Confronted with a serious challenge, the local people decided to take action, at both household and community levels. Households simply tried to reduce their consumption of firewood. Community action involved the development of community forestry and the conversion of degraded lands and pastures to fuelwood plantations. Their efforts have attracted help and support from local organizations such as the Annapurna Conservation Area Project (see page 25) as well as international agencies. It is a beginning.

Paradoxically, forests in Annapurna began to benefit as the economy was transformed from farming-based to tourism-based. Much of the agricultural land was abandoned, and people began to plant trees on the fallow land. (Whether this is a wise outcome, and whether forestry should take the place of agriculture in such communities, is hotly debated.)

Community-based mountain tourism is not yet widespread in the world, yet it offers the best chance for mountain people to develop their economies in harmony with their traditions, cultures and natural environment, and to reinforce and strengthen their traditional stewardship roles. And it can stimulate the creation of procedures and tools for countering threats from the pressures of modern development.

Sanjay Nepal teaches at the University of Northern British Columbia in Prince George, Canada.
Mountain farming systems over the world are the fruit of centuries of effort by mountain communities to meet their needs for food, fodder, fibre and fuel. Crop cultivation, livestock rearing and forestry are especially challenging in upland areas, where they must be carefully adapted to local conditions – slope, aspect, climate and soils – which can vary greatly over short distances and periods of time.

To survive, mountain farmers have had to learn to conserve their resources in four critical areas:

➤ Maintenance of soil fertility, through methods such as composting with livestock manure, leaf litter and crop residues; inter-cropping and crop rotation; agroforestry; and planting of nitrogen-fixing legumes.

➤ Control of soil erosion with proper drainage, use of vegetation to minimize surface erosion, and terracing. Terracing is a necessary feature of mountain farms everywhere, and represents a store of traditional engineering knowledge that remains to be properly tapped. Trees in cropland can decrease the incidence of shallow landslips.

➤ Management of water resources, which is a question of adjusting to 'boom and bust' conditions. In areas such as Nepal this can mean organizing a safe discharge during a three-four month surplus period combined with parsimonious use of available water over a nine-month dry period.

➤ Management of forest resources, through preservation of forest biodiversity and sustainable community forestry. Leaf fodder, medicinal plants and fuelwood are among the most important products of the farming system.

Adapting to change

Change is a reliable constant in mountains, although its scale and nature is variable. The population of upland areas has more than doubled in the last 50 years, accompanied by a rapid increase in demand for natural resources beyond the carrying capacity of many of these areas. The increase in livestock has resulted in excessive deforestation and overgrazing, and is considered a major threat to the sustainability of the hill environment. The penetration of market forces has brought both advantages and disadvantages to mountain areas. Extraction and use of natural resources, particularly forests, has intensified. Concern with profits over sustainability has led to a rapid depletion of limited resources. Evolving national land policies have often done more harm than good, aimed more at generating revenue for governments than managing land sustainably.

Women in mountain regions have traditionally done much of the farm work. The exodus of the young and skilled to urban centres is creating new problems in farm labour.

Moving to sustainable management

The burning question is: how do we move towards a system of sustainable management? How can we ensure the needs of a growing number of mountain people and at the same time not destroy the environment? The biggest obstacles to this effort appear to be in the socio-political, economic and institutional areas.

A first step will be to manage the scale of demand for mountain resources, by controlling the growth of human and livestock populations and eliminating harmful and wasteful practices. We must also ensure that increasing the income of mountain communities is not accompanied by intolerable pressure on limited natural resources, as in the case of tourism’s impact on forests in remote areas of Nepal. The cutting of vegetation in fragile alpine areas for cooking and heating fuel is degrading these areas. We need to develop better know-how regarding sustainable development in mountain environments, particularly through locally focused research and development. Little effort has been made thus far to systematically tap the knowledge of mountain communities relating to resource management.

Equitable development is another key factor in the health of mountain communities, which have few alternatives to their natural resources and are most severely affected by
What do you see as the main threat to mountain environments?

Jack Ives: I am convinced that mountain warfare is a problem of such overwhelming magnitude that no less than a restructuring of the world political agenda is required to meet it. Let me give you a couple of quotes:

One of the core publications of the Mountain Agenda, Mountains of the World: A Global Priority states it like this: “When the World Mountain Balance Sheet is reviewed as a whole, military assault on mountain peoples, legitimized by the state, surely offsets all progress that has been made.” (Ives, Messerli and Rhoades, p. 456).

It also says: “The singlemost obdurate obstacle to sustainable mountain development is warfare in any or all of its forms. In terms of the world-at-large, the disproportionate burden that mountains and their peoples are obliged to carry, as victims of inhuman treatment, will surely rebound on society unless the current situation can be alleviated and reversed quickly... To end this shame on humanity... nothing less than a major restructuring of world affairs will be required. Unless there is a strong measure of success in this arena, the long-term costs will likely exceed the ability of society to pay; the moral cost will be even greater. The losses, in terms of nothing less than cultural and biological extinctions, will be beyond recovery.” (Ives, Messerli and Rhoades, p. 457)

So far, those of us who enthusiastically claim to belong to the Mountain Agenda movement have done little more than try to describe the problem. We must do a great deal more.

What kind of warfare do you mean?

Jack Ives: The most obvious problem is conventional warfare between states, or within states by rival claimants to governmental legitimacy. To this we must add:

➤ terrorism;
➤ the drug wars in all their forms;
➤ local insurrections and guerrilla actions;
➤ pure and simple banditry;
➤ and even passive national “defence” that places large numbers of military personnel in environmentally and culturally vulnerable locations.

The causes range from national rivalries, ethnic and religious conflicts, and discord over access to water and other resources to simple greed and misguided self-interest.

For example?

Jack Ives: Let’s use the one that is already on everyone’s mind. The appalling events of 11 September 2001 have focused the entire world’s attention on a single mountain country – Afghanistan. This is something new! The explosion of worldwide terrorism has riveted world attention on one aspect of the mountain problématique. Additionally, the events unfolding in Afghanistan have already drawn in neighbouring mountain regions, including those in Northern Pakistan, Kashmir, India, Tajikistan, Western China and Iran.
Furthermore, there is a critical subjective issue – refugees in particular and poor mountain people in general.

It is hard to contemplate how the Mountain Agenda can play a role in this deadly turmoil. As the International Year of Mountains unfolds, however, we can hardly ignore it.

Do you see Afghanistan a microcosm of mountain issues?

Jack Ives: No, but it is the case now before us on our television screens, hour by hour. In their enormity, these events may awaken the world to reality, yet they may also seriously detract attention from other areas of mountain devastation. They tempt us to focus too closely on these particular horrors and lose focus on other, perhaps distantly related, and – for the moment at least – only minor horrors. I mean by this the many [resource] conflicts, tribal rivalries, poverty and misguided policies, and even half-forgotten crimes against humanity, if not actual ethnic cleansing, taking place in other mountain regions.

For example, how many of us are aware that more than 100,000 people have been forcibly expelled from Bhutan – most of them subsistence farmers – and have been confined to refugee camps in eastern Nepal for over a decade? I could find many other examples, but the moral is that sustainable mountain development remains in the balance.

Q: Are you hopeful that mountains are now firmly on the international agenda, and that progress is in sight?

Jack Ives: The 1992 Earth Summit (UNCED) and the UN’s declaration of 2002 as the International Year of Mountains has certainly resulted in a large number of beneficial activities aimed at mountain communities and environments. For one thing, there has been a huge increase in contacts amongst mountain peoples, researchers, development agency personnel, and NGOs, especially aided by the Mountain Forum and its online communications system.

As for real progress, I’m not so sure that we yet have our priorities straight.

You sound pessimistic.

Jack Ives: Not entirely. Mountains occupy practically a fifth of the world’s land surface, so that problems and progress vary enormously from region to region. For instance, much of the work being done by the Mountain Agenda partnership – with first-rate leadership being provided to the FAO focal point for IYM – is helping to reduce tensions between countries and ethnic groups. IUCN in particular is doing useful work in this regard (see page 35).

Here is an optimistic statement I can make: success in the war against terrorism will be won. It might even have a widespread and positive result – if the international community is persistent, and ensures that mistreatment of poor mountain peoples and efforts to mitigate their plight become and remain a priority on the world political agenda.

