International Wilderness Provides Ecological Services for Sustainable Living

BY KENTON R. MILLER

Editor's Note: This is a revision of Dr. Miller’s keynote address to the 6th World Wilderness Congress, October 1998, Bangalore, India.

he designation of wilderness and other special places and sacred areas is not a new idea. Ancient cultures have protected certain places from people-caused change since the earliest of human times. They sought to protect their freshwater springs, their supplies of firewood and building materials, their sources of medicinal plants, and their special hunting and gathering grounds. Sites of historic, religious, spiritual, and cultural significance have been assigned special places in the landscape within a mosaic of farms, hunting areas, harvested forests, and settlements. Some of these ancient protected areas are still found, having survived centuries of time and change. Many hinterland sites continue to be used for pilgrimages and rest, and for communion with nature and the human spirit.

Modern and industrial societies also give special status to the places they consider to possess outstanding values, and these places serve many purposes. Examples from around the world illustrate the diverse reasons for which different communities establish and manage these areas. In Bali centuries-old irrigation systems provide for today’s needs for rice, drawing water for irrigation from Lake Batur that is considered to be a holy site by the local Hindu culture. In Brazil the Dos Orgoes National Park provides potable water to Rio de Janeiro. The Cibodas Reserve on Java offers firewood to local communities, while in Botswana, safari hunting is an economically important use of wildlife. At the most southern tip of the Andes in the Torres del Paine National Park of Chile, rugged hikers enter wilderness to pit their mountaineering skills against the dynamic and challenging elements of nature. Ecuador’s Galapagos Islands National Park provides facilities to support research into that unique environment, while in Russia, the Cernozem Biosphere Reserve offers research opportunities on one of the world’s most productive soils, and maintains one of the last unplowed areas of steppe. Tigers have been restored in Rathambore Reserve in Rajasthan, while the buffer zone of Baluran National Park in Eastern Java protects fishing services for local communities. Deep in the forest of Ujung Kulon National Park in far Western Java, some of the last Banteng, an ancient form of wild cattle, still survive. Environmental education is a main theme of the Poas Volcano National Park in Costa Rica.

Wildland Protection Is Not New

The concept of protected wildland areas is neither an invention of this century nor an import from any one particular culture or region of the world. Presently, more than 33,000 places are being accorded special legal status as national parks and other types of protected areas by 252
The starting point must be a definition of a protected area. The definition adopted is derived from that of the workshop on categories held at the IVth World Congress on National Parks and Protected Areas:

An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.

This definition embraces the “universe” of protected areas. All categories must fall within this definition. But although all protected areas meet the general purposes contained in this definition, in practice the precise purposes for which protected areas are managed differ greatly. The following are the main purposes of management:

- Scientific research
- Wilderness protection
- Preservation of species and genetic diversity
- Maintenance of environmental services
- Protection of specific natural and cultural features
- Tourism and recreation
- Education
- Sustainable use of resources from natural ecosystems
- Maintenance of cultural and traditional attributes

Having regard to the different mix and priorities accorded to these main management objectives, the following emerge clearly as distinct categories of protected areas:

Areas managed mainly for:

I. Strict protection (i.e., Strict Nature Reserve/Wilderness Area)
II. Ecosystems conservation and recreation (i.e., National Park)
III. Conservation of natural features (i.e., Natural Monument)
IV. Conservation through active management (i.e., Habitat/Species Management Area)
V. Landscape/seascape conservation and recreation (i.e., Protected Landscape/Seascape)
VI. Sustainable use of natural ecosystems (i.e., Managed Resource Protected Area)

However, most protected areas also serve a range of secondary management objectives.

The relationship between management objectives and the categories is illustrated in matrix form in the table below. It is developed further in Part II, where each category is described, and through a range of examples presented in Part III.

This analysis is the foundation upon which the international system for categorizing protected areas was developed by IUCN and which is presented in these guidelines. There are several important features to note:

- The basis of categorization is by primary management objective
- Assignment to a category is not a commentary on management effectiveness
- The categories system is international

Source: IUCN, 1994. Guidelines for Protected Management Categories, Gland, Switzerland

countries (WCMC 1997). This represents almost 9% of the Earth’s terrestrial surface. The World Commission on Protected Areas and the World Conservation Monitoring Centre have classified these areas according to the objectives for which individual countries manage them, as shown in Figure 1. Not included in this tally are the thousands of smaller sacred forests, community forests and wildlife reserves, and local government managed wildlands.

Nature and natural processes dominate most of these sites. Here, in the ideal case, streams flow unimpeded by waterworks. The sounds are of birds, mammals, insects, and flowing waters. There is limited development of roads, buildings, agriculture, and human settlements. While most have felt the hand of human cultures as people have molded and shaped nature over the centuries in their search for sustenance and living space, nature’s processes still dominate the landscape.

These sites are special for three important reasons:

1. The species and their genetic variations found at each site are unique forms of life. Should they become extinct, people have no capacity to recreate them.

2. The ecological functions that take place at each site, like pollination and detritus cycling, cannot be replaced by human-
made technological inventions, nor could the economic cost be afforded.

3. These communities of life forms and their myriad inter-connections and inorganic environments cannot be picked up and relocated geographically to accommodate human preferences.

The Convention for the Conservation of Biological Diversity (CBD) in its Article 8(a) features protected area management as a central strategy for the maintenance of species, their genetic variation, and habitats around the world. Most ratifying nations have included their protected area programs as a component of their national biodiversity strategies and action plans.

