Box 65: Commentary from the GWS Office and Our Members

The Four R's as an Rx for the Andes ... and Elsewhere?

he Andean countries have done remarkably well in establishing systems of protected areas of various kinds in the Andean Cordillera. There are at least 23 million ha of mountain protected areas in 82 units in the Andes (Thorsell and Paine 1995). Brazil and the Central American countries have also protected non-Andean mountain environments, as has Venezuela. Many more protected areas are needed to give adequate coverage of representative ecosystems, to provide more continuous pathways for biological diversity shifts with climate change, and to conserve traditional cultural mountain landscapes and the cultures themselves. And of course, the level of management urgently needs to be improved. These protected areas are of various kinds and come under the six categories established by IUCN-The World Conservation Union: I-strict nature reserve/wilderness area; II-national park; III-natural monument; IV-habitat/species management area; V-protected landscape/seascape; and VI-managed resource protected area (IUCN 1994).

These existing mountain protected areas (and, it is to be hoped, others to come), plus what we can salvage in the usually more intensively developed lowlands, will be the only remnant wildlands in an increasingly populous Latin America, with commensurately larger needs and wants per capita. The increasing demands on land and water resources to meet these needs is of course tremendously exacerbated by export-related resource development associated with the global economy. Minerals and water development and use for export are currently the cause of much degradation of wild land (and traditional mountain cultures), and these show only greatly increasing trends. Fortunately, a reasonable

compromise has been reached this year for the Antamina Mine affecting Perú's Huascarán National Park, but this was probably only achieved because it is also a World Heritage Site. Elsewhere in South America, unfortunately, governments seemingly welcome any and all mining with open arms, even in formally protected areas. Our best chances of conserving natural biodiversity, agrobiodiversity, and cultural biodiversity are being nibbled away and fragmented. Greater attention to the role of national parks and other kinds of conservation areas in the Andes is imperative, and is the theme of this essay. But, these areas need a new vision to replace the old one of drawing a line around the highest

6

and most scenic peaks and then promoting visitation by urban citizens and overseas tourists.

We are gaining a new appreciation of the values of conserved wildlands, even as we are losing them rapidly to development. There is, for instance, an increasing recognition of the important role of sacred mountains or of their sacred groves or springs; of wildland ceremonial, medicinal, and otherwise useful plants and animals; and of controlled traditional use of alpine grasslands, forests, puna, and water bodies as sustainers of valuable traditional livelihoods and cultures of mountain ethnic peoples. The protected landscape, natural monument, or managed resource (stewardship) area designations can help to conserve cultural diversity. Biological diversity is best conserved in situ by protected areas of various kinds, sometimes in Strictly Protected Areas if endangered species are involved. Naturebased ecotourism can be accommodated for direct economic gain in national parks or other types of community-based conservation areas.

But wildlands in general are finally being recognized for the economic value of their ecosystem services, as well as that of their direct products. New studies as to monetary value are directed at the "money counters" who understand only pesos, bolívares, and dollars, and these values are staggering. A recent economic study (Costanza et al. 1997) put dollar values on many of the hard-to-value ecosystem services such as maintaining water supplies and nutrient cycling, to pollination and recreation, and came up with an estimate of US\$33 trillion per year (range between \$16 and \$54 trillion), a sum that equals two times the Gross Global Product. Even if we take only the lowest of the estimates, it is an impressive number. As a specific example, replacing the carbon storage function of tropical forests could cost US\$3.7 trillion (Panayotou and Ashton 1992).

Unfortunately, as we alter or convert wildlands, we run up against the reality that many of their features are irreplaceable: there are no substitutes for the components and we have no spare parts, there are generally no substitutes for the functions performed, wild areas critical for ecological functions cannot be moved, and the resilience of wild areas is limited. How, then, can protected areas function in this situation? To make them work, we need to **reconceptualize, rescale, reform,** and **research**.