It surely is the opportunity and the responsibility of the supporters of the IYM to seek this goal, if only through insistence on rigorous identification of the related problems. This will depend on appropriate use of 2002 to effectively publicize the negative issues as well as the positive ones that are facing mountain environments and their peoples.

Jack Ives is Adjunct Professor of Mountain Geocology at Carleton University in Ottawa, Canada, and co-leader of the Programme on Mountain Ecology and Sustainable Development at United Nations University.

Imagine this: a continuous biological corridor extending 20,000km along the mountain backbone of the Americas, from Alaska to Tierra del Fuego, that protects a significant proportion of the biodiversity of two continents.

This vision may at first seem unrealistic, but efforts are under way to make the Ecological Corridor of the Americas, or EcoAméricas, a reality.

Protected areas, whether national parks, biosphere reserves, wildlife refuges, peace parks or private nature reserves, play a key role in the conservation and maintenance of the world’s biodiversity. Unfortunately, most of them are too small to conserve ecologically functional populations of the species they contain, particularly the larger-bodied or highly mobile fauna (‘landscape species’). They need to be embedded in a broader landscape, where natural areas and wild species are used by human communities to meet their socio-economic needs and aspirations. For conservation to be effective, it is essential that we integrate use and non-use areas across the landscape.

We can define a ‘sustainable landscape’ as one which provides people with a living while conserving biodiversity. It should incorporate:

➤ protected areas;
➤ areas where resource use is extensive, such as well-managed forestry concessions, indigenous management areas, and extractive reserves; and
➤ more intensive land uses, such as nature-friendly agriculture and settlement areas.

The purpose of EcoAméricas is to link sustainable landscapes along a corridor of relatively wild areas of high biodiversity and endemism, most of which are considered of high priority for conservation. The project is, in fact, a strategic instrument to promote planning for conservation and sustainable use of natural resources in such areas, on a hemispheric scale.

At a global level, interest in creating corridors to conserve biodiversity began with the publication of the theory of island biogeography in 1967. A decade later, the scientific community began to write about the need to establish connections among protected areas.

Projects began on the ground in 1990 in Florida, USA, with the design of a system of greenways linking national and state protected areas, and in the Central Appenines in Italy spreading out from Abruzzo National Park. In 1991, “Yellowstone to Yukon”, a conservation initiative to restore and create corridors along the western USA and Canada, got under way.

The idea of regional corridor projects in Latin America also dates from 1990, when the Wildlife Conservation Society (WCS) and the Caribbean Conservation Corporation developed the “Paseo Pantera” project to link protected areas in Central America to...
form a green corridor of parks, buffer zones and multiple-use areas. Their hope was that ecologically sound and sustainable management of the corridor would guarantee the conservation and restoration of Meso-American biodiversity.

The idea caught on, and has evolved into one of the most compelling environmental and socio-economic initiatives of the century: the Meso-American Biological Corridor. The project was endorsed by all of the region’s governments and supported by several international agencies. The IUCN Regional Office for Meso-America (ORMA) played a key role in promoting and implementing this initiative, working in partnership with national governments, protected areas agencies and IUCN members.

The ultimate goal of EcoAméricas is the long-term conservation of the rich biological diversity of the American continent. It will allow natural movements of wide-ranging species and provide opportunities for multi-species migration in response to climate change. International institutions including WCS, Conservation International, The Nature Conservancy, Tropical Science Centre and national institutions will promote and support research to determine ranging behaviour, habitat and spatial needs of viable populations of “landscape” species, and how the species fare in various human-modified ecosystems.

Human societies on both continents will benefit from the project. In addition to preserving the intrinsic value of biological diversity, it will

➤ contribute to the maintenance of productive lands over the long term;
➤ help to abate disasters relating to natural causes, such as hurricanes, flood and forest fires;
➤ mitigate climate change impacts;
➤ help to maintain a supply of clean water;
➤ provide a source of new medications and chemical substances;
➤ offer new and diversified economic opportunities;
➤ preserve a source of scenic beauty, cultural values, artistic inspiration and scientific discovery.

**Hemispheric effort**

In the beginning, EcoAméricas will focus on Latin America, while making use of lessons and experience from the North American corridor projects. As WCS continues its work to implement the Meso-American Biological Corridor, it will promote its use as the foundation of a larger, hemispheric effort.

Our next steps will be to work with local organizations and stakeholders in Mexico and South America to promote the corridor concept; to link the project with existing corridor initiatives, local projects and national biodiversity conservation strategies; and to explore how to consolidate existing protected areas and buffer zones into a potential route for the corridor. Once this preliminary research is completed, we will identify potential donors and implementing agencies.

If all goes well, EcoAméricas will soon be in place to preserve and restore the biological diversity of the mountain backbone of the Americas. By doing so it will make an important contribution to the social, economic, cultural and scientific development of the entire Western Hemisphere.


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**Protected landscapes:** need for innovation

Jessica Brown

Mountainous regions are typically rich in landscapes that have been shaped by the interactions of people and nature over time. These traditional patterns of land use have proven sustainable over centuries, contribute to biodiversity and other natural values, and are living examples of cultural heritage. They are places where people live and work.

However, in many places, these landscapes and the array of values they embody are increasingly vulnerable. Sustaining them will require new and innovative approaches to conservation.

**Flexibility and variety**

The Protected Landscape designation (Category V) has great potential to respond to these challenges, and to reinforce local responsibility for stewardship. The Protected Landscape approach is well suited to areas with a mosaic of land ownership patterns, and can accommodate diverse management regimes, including customary law. It encourages flexible arrangements for management of resources, including...
co-management of resources and the range of private land stewardship tools. It seeks to bring benefits to local communities and sustain local livelihoods.

Protected Landscapes can therefore provide valuable models of how to integrate biodiversity conservation, cultural heritage protection, and sustainable use of resources in mountain environments.

**Growing Interest**

While Protected Landscapes are common in some regions such as Europe, the designation has been little used in many parts of the world. However, there is growing interest in the Protected Landscape approach worldwide, including in mountainous regions such as the Andes and the Himalayas.

Responding to this interest, WCPA established a Task Force on Protected Landscapes to promote and demonstrate the use of the Protected Landscape designation. The Task Force has held two working sessions: the first in Vermont, USA (June 1999) and a second in England (November 2001). It has produced three publications to date, which are available from WCPA (see web address below).

Plans are under way to offer workshops on this theme at the upcoming Vth World Congress on Protected Areas (Durban, South Africa, September 2003). In addition, several Task Force members are involved in a pilot project to link protected landscapes in Andean South America, focusing on themes which recognise the great diversity of cultural and natural resources in that region.

Jessica Brown is Vice President for International Programmes at QLF/Atlantic Centre for the Environment (see http://www.qlf.org) and a member of the WCPA Task Force on Protected Landscapes (see http://wcpa.iucn.org/theme/landscapes/landscapes.html).

**Mountain centres of plant diversity**

The IUCN/WWF Centres of Plant Diversity project identified nearly 250 major sites important for plant conservation worldwide, a significant number of which are in mountains.

European centres of plant diversity are covered in Volume 1 of *Centres of Plant Diversity*. One centre is the Alps (Austria, France, Germany, Italy, Liechtenstein, Slovenia, and Switzerland), identified as having some 5550 species of vascular plants, of which 7% are endemic. Threats to these species are many, including mass tourism, ski resorts, construction of communication links, hydroelectric dams, decline in traditional agriculture. Global warming and damage from acid rainfall or high ozone levels may also threaten the high-altitude environment.

You may order printed volumes from IUCN (see http://iucn.org/bookstore/index.html), or access Volume 3 (The Americas) on the IUCN website. Volumes 1 and 2 will soon be available online. See http://iucn.org/themes/ssc/plants/centres.htm

## Cultural landscapes: Kyrgyzstan’s crown jewel

**Stephan Doempke**

The Issyk-Kul Biosphere Reserve in Kyrgyzstan is one of the most encouraging success stories of nature conservation and sustainable development worldwide, in a region where success stories are rare.

At its September 2001 meeting, UNESCO’s Man and Biosphere Programme (MAB) formally approved the designation Issyk-Kul as a Biosphere Reserve, the culmination of an eight-year effort. The reserve sets aside 43,100 sq km – an area as big as Switzerland and almost a quarter of the country’s territory – for nature conservation and sustainable land use.