Change and the 21st Century

As we look to the future, communities and their governments are challenged by the rapidly disappearing wildlands and the imperative to achieve sustainable livelihoods. Namely, in the face of global change in the 21st century, how can ecosystem services continue to meet the needs of people and other life forms? Scenarios drawn by scientists suggest major forces at work, including rising trends in world population, a fall in world fish catch, an increase in atmospheric carbon dioxide, rapid soil degeneration in many regions of the world, deforestation, and fragmentation of landscapes. This latter scenario is one of the most powerful forces responsible for the loss of biodiversity and ecosystem services, such as has occurred at sites in the United Kingdom and Western Australia. All of these phenomena, and other factors in terms of the “domestication” of landscapes, had and will continue to have a tremendous impact.

Wilderness, Ecosystem Services, and Sustainable Living

Natural ecosystems support nature and human communities in myriad ways. Figure 2 is adapted from the work of Costanza et al. (1997). The full array of goods and services derived from ecosystems are listed along the left-hand axis. A financial value is proposed for each good and service which enables the authors to rank the relative importance of each. While this work is still very much open to discussion among ecologists and economists, the study provides a useful framework to orient our understanding of the role of ecosystems in sustainable living. For example, food security is dependent upon the cycling of nutrients and wastes in the soil and water. These services are suggested to be among the most valuable of all. The supply of fresh water and purification of air are similarly dependent upon well-functioning ecosystems. These services are not exchanged in the economy.

Cultural values rank high on the list. Sites like Peru’s Machu Pichu National Reserve and the Kagar Alam in Bali illustrate how those societies have chosen to protect these sites to retain their cultural heritage and also employ these sites to generate tourism income. In the Kakadu National Park in Australia the Aboriginal community retains control over and administers access to their sacred sites within the area. Those goods and services that we most commonly associate with natural ecosystems, including wood products, recreation, tourism, and genetic resources, appear to rank much lower in value. They are exchanged in the marketplace and carry monetary values.

Perhaps the most striking observation to be drawn from this analysis is that many of the services (ecological services) that governments and local communities appear to value most are not directly managed in our economies. They are taken for granted as “free” from nature. We do not generally invest in and nurture these lands and waters to protect, restore, and enhance their capacity to produce these valued services. But they are natural by-products of wilderness and wildland reserve protection.

As can be seen, wild and natural ecosystems are directly linked to the support of life itself. On ethical and moral grounds alone, we would conclude that

Figure 2—Our Understanding of Ecosystem Value is Increasing

<table>
<thead>
<tr>
<th>Ecosystem Service</th>
<th>Value (in $ billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrient cycling</td>
<td>17.075</td>
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<tr>
<td>Cultural</td>
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<td>Waste treatment</td>
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<td>Disturbance regulation</td>
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<td>Gas regulation</td>
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<td>Water regulation</td>
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<td>Recreation</td>
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<td>Raw materials</td>
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<tr>
<td>Climate regulation</td>
<td></td>
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<td>Erosion control</td>
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<td>Biological control</td>
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<tr>
<td>Habitat/refugia</td>
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<tr>
<td>Pollination</td>
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<td>Genetic resources</td>
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<td>Soil formation</td>
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</tbody>
</table>

Source: Costanza et al., 1997
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• Avoid locating major human interventions in areas critical to ecosystem service production, such as draining and filling wetlands, and infrastructure development.

• Link key wildland patches and protected areas by corridors to facilitate adaptation to global change.

• Incorporate biodiversity-friendly practices into farming, fishing, and forestry.

• Establish social, institutional, and economic arrangements that foster stewardship, equity in the sharing of costs and benefits, and voluntary cooperation.

• Focus simultaneously on the actions needed at local, bioregional, national, and global levels.

Employing Bioregional Approaches to Land Use Planning

• Identify, select, and establish core wildland areas that will be retained in the landscape.

• Establish buffer zones around wildland core areas to provide a transition from wild to domestic land uses and space for between them managing negative impacts.

• Link core areas and buffer zones by corridors of nature-friendly land- or seascape to provide for migration and for adaptation to global change.

• Manage core areas, buffer zones, and corridors as elements of greater ecosystems or bioregions, the matrix of which features farms, harvested forests and fishing areas, and human settlements and infrastructure.

Bioregional planning can be most successful when accompanied by steps to create an appropriate social and political environment because its people who will make it happen. This includes:

• Participatory democracy among stakeholders.

• Appropriate levels of decentralization and devolution.

• Strengthened role of the central, state, and local governments to help communities and stakeholders gain new skills, exercise newly devolved authority and responsibility, and establish the incentive structure to foster stewardship.

• Information and access to education for all stakeholders.

• Application of science and local knowledge.

• Removal of negative policies and incentives and establishment of a positive living and working environment.

Toward a Goal of Sustainable Living

Sustainable living will depend upon a secure flow of ecosystem services, and their source is often linked with wild and semiwild places. These natural and protected areas must be diverse and will need to include patches of forest and other natural habitats, including wilderness, appropriately defined to fit the local context. Some of these protected areas can serve society’s needs for material, solace, cultural identity, and spiritual uplift. Others will need to be as large and as wild as possible (wilderness and nearly wilderness) to fulfill their ecological functions. They can be managed through different mechanisms of governance, but the continuity in their management as key ecosystems must be long term. For long-term survival, and therefore service to people and nature, these key sites need to be established and managed within a network of reserves connected by biodiversity-friendly corridors. Each society will need to seek its own approach to participatory democracy and governance to make this vision possible.

KENTON R. MILLER is vice president for International Development and Conservation, World Resources Institute, 1709 New York Avenue, NW, Washington, D.C. 20006, USA. Phone: (202) 662-2582. E-mail: kenton@wri.org.

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