The Four R's

The role of protected areas must be **reconceptualized**. We have been prone to create mountain protected areas because of their spectacular scenery, or sometimes to try to safeguard a single endangered species such as the Andean spectacled bear, or because the high summits were not in demand for agriculture, forestry, or mining, and therefore there would be little objection. This has led to the creation of isolated high mountain reserves-fragmented archipelagos. We need to establish new sites and to link and manage existing reserves so that they maintain ecosystem functions and biodiversity along with production of economic goods, especially water of high quality. Increasingly, we must also make creative use of IUCN's Category V, protected landscapes, "where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecologic and/or cultural value, and often with high biological diversity"; and creative use of Category VI, managed resource protected areas, whose purpose is to "to ensure long term protection and maintenance of biological diversity while providing at the same time a sustainable flow of natural products and services to meet community needs." Note an emphasis in this reconceptualization on biodiversity conservation. The Andean countries were signatories to the United Nations Convention on Biological Diversity, and in order to fulfill their commitments to this treaty, many more in situ areas are needed that safeguard this national and global treasury of genes, species, and ecosystems.

To carry out these expanded functions, we need to **rescale** our efforts. The size of most protected areas is too small. A single catastrophe can destroy a small protected area, or so disturb it that its resilience will not be sufficient to restore it to its original function and species

complex within decades or even centuries. They are also too small to provide for the continued welfare of the full suite of the biological complement of the area, including large, wide-ranging species (especially predators), that we now know are essential to the well-being of the whole ecosystem. Even Yellowstone National Park, at just under 9,000 sq km, has its elk move seasonally out of the park,-as do the bison and the wolf. Areas that will conserve a minimum viable population (at least 500 individuals) of a species like the lion may have to be on the order of 6,250 sq km, and for Africa's endangered wild dog may be 100,000 sq km (Newmark 1992). The island biogeography studies of MacArthur and Wilson (1967) and Diamond (1975) showed us long ago the rates at which species are lost with respect to island size and distance from nearest source of replenishment. Conservation biology has shown us that nature protection areas surrounded by an "unfriendly" landscape from which recruitment (species migration and gene flow) cannot occur are similar to islands. In essence, the smaller the island, the more rapid and greater is species loss. Larger is thus better than smaller and one single area is generally better than several smaller areas aggregating the same size as the single area. There is not only less edge effect with its attendant problems, but a large area is less susceptible to being destroyed by natural or human-caused catastrophes. A transition or buffer zone

around a core protected area can make the surrounding area more "nature friendly." The shape of a protected area is also important, with circles and squarish areas being better than long narrow areas (again because of minimizing edge effect). Connectivity can provide for gene flow and species migration and recruitment, and this is especially important in view of climate change. Landscape linkages in the form of corridors that are managed in a nature-friendly way are needed to connect these island archipelagos of mountain protected areas. Along mountain ranges, large corridors are easy to conceptualize, and we need to work toward them. Also critical are altitudinal corridors or connections from the summit to lower elevations, and perhaps eventually to the sea and marine environment. These too provide for species movement and genetic flow in altitudinally zoned habitats-habitats that may shift with climate change. They also offer a watershed or basin approach that maximizes the ecosystem services that depend on the interaction of land and water in a hydrologic unit. Two good examples of this near Quito, Ecuador, are the Choco-Andean Corridor and Biosphere Reserve proposal of the Maquipucuna Foundation (Figure 1), and the Condor Bioreserve cluster of four protected areas fostered by the Autisana Foundation and The Nature Conservancy.

The third R is to **reform** institutions so that we can develop some needed changes in institutional arrangements. Those managing protected areas need to work with neighboring communities, residents, indigenous groups, corporations, or local levels of government that own or use the surrounding land. These need to become nature-friendly stewardship areas-ideally through voluntary cooperation in a bioregional program such as described by Miller (1996) and Saunier and Meganck (1995). These will be new partnerships for those dealing with protected areas, but very necessary ones. Many of them will hopefully become voluntarily dedicated and government-blessed as IUCN Category V protected landscape or Category VI managed resource protected areas. Each protected area should encourage the development of a local support group, a private voluntary organization-and develop good relations and real communication with existing community groups.

And fourth is research. Science and other types of information such as traditional knowledge are more important than ever. Particularly needed are greater appropriate use of the best that new GIS techniques have to offer, and more complete biodiversity inventory and location. In the United States, where the level of research knowledge and protected area management is relatively high, there is nonetheless an alarming ignorance of what biological diversity exists in most national parks, for instance. While species inventories for vertebrate species and the higher

Volume 16 • Number 2

plants may be relatively good, data on invertebrate, fungi, and lower plant species is inadequate for sound biodiversity and ecosystem management. The National Park Service in the USA has begun a 10-15 year project in 1998 that will improve the situation under a Natural Resources Initiative, and projects such as the All Taxa Biodiversity Inventory being carried out in Great Smoky Mountains National Park (Clarke 1998). Partnerships with research institutions need to be initiated or expanded greatly since the research component in most protected area agencies around the world is generally either lacking or not adequately supported. In addition, systematic and careful monitoring must be initiated if trends are to be accurately identified.