The reserve encompasses the Central Tien Shan mountain range, the huge basin of Lake Issyk-Kul, three cities and more than 400,000 people.

Issyk-Kul means “warm lake”: underground warm springs prevent it from ever freezing. The lake is framed by mountain ranges rising from 1608m to almost 5000m directly from the lakeside. With an area of 6236sq km it is the second-largest high-mountain lake, and the second-deepest lake in the world.

Of the total area, 141,022ha constitute the reserve’s core zones, 3.5 million ha are buffer zones (including all seasonal grazing areas), and 688,540ha are transition zones. Its landscapes include agricultural and horticultural areas around the lake, endemic Tien Shan spruce forests, endless mountain meadows and steppes with unique permafrost swamps (*syrts*), high mountain peaks, and the two biggest glaciers outside the polar regions (*Northern and Southern Ingilchek*) which provide the Central Asian oases with water.

The notable endangered species in the region include snow leopard *Panthera uncia*, Argali mountain sheep *Ovis ammon*, the ibisbill *Ibidorhyncha*
struthersii, and dozens of species of foxtail lilies Eremurus spp. and wild tulips Tulipana spp.

A cultural landscape

After the collapse of the Soviet system and the closure of Kolkhozes and Sovkhozes, the traditional semi-nomadic (transhumant) way of life has been taken up again by the people. Culture and nature are again becoming one. To provide a space for this cultural landscape to thrive as it did in the past is one of the main tasks of the Biosphere Reserve.

The basis of the project was a 1993 agreement between the German NGO, Naturschutzbund Deutschland (NABU), and the Kyrgyz State Committee for Environmental Protection. It involved scientific cooperation between the Universities of Greifswald and Bishkek. The German Government funded the formal planning process in 1995, and it became a Kyrgyz-GTZ project.

World-famous Kyrgyz writer Chingiz Aitmatov, a former advisor to Gorbatchev, who had organized the first perestroika think-tanks on Lake Issyk-Kul, spoke out publicly against further gold-mining and became a member of the steering committee.

When the planning was completed, the President of Kyrgyzstan Askar Akayev decreed the Biosphere Reserve in September 1998. Parliament passed a special law on biosphere reserves in 1999, an executive order for its implementation was decreed, and the administration of the Biosphere Reserve was established in 2000.

Central Asia’s model of conservation

Kyrgyzstan’s accomplishment was unique: one of the poorest countries in the world, it was far-sighted enough to base its development strategy on sustainability, nature conservation and culture, while excluding mining and hydro dam development.

At the same time, the size and complexity of the Biosphere Reserve has taken UNESCO’s MAB Programme to new horizons. For the first time, an entire bio-region has been placed under protection as a functional unit in ecological, economic and cultural terms.

Work continues apace:

➤ GTZ continues to support the Reserve through the training of staff;
➤ the EU has agreed to fund small-scale tourism facilities;
➤ Swiss Intercoporation has developed a sustainable forestry policy, and the Swiss NGO Helvetas is running a comprehensive agricultural programme;
➤ the German NGO “People and Nature” (PAN) is marketing traditional felt carpets and other crafts made by nomad women, and thus encouraging nomadism as an ecologically-adapted way of life deeply rooted in the Kyrgyz culture;
➤ NABU has initiated an anti-poaching brigade run by the Kyrgyz Government to protect the snow leopard;
➤ PAN is also supporting the securing of archeological and sacred sites in the Reserve, and has lobbied the German Government to allocate another DM1.5 million for implementation projects over the next three years.

And things do not stop here: a large transboundary Biosphere Reserve is already on the way in the Western Tien Shan which will connect Kyrgyzstan, Kazakhstan and Uzbekistan.

Central Asia is fast becoming one of the most promising regions for nature conservation in the world. Kyrgyzstan will host the “Global Mountain Summit” in 2002. We can hope that these events will focus some well-deserved attention on the country’s conservation efforts.

Stephan Doempke is Executive Director of People and Nature, Berlin.

Visit: http://www.peopleandnature.de
Nepal has less than four decades of experience with tourism development. In that time the number of visits has increased several fold, from around 6000 in 1962 to over 460,000 in 1998. Tourism has become the country’s number one source of foreign exchange, generating income and employment opportunities in once-remote mountain areas.

At the beginning, tourism activities were concentrated inside the Kathmandu valley. Then Annapurna, Everest and Langtang regions started becoming popular trekking destinations among organized group trekkers, later followed by free and independent trekkers. Teahouses and lodges began to proliferate along the major trekking routes in mountain areas, changing the nature – and impacts – of tourism on the country forever. Pressures on the country’s rich biodiversity intensified, as fuelwood cutting and pollution increased in all the major trekking destinations.

In 1986 the Annapurna Conservation Area Project (ACAP) under the aegis of the King Mahendra Trust for Nature Conservation (KMTNC) was established to address three key concerns: community development, nature conservation and tourism development. It would do this by reducing the pressure on forest resources, improving the quality of life of local residents and making tourism more responsible.

The major thrust of ACAP and other such integrated projects in Nepal has been on building local capacities so that the people eventually become masters of their own destiny. The local people are considered prime actors and key beneficiaries in all endeavours. The income from tourism and entry fees for visiting ACAP (approximately US$15) are ploughed back to promote biodiversity conservation and sustainable community development activities in the region.

These activities include:

- establishment of forest nurseries for community and private plantations;
- providing alternatives for fuelwood, by providing kerosene and LPG depots, micro-hydro schemes and fuel efficient cooking and heating devices;
- development of extension and educational programmes to educate tourists as well as local people. Organizations such as the Kathmandu-based Kathmandu Environmental Education Project (KEEP) have been working closely with ACAP in spreading the ethos of ecotourism.

After several years of working in southern Annapurna, a special tourism intervention programme was initiated to improve the wilderness experience and the safety of trekkers to the Annapurna Base Camp. This included the relocation of lodges in clusters at intervals of three hours trekking.

Among the new lessons we have learned from our experience in ACAP, two stand out:

1. The success of ecotourism largely depends on education and sensitization programmes for mutual respect between tourists and local people. If tourists and local people know about each other’s cultural backgrounds as well as their expectations and needs, their encounter will be much more rewarding and productive.

2. To reduce the risk of dependency on tourism for economic growth, it is advisable that ecotourism be small, manageable and complementary to other sectors of the local economy. Recent events have reminded us that the tourism sector is very sensitive to political uncertainty and instability. Until last year, the number of tourists and trekkers to ACAP was growing steadily. But after the event of September 11th in the USA and the escalation of Maoists insurgency and the declaration of state of emergency in Nepal, tourist or trekker arrivals to ACAP declined by 12% from the previous year (2000). But because the ecotourism initiative in ACAP is rather small in scale and most businesses...
are family run, the impact of this drop has been relatively modest. The local economy has proven sustainable and resilient in the face of internal and external changes.

The success of the Annapurna Conservation Area Project has encouraged many other projects in Nepal to follow its lead, including those in Manaslu, Kangchenjunga (see page 32), Langtang, and the Makalu-Barun National Park and Buffer Zone. The goal is to make tourism more socially and environmentally responsible, economically beneficial, and institutionally manageable at the community level.


China’s model counties

Hu Yuanhui

China’s mountainous areas – some 6.6 million sq km – account for nearly 70% of its territory, and are home to more than 50% of the population. Mountain regions provide an abundance of natural resources including non-timber forest products and minerals. Many of China’s main river systems originate in mountains.

Located mainly in the west and south of the country, China’s mountain areas enjoy a growing ecotourism industry, and serve as an important source of income for local communities and local governments. Their communications, infrastructure and economic development, however, lag behind the developed coastal regions.

Research and demonstration projects

To promote China’s rural economy, the Central Government established model counties for sustainable development of mountain areas (SMD) in 1996. A national coordination group headed by the State Forestry Administration was given responsibility for programme supervision, while ten other ministries, commissions, financial institutions and international organizations participate in the process. An expert panel of renowned scholars from the China Engineering Academy is providing technical supervision.

Financed with a low-interest loan of RMB300 million (US$38 million) from the Central Government, 24 counties were selected as research and demonstration models, based on their resources and level of economic growth. In 1998 the number of model counties increased to 111.

The main components of the Sustainable Mountain Development Programme are soil improvement and infrastructure development, but it also includes the planting of commercial tree species and related processing industries. The Programme gives top priority to improving farming practices on slopes of less than 25 degrees.

Signs of improvement

Soil and water conservation measures have improved soil fertility and productivity and water conservation capacity. Steeper farmland of more than 25-degree slope and land at higher altitudes is being converted to forest and grassland, which is also part of the National Forest Protection Plan established in 1998 after the devastating floods of the Yangtse, Nen and Songhua Rivers. Protecting forests in the upper and middle reaches of the main rivers are a priority of this plan.

In addition, forest shelter-belts have been introduced to protect crops from strong winds, access roads have been constructed, water discharge channels have been improved, and the irrigation systems have also been improved.

These efforts have paid off in recent years, and living conditions in mountain regions are improving. Millions of commercial trees have been planted on a total of 82,000 ha; 70,000 water conservation schemes have been established and 7000km of county roads have been built. Hundreds of modern farms have been established.

Encouraging investment

Nevertheless, the pace of mountain economic development remains slower than that of the coastal areas. County roads are not as good as they should be. Farmers’ incomes are still modest compared with those of city-dwellers. More education and extension
services are needed. Communication with other areas outside mountain communities is sporadic, and modern equipment needed for further improvement is still lacking.

The Western Development Strategy of the Chinese government gives priority to developing infrastructure and services in 13 provinces, but capital investment is needed and the conditions are not as attractive as the East Coast where access to markets is much easier. The Western Development Strategy gives priority to investment to assist these under-developed

areas giving both foreign and domestic investors preferential conditions in order to encourage investment, as was done in the special economic zones of the east during the early stages of the reform period.

Hu Yuanhui is the Deputy Director General of the NGO Division, International Forestry Cooperation Centre, State Forestry Administration, China. For an overview of Chinese participation in ICIMOD, see page 36.

Pohnpei: power to the people

Bill Raynor

With the largest remaining native forests in Micronesia in the western Pacific Ocean, the small volcanic island of Pohnpei (355sq km) is one of the greenest, wettest places in the world. The island’s native forest, which provides essential habitat for 330 plants and animals, many found nowhere else on Earth, is also vital to maintaining the island’s water quality, supporting a growing tourist industry, and enriching the cultural and spiritual lives of the island’s people. It includes a mountain “crown” of tropical montane cloud forest.

But during the twenty years from 1975 to 1995, Pohnpei’s intact native forest in the island’s “mountainous” interior was dramatically reduced from 42% to just 15% of the island’s area. The culprit: the devastating impacts of cultivating kava (*Piper methysticum*), a Pacific plant that is used in the preparation of a culturally important and mildly intoxicating beverage that has emerged as the premier cash crop for the island’s people over the last two decades.

As the commercial market for kava has expanded, cultivation has encroached on public lands in the upland forest where soils are rich and moist. Contemporary kava production requires almost complete removal of the forest overstory to stimulate fast growth. The planing of the shallow-rooted crops on steep slopes adjacent to mountain streams leads to erosion and increased sedimentation in the coastal mangrove forests, lagoons, and coral reefs.

During a vegetation survey jointly undertaken by the US Forest Service and the local government in 1982–83, foresters first became concerned about the rapid forest clearing in the island’s interior. This led to the passage of *The Pohnpei Watershed Forest Reserve and Mangrove Protection Act of 1987*, a law which designated some 5100 ha of the central upland forest area and 5525 ha of coastal mangrove forests of Pohnpei Island as a protected area, to be managed and enforced by the Pohnpei Department of Resource Management and Development.

Its legislative intent was that all utilization of the upland and mangrove forests within the reserves would have to be coordinated with State officials so that further upland settlement and other perceived unsustainable activities could be restrained.

In 1990, the government tried to establish the boundary for the Watershed Forest Reserve, but the move precipitated a backlash by angry villagers suspicious of the government’s intentions. Today this crisis is remembered as the starting point for a community-based resource management programme that has gained widespread support throughout Pohnpei.

Working with the local government, The Nature Conservancy helped conduct 200 meetings with local communities from 1992–94, and from this input

Pohnpei’s biodiversity-rich upland forests are being sacrificed to kava production as the market expands. Pictured: Mount Mutante.
Mountain protected areas are usually established to conserve biological diversity, protect outstanding scenic heritage and sustain ecosystem services. But one of their happiest side-effects is their role in reducing tension between neighbours.

Mountains make convenient political boundaries between nations or other jurisdictions. Differences in language, religion or other cultural characteristics, may exist across these borders, causing misunderstandings and tension. In many parts of the world, the precise location of these has not been determined or agreed upon, a situation that can easily escalate into sudden armed conflict or fuel a simmering, long-term political confrontation.

As of 1985, there were roughly 35 wars and 13 armed conflicts in the world, involving 43 countries. More than half occurred in mountains, and most of these involved border disputes. One has only to think of recent conflicts across the India/Pakistan border in the Karakorams, the Golan Heights between Israel and Syria, the Ecuador/Perú border, the Balkans, the Pamirs, and so forth.

A transboundary protected area can eliminate the reasons for conflict as well as plant the seeds of cooperation and common purpose.

Confronting common enemies

The world’s first International Peace Park was established in 1932 involving Glacier National Park (USA) and Waterton Lakes (Canada). There was hardly a conflict situation, but there were problems of different approaches to park management and to fighting common enemies such as fire and invasive species. Solid cooperation across the border has developed since then, an example to the world.

The earliest proposal to use a peace park in the settlement of a frontier dispute came in the Krakow Protocol of 1925 which terminated the conflict between Poland and Czechoslovakia by setting the boundary and calling for an international nature park. This did not materialize until after World War II with first the establishment of Tatra National Park in Slovakia in 1949 and then the Tatra National Park in Poland in 1954. This is now a joint Tatra International Biosphere Reserve with excellent scientific collaboration across the border.

Guidelines for cooperation

IUCN has published a book on Transboundary Protected Areas for Peace and Cooperation (Sandwith, T. C. Shine, L. Hamilton and D. Sheppard, November 2001) in its IUCN/University of Cardiff Series of Best Practice Guidelines, edited by Adrian Phillips. It sets forth the many benefits of transborder cooperative management; discusses the difficulties; and presents a Code of Conduct in times of peace or war. Available from WCPA or the IUCN Bookstore, http://iucn.org/bookstore

Local participation in “ridge to reef” watershed management in Pohnpei has created a new spirit of cooperation between government and community leaders.

their village chiefs, are responsible for conservation education and awareness building, promoting sustainable development activities, monitoring, and enforcement of community-approved restrictions. The Conservancy and partners are providing training, strategic planning and fund-raising support to CCO groups. In addition, participating municipalities have gone through extensive participatory community visioning and planning exercises focusing on all aspects of community life – health, education, culture, economic development, environment, etc. – amplifying links between a healthy environment and human survival and well-being and building a strong community consensus to sustainably manage their natural resources. The work has fostered local participation in “ridge to reef” watershed management and created a new spirit of cooperation between government and community leaders. More importantly, it has allowed the people of Pohnpei to regain control of their own resources after more than a century of colonialism.

Bill Raynor is the Country Programme Director for The Nature Conservancy, Federated States of Micronesia.

REDDUCING TENSIONS Parks are for peace

Lawrence S. Hamilton

Mountain protected areas are usually established to conserve biological diversity, protect outstanding scenic heritage and sustain ecosystem services. But one of their happiest side-effects is their role in reducing tension between neighbours.

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Models for peace and friendship

There are now 136 border-abutting protected areas around the world involving two or more countries, about half of them having some cross-border cooperation. A few examples:

➤ The opening of the Iron Curtain resulted in the creation in March 1990 of an NGO alliance called “Ecological Bricks for Our Common House of Europe”. Several nature protection areas were established which include the “security-protected” buffer zone between countries of the East and West, where for years the human imprint was reduced and nature allowed to recover. Mountain examples include Bavarian Forest National Park (Germany)/Sumava National Park (Czech Republic) and Bohemian Saxonian Switzerland National Park (Germany)/Elbe Sandstones Protected Landscape (Czech Republic).