Figure 1. Proposed Choco-Andean Corridor, Ecuador.

Action on the Ground

A summary of the on-the-ground action for mountain protected areas would involve:

- Identify, select, and establish new core wild areas using criteria of biodiversity conservation and capturing ecosystem services, rather than just spectacular summits and alpine scenery. Important headwaters should figure prominently in this.
- 2. Develop zones of conservation around both new and existing core protected areas where public, private, and communal landowners and users are invited, through legal means or incentive policies, to manage their resources in ways that minimize negative impacts on the protected cores. These transition areas of conservation have been referred to as buffer zones and may even be a heavier-use area within the same national park or legal protected area. Where the land is in private or communal ownership. they might be more appropriately called stewardship lands. Brown and Mitchell (1998) present a good discussion of the myriad aspects of incentives, policies, philosophy, reguirements for success, and some case examples from around the world for stewardship lands. These areas can do much to help preserve traditional life styles and cultures. The classical model biosphere reserve of UNESCO's Man and the Biosphere program promoted the designation and management of buffer zones of this nature around core protected areas.
- 3. *Link* these cores and their buffer zones by corridors of wild or *naturefriendly landscapes*, both altitudinally to the lowlands and along the ranges. The need is to somehow achieve land and water management in these connectivity areas that will permit plant and animal migration. Currently these intervening lands are often in almost "nature-

hostile" uses, such as monocrop agriculture with heavy fertilizer and pesticide use, or are overgrazed lands or heavily overcut forests. The challenge of converting these to a stewardship regime of management is formidable and demands creativity, patience, and hard work with local landowners and community groups. It demands new partnerships and the reforming of institutions referred to previously.

 Inventory of biodiversity and monitoring are necessities in all protected areas, and in the buffer zones.

Is any of this practicable? Some progress is being achieved by agencies or organizations that have caught the vision of these large-landscapelevel ecosystems or bioregions (described in Hamilton 1997). I am currently working with Kenton Miller of the World Resources Institute on a joint project with IUCN's World Commission on Protected Areas to identify and map the various proposed large ecoregion corridors or clusters around the world, and the number is substantial. They are mostly in mountain areas, where there are some 31 areas. In the Andes, in addition to those shown in Figures 1, there are the Naya River Watershed Corridor in Colombia, the Andean Bear Ecological Corridor in Venezuela, a corridor in Bolivia beginning near Cochabamba and extending north to and across the border with Perú, the Huascarán-Huayhuash corridor in Perú, and an exciting transborder corridor along the southern Andean spine between Chile and Argentina near Puerto Montt, recently given impetus by the

creation of Pumalin Park.

An ambitious and stirring proposal for a Yellowstone-to-Yukon Conservation Initiative is underway, and it has a full-time executive officer at the present time. This inspiring initiative causes one to dream of an Andean Mountain Conservation Corridor from Tierra del Fuego to the Isthmus of Panamá, and this was fostered by an Andean IUCN proposal for an Integrated Program of Environmental Conservation and Sustainable Development presented by José Pedro de Oliveira Costa and Danilo Silva at the 1995 Andean Mountain Association Symposium in Huarina, Bolivia. And those attending that meeting will recall also that Jim Thorsell and I introduced "our dream" of a Conservation Corridor

of the Americas which would extend from Tierra del Fuego to the Bering Sea. This was given some realization when the governments of seven Central American countries signed a formal compact in 1997 proposing a Meso-American Biological Corridor of connected protected areas.

The Andes are what might be termed a "natural" for such a biotic corridor of conservation. Maps of protected areas elsewhere in the world show the potential, as in the European Alps, the Western Ghats, and many more. We need a vision, a dream. The Reverend Martin Luther King, Jr. would have had little impact if he had shouted "I have a small strategic plan!" instead of "I have a dream!"

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