➤ The Cordillera del Condor in the zone of dispute between Ecuador and Perú was the scene of regular skirmishes during the minor war in 1995. In the agreement brokered by the USA, Brazil, Argentina and Chile, part of this range was designated as a Parque para la Paz at the suggestion of IUCN President Yolanda Kakabadse, then Ecuador’s Minister for Environment as well. In October 1998 two ecological Protection Zones, 2500 ha in Ecuador and 5400 ha in Perú, were created as a Peace Park. The area has recently been proposed for expansion to protect vital water sources for both countries, and to include lands of indigenous groups who have proposed communal reserves for their traditional lands.

➤ Also in Latin America is La Amistad Biosphere Reserve consisting of two national parks of the same name, in Costa Rica and Panama. These were established in 1982 and 1988 in the Talamancas mountains and designated as a peace park “to serve as models for peace and friendship between neighboring countries.”

A world of possibilities

Could such models be useful in the Caucasus Mountains, where military conflict continues to erupt? Here 18 of 36 zapovedniks (exclusive nature reserves) have become border areas between recently created States. Could an International Peace Park help in solving the disputed Siachen Glacier boundary in the Kashmir? Or offer a solution in the Korean Demilitarized Zone where there is now a de facto nature reserve in a mountainous strip roughly 4 by 250 km?

An International Conference on Parks for Peace was held in South Africa in 1997, co-sponsored by WCPA and the Peace Parks Foundation. Its Declaration of Principles stated that:

“A major contribution can be made to international cooperation, regional peace and stability by the creation of transfrontier conservation areas which promote biodiversity conservation, sustainable development, and management of natural and cultural resources... such areas can be managed cooperatively, across international land or sea boundaries without compromising national sovereignty.”

Clearly we have only begun to realize the potential for mountain protected areas to keep the peace and rescue borderline mountain communities from marginalization and persistent conflict.

Lawrence S. Hamilton is Vice-Chair (Mountains) of the IUCN World Commission on Protected Areas (WCPA).

Further reading:


Resolving conflicts in Mt Elgon

Sean White

Mt Elgon lies just north of the equator on the border between Uganda and Kenya. The mountain is protected in both countries and forms a conservation area of approximately 200,000 ha. It is one of a series of mountains in East Africa, all of which possess a similar afro-alpine ecology unique to the region which has fascinated ecologists since it was first discovered over a hundred years ago.

On Mt Elgon the vegetation changes with increasing altitude from mixed montane forest on the lower slopes below 2500m to bamboo forest, ericaceous cloud forest, high montane heath, and finally high moorland above 3500m.

The mountain is surrounded by fertile and heavily populated farmland. During a period of political chaos and civil strife in Uganda in the 1970s and 80s, people left the towns and cities and returned to subsistence farming in rural areas. Large areas of forest on Mt Elgon were cleared for agricultural crops, valuable timber trees in the remaining forest were selectively logged and wild animals were killed for bushmeat.

When order was restored to Uganda by a new political regime in the late 1980s, the government began to rehabilitate the degraded conservation areas and restore the integrity of the National Parks. Institutional capacity was still weak, but the authority began to evict encroachers, arrest pit-sawyers and poachers and prohibit grazing by domestic livestock.

Not surprisingly, these actions caused conflicts between the community and the authority and an atmosphere of distrust and resentment prevailed. Extractive resource use was illegal according to the laws governing National Parks at the time, but with little or no alternatives outside the Park, people continued to rely on Park resources and the authority found it impractical to prevent it.

Change of policy

The approach to management of protected areas in Uganda began to change in the mid-1990s as environmental management and conservation policies in Uganda were revised to focus on serving the needs of people. Resource use in National Parks became legal in 1996, provided it was sustainable and certain regulatory mechanisms were put in place.

Drawing on the expertise of IUCN and on experiences of collaborative forest management in countries such as Nepal, the authority negotiated two pilot collaborative resource use agreements with representative communities around the Park and implemented them on a trial basis for two years.

Since then, the authority has evolved a standardized process for negotiating agreements, involving Park rangers and community resource user groups. The communities have responded positively to the new arrangements, and indications from the pilot areas are that resource use is now better regulated, illegal activities have declined, relations with the authority have improved and attitudes to conservation have improved.

There is still a lot to be done, but it is already clear that involving the communities in regulating their use of Park resources is bringing immediate benefits to the communities while at the same time helping to conserve Mt Elgon National Park.

Sean White is Chief Technical Advisor, Mt Elgon Conservation and Development Project (Uganda).
Linking communities in Maloti-Drakensberg

Trevor Sandwith

South Africa and the Kingdom of Lesotho share a border along the 300-km Maloti-Drakensberg mountain range. The mountains link the livelihoods of people in both countries, who depend on the water resources and the use of the mountains for agriculture and tourism. The outstanding universal value of the area has been recognised by the listing in 2000 of the uKhahlamba-Drakensberg Park as a World Heritage Site meeting both natural and cultural criteria. Its unique biological diversity is reflected in its status as a Ramsar site, an Endemic Bird area and one of WWF’s 200 global ecoregions. Within this same landscape is one of the world’s richest archaeological treasures, with over 40,000 rock art images painted in 600 sites, the only trace of the San hunter-gatherers who once lived there.

In addition to these biological and landscape linkages, there are striking socio-economic ties between the communities on either side of the international boundary, and transboundary activities which threaten the integrity of the area including alien plant invasions, poor fire management and over-grazing.

Despite its significant inherent value, the area has remained politically and economically marginal to the interests of both countries. In day-to-day terms, illegal activities, including drug smuggling and stock thefts, bedevil the relationship between the countries, yet both recognise the untapped potential of the area as a world-class tourism destination, and the opportunity to build an economy which will ensure that the unique resources are managed sustainably.

The transfrontier programme was initiated in 1982 and, after South Africa’s political transformation, a bilateral meeting in 1997 resulted in a joint declaration to pursue the goals of a cooperative programme. With support from the Global Environment Facility through the World Bank, progress was made with coordinated activities, and on 11 June 2001, a bilateral Memorandum of Understanding was signed by the Ministers of Environment in each country, creating high-level political endorsement. This was the basis for the award on 13 September 2001 of a GEF grant totalling US$16 million for the transboundary programme.

The ultimate aim is to secure the commitment of the two countries to a broad conservation and development area, characterized by harmonized planning and cooperative management. Activities will include strategic conservation planning; the establishment of protection measures for priority sites; enhanced management of existing protected areas; community involvement, including the strengthening of community conservation forums and local boards for protected areas; nature-based tourism planning, including building of capacity to take advantage of economic development opportunities; and institutional development for effective conservation and management.

Of strategic importance is the way in which South Africa and Lesotho engage to effectively and jointly implement the World Heritage Convention in the area, as a force for both heritage protection and economic empowerment.

There is also an opportunity to link several disparate components of the greater Maloti-Drakensberg conservation area to achieve a major focal area spanning both countries, generally known as “The Roof of Africa”, and to develop and market its tourism potential as a major contribution to removing barriers to social and economic development in the region.

Trevor Sandwith is Coordinator, Cape Action Plan for the Environment (CAPE), Claremont, RSA, and Chair of the IUCN/WCPA Task Force on Transboundary Protected Areas.
On an early spring morning in 1997, during our 12-day trek, we came across a farmer treating his wounded yak. The yak had been attacked by a snow leopard the night before, near the remote village of Gunsua, which lies at an altitude of 3500m on the slopes of Kangchenjunga. Once we paused to talk with him, we also met with local traders, who were returning through ancient high passes after bartering for goods in Tibet.

Snow leopards *Uncia uncia*, a highly endangered species, are found in high altitude areas along the slopes of Kangchenjunga in Nepal, India and China. Due to depletion of their natural prey, wild ungulates such as Himalayan blue sheep or *bharal*, there are increasing reports of snow leopards entering human inhabited areas to attack domesticated animals.

The Kangchenjunga region is extraordinarily rich in biological diversity, cultural heritage and dynamic geomorphology. The Kangchenjunga mountain ecosystem in the Eastern Himalayas is a dominant landscape, rising up to 8586 meters as the world’s third highest peak. At the heart of this ecosystem lies the Kangchenjunga Conservation Area (2035sq km) of northeastern Nepal and the Kangchenjunga Biosphere Reserve (2566sq km) of Sikkim, in India. To the north, the ecosystem extends into a narrow strip of the trans-Himalayan Alpine Shrub/Meadow ecoregion of south central Tibet. This region essentially constitutes a tri-national protected area. Thus, the Kangchenjunga Complex corresponds with the proposed “tri-national reserve”, which would be shared by Nepal, India and China.

The southern slopes of the Kangchenjunga Mountain are heavily denuded mainly due to uncontrolled harvesting of medicinal plants and slash-and-burn agricultural practices. In the past, the rich ecological resource base sustained the well-being and economic survival of an ethnically diverse human population through animal husbandry, transhumance pastoralism, crop farming, forestry, hunting and harvesting of plant materials. However, human population pressures (as a result of population growth, unsustainable tourism, trade and other such factors) on the resource base threaten the region’s biological resources as well as the well-being of local communities.

On the last day of our trek, we were joined by several dignitaries from Kathmandu, including the Minister of Forests and the Member of Parliament from Taplejung district. A brief meeting was held at Gunsua village, followed by a formal function in Kathmandu that evening during which, His Majesty’s Government of Nepal (HMG/Nepal) declared the Kangchenjunga region in Nepal as a “Gift to the Earth”, in support of WWF’s Living Planet Campaign on 29 April 1997.

This declaration was preceded by several biological and socio-economic surveys between 1996 and 1997 as well as consultation meetings with local people, all of which indicated strong support for declaration of the area as a multiple land use conservation area similar to the Annapurna Conservation Area (see page 25).

After several informal consultations with government officials from India, China and Nepal, the WWF Nepal Programme with technical support from the International Centre for Integrated Mountain Development (ICIMOD) organized a consultative meeting with participants from India, China and Nepal in Kathmandu from 31 March – 1 April 1997. The participants included government representatives, NGOs and field and wildlife experts. The result was a set of agreed recommendations for conservation of the Kangchenjunga Mountain ecosystem. Shortly thereafter, an area of 1650sq km was given protected area status as Kangchenjunga Conservation Area; on 14 September 1998 this was increased to 2035sq km. In India, the Kangchenjunga National Park was converted to a Biosphere Reserve. Following the consultation meeting, the Kangchenjunga region was envisioned as a Tri-National Peace Park shared by China (Tibet Autonomous Region), India (Sikkim) and Nepal.
The Kangchenjunga Tri-National Conservation Initiative aims to conserve biodiversity and habitat integrity among the three countries sharing the Kangchenjunga mountain ecosystem. In the past, lack of coordination amongst the three countries resulted in illegal wildlife traders and poachers being able to cross international borders and escape capture.

This transboundary collaboration has set into motion an integrated approach towards illegal trade and poaching of wildlife and plants across national boundaries.

Mingma Norbu Sherpa currently directs WWF-US programmes in the Himalayas and South Asia. Prior to 1998 he was WWF Country Representative for Nepal and Bhutan.

### Maritime Alps: nature without borders

**Patrizia Rossi**

Southern Europe’s Maritime Alps are only some tens of kilometres from the sea, yet their wild, rugged and rocky 3000m peaks, their snow-fields and glaciers give them the appearance and features of high mountains.

An area at the heart of the Maritime Alps is protected by two remarkable mountain parks: the Alpi Marittime Nature Park in Italy and the Mercantour National Park in France. These twinned parks complement one another in terms of their history and culture as well as in their importance for biodiversity and scientific study.

Covering an area of about 100,000 ha, the parks unite the North and South sides of the Maritime Alps, an area which has the crystalline Argentera-Mercantour massif at its heart. Around this elliptic massif a band of sedimentary rock has stratified, so from the geological point of view the region is extremely diversified. This feature and a wide variety of

Every August Park authorities organize the “Festa della Segale” (rye festival) in the village of Sant’Anna di Valdieri, the only village in the park that is inhabited year-round. With the villagers’ collaboration, the park has revived the ancient tradition of celebrating the reaping and threshing of the rye crop.
The need to coordinate their management of these wild herds led the parks’ managers to strengthen their cross-border collaboration through the exchange of data, cooperative censusing and harmonized controls.

Today the most significant transfrontier initiative remains Operation Ibex, which included the creation of two new groups of ibex, one on each side of the border, in areas that had not yet been colonized. This operation took place in 1986–1989 and was considered a great success, having increased the common population of ibex from 400 to 800 individuals. Moreover, it resulted in even closer collaboration between the parks’ managers, who decided that Operation Ibex should not become an isolated incident.

At a ceremony on 10 July 1987, park officials signed a formal agreement twinning the Alpi Marittime and Mercantour Parks.

**Return of the carnivores**

Another successful operation involved the reintroduction of the bearded vulture *Gypaetus barbatus*, the largest European bird, which disappeared from the Alps at the beginning of the last century. Because the vulture can cover hundreds of kilometres in a short period of time, the extension of the two protected areas together (a total of 100,000 ha) was particularly valued by the international expert commission directing the project.

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**Operation Ibex: a model of cooperation**

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The need to coordinate their management of these wild herds led the parks’ managers to strengthen their cross-border collaboration through the exchange of data, cooperative censusing and harmonized controls.

Today the most significant transfrontier initiative remains Operation Ibex, which included the creation of two new groups of ibex, one on each side of the border, in areas that had not yet been colonized. This operation took place in 1986–1989 and was considered a great success, having increased the common population of ibex from 400 to 800 individuals. Moreover, it resulted in even closer collaboration between the parks’ managers, who decided that Operation Ibex should not become an isolated incident.

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A remarkable number of organizations throughout the world share a concern for mountain ecosystems and peoples. Many of them are IUCN’s members and partners. The Mountain Agenda which emerged from the Rio Summit was the beginning of a process to combine their energies, a process given further impetus by the International Year of Mountains.

➤ promoting a greater awareness of values of mountain protected areas among governments, environmental NGOs, donors and the general public;
➤ co-sponsoring or collaborating in planning and implementing several major conferences and workshops on mountains;
➤ formulating the Mountain Cloud Forest Initiative (see page 12);
➤ promoting transboundary protected areas and the Parks for Peace initiative, particularly in mountains;
➤ helping to launch and support the Mountain Forum, a global electronic network for sustainable mountain development (see page 37);
➤ publishing a free quarterly newsletter, Mountain Protected Areas Update, which is distributed to the mountains network.

Remember the people

Looking ahead, the two main thrusts of the Mountain Theme Programme will be (1) promotion of mountain conservation corridors throughout the world (see page 21), and (2) promotion of transboundary protected areas for peace and cooperation across mountain frontiers (see page 28). These objectives are firmly grounded in our conviction that everything we do in mountain environments must be done with the close participation and agreement of the people who live in them – people whose knowledge of mountain ecosystems and appreciation of their fragility is a resource to be cherished.

Mountains are destined to remain at the heart of our concerns, if only because so many of us still find great inspiration in them. All we have to do is look out of our windows at IUCN Headquarters to see the very mountains that inspired the creation of our Union.

David A. Sheppard is Head of the IUCN Programme on Protected Areas.

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IUCN Inspiring action

David A. Sheppard

If IUCN was born in 1948 in Fontainebleau, it was conceived in the mountains. In 1946 a group of pioneering naturalists accepted an invitation to tour the National Park and nature reserves of Switzerland. Apparently they were inspired by what they saw, for they decided that the world needed a global organization to coordinate efforts to protect the environment.

Their inspiration bore fruit: they met again a year later and agreed to launch the International Union for the Protection of Nature (IUPN). Since then the Union has grown, evolved and changed its name, but the conservation and sustainable development of mountain environments has remained among its ‘heartland’ concerns.

Mountain Theme Programme

Prior to 1992, the Union approached mountain conservation indirectly, through the activities of individual programmes (protected areas, species, ecosystem management), activities related to environmental impact assessment and collaborative management, and the work of its field offices (e.g. in Nepal, South and Meso-America, Pakistan and Europe).

In 1992, the Mountain Theme Programme of the World Commission on Protected Areas (WCPA) was set up to organize mountain expertise on protected areas, and to promote IUCN’s role in Mountain Agenda, a follow-up to Agenda 21 (see page 36).

Since then, under the inspired leadership of Vice-Chair Larry Hamilton, it has undertaken an impressive number of activities, including:

➤ representing IUCN on the Interagency Task Group for Mountain Agenda, responsible for coordinating activities for the UN-designated International Year of Mountains in 2002 under the leadership of FAO;
➤ developing a support and exchange network of protected area managers, researchers and other professionals dealing with mountain protected areas, which now numbers around 485 individuals in 66 countries;
➤ formulating the Mountain Cloud Forest Initiative (see page 12);
➤ promoting transboundary protected areas and the Parks for Peace initiative, particularly in mountains;
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David A. Sheppard is Head of the IUCN Programme on Protected Areas.
The International Centre for Integrated Mountain Development (ICIMOD) is an independent international organization established in 1983 and the first such centre to be dedicated solely to integrated mountain development. The Centre operates principally in the Hindu Kush-Himalayan region, covering all or parts of the countries of Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Pakistan and Nepal. The concept for such a Centre arose out of concern for the increasing poverty of mountain people in this region and concomitant deterioration of the mountain environment. It was based on the realization that mountain areas had more to learn from other mountain areas than from the dominant research and development paradigms of the plains.

The idea was first discussed in Munich in the late 1970s, and ICIMOD was eventually established through an agreement between His Majesty’s Government of Nepal and UNESCO, strongly facilitated by the German and Swiss governments and endorsed by the regional governments.

ICIMOD’s Mission is “…to help promote the development of an economically and environmentally sound mountain ecosystem and to improve the living standards of mountain populations in the Hindu Kush-Himalayas.” Its principal role is to function as a multidisciplinary applied research, training, and documentation centre on integrated mountain development. Working through a network of more than 150 partners in the region and drawing on a worldwide network, ICIMOD seeks to overcome the constraints to sustainable development of mountain areas, and promote policies, local capacities and institutional and technological solutions.

Although the challenges are great and the resources limited, ICIMOD and its partners and supporters are a prime example that ‘the whole is worth more than the sum of its parts.’

Gabriel Campbell is Director General of ICIMOD. Greta Rana is Head of the Information, Communications and Outreach Division of ICIMOD. Visit: http://www.icimod.org/

Pictured: Tibetan minority women in the Huanglong scenic area of China’s Minshan mountains.

ICIMOD’s Ecoregion, the Hindu Kush-Himalayan Region, extends 3500km from Afghanistan in the west to Myanmar in the east and is home to approximately 150 million people. Its mountains serve as major sources of water, energy, and biological and cultural resources which are largely ignored in national policies and very rarely compensated for, or supported by, appropriate development efforts. These factors have contributed to making the Hindu Kush-Himalayas not only the world’s most populated mountain region, but also the most poverty prone. Lack of access to infrastructure, social services, markets, and appropriate institutions and technologies along with the normal risk of the mountain topography has severely limited agricultural productivity and related economic growth.

When in 1992 the United Nations Conference on Environment and Development (UNCED) agreed on a global action programme on sustainable development called Agenda 21, FAO’s Forestry Department was assigned the role of Task Manager of Chapter 13, “Managing fragile ecosystems: sustainable mountain development”. This was informally known as the ‘Mountain Agenda’.

As Task Manager, FAO works closely with other international organizations and governments to help implement Chapter 13 and strengthen partnerships in the process. FAO also works closely with non-governmental organizations in holding meetings, developing communication and information sharing, and reporting and reviewing implementation of the Mountain Agenda. FAO is also the lead agency for preparations for the observance of the International Year of Mountains (IYM) 2002.

The wise and respectful use of the fragile resources in the highland areas represents one of the greatest challenges for sustainable mountain development. Through its role in Mountain Agenda and IYM, FAO hopes to continue its long tradition of involvement in these crucial issues.

Doug MacGuire is with the Forestry Division, Food and Agriculture Organization of the United Nations (FAO), Rome, Italy. Visit http://www.fao.org/

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Mountain people and their community organizations throughout the world face similar challenges. These include limited access to public resources; isolation from one another and from much of the rest of society; and marginality – they are barely on most national political agendas.

In response, representatives of NGOs, universities, multilateral agencies, and the private sector created the Mountain Forum in 1995. The Forum is a global network of regional networks for information exchange, mutual support, and advocacy for equitable and ecologically sustainable mountain development and conservation. Today it links more than 2500 individuals and 150 member organizations in 100 countries, and is still growing rapidly.

The main technology for information exchange is the Internet, which is rapidly becoming more accessible in mountain areas. The Forum moderates 15 discussion lists, global and regional electronic conferences, and an interactive website with membership services, a calendar of events, online library, and links to other networks. Working with IUCN/WCPA the European Mountain Forum has assisted the training of protected areas staff to set up their own web pages and discussion lists.

One region in which Mountain Forum participants have been particularly active is the Central and Middle Mountains of Europe, with coordination from the Snow Mountains of southwestern Poland. One activity is 'The Visegrad Network of Community Funds' – a practical lesson in democracy with a training camp for teachers and a summer camp for children from four participating countries. Another focuses on forgotten vineyards, with classes for vinegrowers and small experimental mountain vineyards in village secondary schools.

Alejandro Camino is Executive Secretary, and C.P. Jayalakshmi is networking specialist, with the Mountain Forum, Kathmandu, Nepal. Visit http://www.mtnforum.org/

**BANFF CENTRE FOR MOUNTAIN CULTURE**

Appreciation and inspiration

Debra Hornsby

The Banff Centre for Mountain Culture promotes understanding and appreciation of the world’s mountain places by creating opportunities for people to share – and find inspiration in – mountain experiences, ideas and visions.

In addition to the Banff Mountain Book and Film Festivals and Film Festival World Tour, activities of the Centre include the Banff Mountain Summits, Banff Mountain Photography Competition, international exhibitions by mountain artists and photographers, a mountain film and book archive, Mountain Communities Conferences, mountain adventure vacations, a membership programme, a speakers series and a mountain grants programme.

Banff Mountain Summit 2002

Banff Mountain Summit 2002, 27–29 October, will mark the International Year of Mountains by focusing on the theme “Extreme Landscape: Challenge and Celebration”. It will feature mountain authors, scientists, dancers, musicians, anthropologists and filmmakers, and will include a symposium, slide shows, lectures, exhibitions, films, vertical dance performances and readings. National Geographic Books will publish a book featuring 17 highly regarded writers involved with the event.

Debra Hornsby is Head of Marketing and Communications, Banff Centre for Mountain Culture, Banff, Alberta, Canada. Contact: www.banffmountainfestivals.ca

The town of Banff, Alberta, Canada.

Presented in conjunction with the Banff Mountain Book and Film Festivals, the Summit promises to be the premier mountain cultural event of 2002.

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OTHER PARTNERS Working in concert

Lawrence S. Hamilton

In addition to those described in previous pages, there are many other key institutions with whom IUCN collaborates on projects or other activities.

A very important one is The Mountain Institute, whose President and CEO for the past many years of partnership has been Dr Jane Pratt. TMI has been responsible for much of the excellence and growth of The Mountain Forum (see page 37). It also carries out several mountain projects in Appalachia, Nepal, and Peru in particular.

United Nations University has supported the effective and myth-busting Highland-Lowland Interactive Systems Project and the two principal investigators Jack Ives and Bruno Messerli have been leaders in the unfolding Mountain Agenda. UNU was the catalyst for the initiation of the Andean Mountain Association and the African Mountain Association with which IUCN has had fruitful cooperation.

The Swiss Agency for Development and Cooperation (SDC) has been a stalwart supporter of very many Mountain Agenda activities, and without this financial support mountains would never have arrived at the point on the global scene where they stand in 2002. SDC was there at the very beginning in support of the small "Mountain Mafia" group of six natural scientists who coalesced from 1986 into a "strike force" that had the audacity to try to get mountains on the global agenda at the 1992 UN Conference on Environment and Development in Rio de Janeiro – and with additional help, succeeded. SDC has most recently supported the Global Mountain Summit in Interlaken in October 2001, and the launch ceremony for IYM at the United Nations on 11 December 2001.

With long-standing interest in mountains dating back to a Man and the Biosphere Project 6 in the early 1970s, UNESCO has continued to be a player in the unfolding Mountain Agenda. UNESCO’s World Heritage Committee uses IUCN as its technical advisor for natural sites (see page 11).

Data and maps for mountains around the world are collected and maintained by the UNU Palaeoecology andmountain monitoring Centre in Cambridge (UK). They have been wonderfully cooperative in providing information to various IUCN projects and programmes, and have been particular collaborators in the Tropical Montane Cloud Forest Initiative.

There are simply too many other partners working with IUCN to mention, and they range in interests from the Union Internationale des Associations d’Alpinisme to the host of conservation NGOs such as The Nature Conservancy, WWF, Conservation International and the Wildlife Conservation Society. In this short piece only international organizations have been identified, but of course the list of within-country partners is huge.

We can hope that with all these organizations and their dedicated staff and members working in concert, we can gradually achieve the sustainable development of the wondrous three-dimensional Earth features we know as mountains.

Lawrence S. Hamilton is Vice-Chair (Mountains), IUCN World Commission on Protected Areas.

Mountain Research and Development

MRD is the leading interdisciplinary journal specifically devoted to the world’s mountain regions. It is a major platform of communication on mountains, emphasizing both research and development and including sections devoted to exchanges of experience among institutions and individuals. It is thus an important means of promoting sustainable development in mountain ecoregions.

Mountain Research and Development is published four times a year by the International Mountain Society (IMS) and the United Nations University (UNU). MRD has financial support from the Swiss Agency for Development and Cooperation, the UNU, and ICIMOD. The journal’s editorial staff is located at the Centre for Development and Environment (CDE), University of Berne (Switzerland).

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Be sure to visit these websites
International Year of Mountains:
http://www.mountains2002.org
Mountain Forum: http://www.mtnforum.org/
International Centre for Integrated Mountain Development (ICIMOD): http://www.icimod.org/
UNESCO Man and Biosphere Programme: http://www.unesco.org/mab/
UNU Project on Sustainable Mountain Development: http://www.unu.edu/env/mountains/index.htm
Bishkek Global Mountain Summit: http://www.globalmountainsummit.org/
IUCN/WCPA Mountain Theme Programme: http://wcpa.iucn.org/biome/mountain/mountain.html
IUCN Mountain Areas Conservancy Project (MACP): http://www.macp-pk.org
IUCN Himal Programme: http://www.himal.sdnpk.org
IUCN Focusing our strengths

Achim Steiner

With more than half of humanity depending on mountains to provide the water it needs to drink, grow food, generate electricity and sustain economic development, we would be undermining our very basis for livelihood if we did not pay attention to the sustainable management of mountain ecosystems.

As we have seen in this special issue of World Conservation, mountains harbour some of the world’s richest biological diversity and some of the world’s poorest people. Mountain communities are largely shaped by their inaccessibility. This both preserves their distinct cultural and environmental characteristics, yet often marginalizes them in terms of their access to resources, democratic processes and, as a result, political influence. We have also seen how, as mountain ranges provide physical barriers and political borders, these communities are often subject to conflict – as reflected by the fact that 23 of the 27 major armed conflicts in the world in 1999 were being fought in mountain regions.

How does IUCN contribute to this frontier of sustainable development – the meeting point of environment, development and security? Is it possible to reconcile the development needs and quest for resources of the lowlands with secured livelihoods for mountain communities and the safeguarding of fragile ecosystems?

Special strengths

Since its founding in 1948, IUCN has worked directly or indirectly to address such questions. In doing so it has capitalized on its unique structure, which makes it able to work with and influence a wide range of stakeholders, from local communities to governments to international policy institutions.

As early as 1977 IUCN convened a High Mountain Conference in New Zealand, and produced a set of Ecological Guidelines for Balanced Land Use, Conservation and Development in High Mountains, which was published in cooperation with UNEP and WWF in 1979. The Union has been a member of the Inter-Agency Task Group for Mountain Agenda since its inception (see page 36), and hosted one of the meetings in Geneva in November 2000.

IUCN is bringing together the diverse components that create our understanding of mountains – geology, meteorology, hydrology, biology, ecology, anthropology, economics and politics – to assess the crucial relationships between upper and lower watersheds, mountain forests and alpine grasslands, mountain communities and lowland urban dwellers. The needed expertise and scientific capacity is readily available in the Union’s voluntary Commissions, who offer scientific and managerial knowledge of mountain protected areas, species, societies, economies, and ecosystems.

Regional action

Moreover, our regional and country offices around the world together can offer a truly global perspective. Most of them deal every day with mountain issues, from the Andes to the Alps and from the Himalayas to the Usambaras, tackling the issues identified earlier in this report as paramount, from biodiversity conservation to watershed management to transboundary ‘peace’ parks. They work closely with the many IUCN members who consider mountain conservation and development central to their concerns.

A prime example of this regional action is the 10-year Himal Strategy being launched by the IUCN Asia Mountain Programme. This effort reflects the aspirations of a wide range of stakeholders, and builds on a number of existing initiatives in Nepal, Pakistan, Bangladesh and, through its membership, in India. It will foster links between people and institutions throughout the Himalayan region for the conservation and sustainable development of mountain biomes. The programme will begin by building a store of conservation knowledge for the region, which will then be used to build institutional and human capacity to conserve biological diversity, direct human resources toward village eco-development, influence government policies for better management of mountain ecosystems, and promote improved governance through empowerment of local communities.

Seize the moment

IUCN must use the opportunity of the International Year of Mountains to focus its collaborative action and known strengths on mountain issues. Our aim should not be to create a parallel programme, or to duplicate the work of other key players, but rather to facilitate the confluence of environment, development and security objectives.

The seemingly impenetrable monoliths of rock we call mountains are in reality our repositories of biodiversity, home to one-tenth of the world’s people and the provider of goods and services to more than three billion people. These fragile environments are our vital life-support systems. Their resources must be managed and used in a way that safeguards both mountain ecosystems and mountain cultures.

Achim Steiner is Director General of IUCN.
Cooperation in the European Mountains

1. The Alps
Martin F. Price

This report was written as a contribution to Action Theme 10 (mountain ecosystems) of the Pan-European Biological and Landscape Diversity Strategy. It includes a review of existing mechanisms for intergovernmental cooperation in mountain ranges, and an analysis of how the experience of the Alps might be applied to other transnational mountain regions in Europe.

Environmental Research Series 12.

2: The Caucasus
Edited by Martin F. Price

The Caucasus is an important centre of biological, landscape, and cultural diversity, and in great need of appropriate mechanisms to maintain and foster it. This report gives an overview of the region and details of existing structures for cooperation at all levels.

Environmental Research Series 13.

3: Sustainable Management of Climbing Areas in Europe
Brigitte Hanemann

This report examines the history of rock climbing and its social and economic significance. It describes the typical flora and fauna of the rock biotope, presents the results of a 21-country survey, and outlines a number of case studies and recommendations for sustainable management of climbing in Europe.

Environmental Research Series 14.

Guidelines for Mountain Protected Areas
Editor: Duncan Poore (1992)

This product of a Parks, Peaks and People Workshop held in Hawaii Volcanoes National Park offers a set of 161 guidelines grouped under topics and themes common to mountain protected areas around the world. It has been translated into Spanish, Russian and Japanese.

Available from the World Conservation Bookstore.

Transboundary Protected Areas for Peace and Cooperation
Trevor Sandwith, Clare Shine, Lawrence Hamilton and David Sheppard. Series editor: Adrian Phillips

It is now generally understood that conservation planning cannot just be site-specific; strategies to conserve biodiversity in the 21st century must emphasise transboundary cooperation, and may at the same time foster better cooperation and understanding between countries. This publication reports on the work undertaken by IUCN’s World Commission on Protected Areas on the conservation and security benefits of transboundary protected areas.


Decision Time for Cloud Forests
L.A. Bruijnzeel and L.S. Hamilton

This IUCN Focus Series booklet points out the importance of tropical montane cloud forests, the threats to them, and calling for action to conserve them. Printed also in French and Spanish.

Available from WCPA.

PARKS Magazine
Vol. 6, No. 1, February 1996

Mountains and mountain ranges have a heterogeneity, a fragility, a climate, and a relative inaccessibility that present special problems in sustainable development. Moreover they are the living environment for some of the world’s most ancient and traditional peoples, whose rich cultures are being rapidly eroded. Some of the characteristics of mountain environments that mandate special attention are treated in this important issue of PARKS.

Available from WCPA at IUCN Headquarters.

Transborder Protected Area Cooperation

This publication is a synthesis of benefits, difficulties, guidelines and recommendations resulting from a convening in the Australian Alps of 35 parks professionals working in mountain transborder protected areas. It includes five case studies of cooperation in managing border-abutting parks in mountains, each with different institutional and management arrangements for cooperation.

Available from WCPA at IUCN Headquarters.

http://iucn.org/bookstore