In technologically advanced societies such as ours, most people who know and love the natural world relate instantly to the term "wilderness". Wilderness evokes the image of a pristine landscape undisturbed by man: a place of solitude, a refuge from the frenetic pace of modern life. For some it is a place of meditation. For others, a place of solitary adventure. For still others, a place for fellowship. The image is clear and, while varying in its individual interpretation, substantially spiritual in nature. In fact, it may safely be said that, of all today's many categories of protected areas, wilderness is the most intensely spiritual in character, the most commanding of reverence for the miracle of the created world as expressed in the substance of millennia of biological and physical evolution. In our society, wilderness has become a sacred space, a living temple in the fabric of our civil religion, if not universally in our ecclesiastical traditions. Our conscious decision to protect wilderness landscapes as a legacy for the spiritual renewal of future generations represents a high accomplishment of our civilization.

Notwithstanding recent efforts to develop their scientific values, National parks, like wilderness, have a well established and strongly spiritual image, which evokes a variety of emotions, such as awe at creation, pride in a nation's natural heritage, and protectiveness toward special places for recreation and revitalization. Like wilderness, national parks are ideally large, self-sustaining ecosystems and leading sites for conserving the planet's biological diversity. Somewhat more than wilderness, national parks have a social image as well, providing for a wide range of opportunities for individual and group recreational experiences (national recreation areas, which are strongly oriented toward active and intensive recreation are better examples of protected areas fulfilling social needs). The national park image also strongly focuses on education to enhance public awareness and understanding of the natural world and the importance of conserving our natural heritage, and in so doing to build and strengthen a conservation ethic.

Other categories of protected areas primarily serve the needs of people for information. They provide the scientific basis and practical skills needed to manage and sustain ecosystems and natural features. Some of these areas provide baseline information for evaluating natural changes and the effects of human activities. Scientific reserves, like the Ice Age Scientific Reserve in Wisconsin and the research natural areas established in many of our national parks and forests serve this purpose.

In addition, there are other areas set aside to help us understand the effects of human manipulation. They provide the knowledge and skills needed to manage ecosystems on a sustainable basis to meet the needs of society for forest products, fish and shellfish, livestock and agricultural crops, a dependable supply of clean water, and a wide range of other commodities and environmental services. In addition, many serve as centers for extension services to demonstrate improved resource management methods within the region. Still others are centers for rehabilitating damaged ecosystems to approximate natural conditions or to restore economic productivity. The Department of Agriculture’s experimental forests and rangelands, and our national network of experimental ecological reserves exemplify areas where science is providing the information we need for ecologically sustainable economic development on which the advancement of civilization depends.

Finally, there are areas managed to produce economic commodities on a sustainable basis to support material human needs. The primary examples include the Forest Service’s managed forests and the Bureau of Land Management’s managed rangelands. Management areas for enhancing stocks of fish, shellfish, or game animals; and areas for rehabilitating the commercial productivity of degraded landscapes would also fall into this category.

Any protected area or special management designation, like wilderness or research natural areas, can be categorized on the basis of its contribution toward meeting basic human needs in the above four areas: spiritual, social, informational, and material. If we were to draw a tetrahedron, with the apexes representing the four basic types of needs, it should be possible to place every protected area somewhere within the enclosed space on the basis of how its management objectives relate to these needs. I submit that, based on existing management objectives, most wilderness areas would fall very near the spiritual apex, national parks somewhere between the spiritual and social apexes, and multiple use areas somewhere in the middle of the enclosed volume on the material apex side.

FIGURE: Conceptual Categorization of Protected Areas With Respect to Basic Human Needs

In developed countries, where the basic commodities of life—food, water, shelter, and energy—are almost universally available, people are liberated to pursue creative, recreational, and similar activities. In these materially advanced societies, protected areas which primarily nourish the human spirit and social needs have strong constituencies. Such areas tend to be relatively well protected from threats originating from within. However, material progress in these areas is causing growing problems from external influences, particularly in the form of air and water pollutants, and land use changes which disrupt animal migrations, seed dispersal, and other processes important in maintaining healthy ecosystems and natural evolution. New approaches are needed to deal with these new and potentially grave problems.
In developing countries facing the tragedy of human suffering because basic material needs go unsatisfied, the setting aside of protected areas primarily to nourish spiritual and social needs becomes increasingly difficult when human bodies are malnourished, poorly clothed, and inadequately sheltered. Traditional western-style national parks which cater to tourists from developed nations are becoming threatened as a result of encroachment by local people who see these areas as unfairly depriving them of lands needed for subsistence. In these parts of the world, just as in the developed countries, new approaches are needed to conserve valuable natural landscapes while helping to improve the material well-being of local people.

The biosphere reserve provides new flexible approaches for both developed and developing countries in conserving ecosystems and their biological diversity while, at the same time, providing an improved basis for sustainable development. The biosphere reserve project is the cornerstone of the United Nations Man and the Biosphere Program (MAB), which was launched in 1971 to help provide the scientific basis for harmonious relationships between people and their environment. As of May 1985, 105 countries including the United States had established their own MAB programs.

Biosphere reserves provide the geographic focus of MAB’s research and educational programs. Linked together to form an international network of 243 sites in 65 countries, they are envisioned as the hubs of planetary efforts to demonstrate the value of conservation in each of the world’s 193 biogeographic regions.

Looking at the human needs tetrahedron, the biosphere reserve occupies a position near the informational apex. This is because a fully operational biosphere reserve is a regional center for research, demonstration, and training to improve the standard of land management and conserving biological diversity. To achieve this purpose, conservation in biosphere reserves focuses on maintaining the capability of ecosystems to generate knowledge of the natural world.

In wilderness, conservation has traditionally focused on maintaining undisturbed landscapes because of their intrinsic aesthetic and inspirational value. In biosphere reserves, it focuses on maintaining both undisturbed and managed landscapes because of their value as informational resources.

Biosphere reserves are places for conserving naturally evolving genetic resources as storehouses of information waiting to be unlocked through science for practical human benefit in the form of new medicines, foods, useful chemicals, and other substances. Particularly in developing countries, they are places for the conservation and study of the traditional uses of indigenous cultures—many of them as endangered as Red Book species—and the judicious improvement of these uses through methods which build upon traditional knowledge. They are places for monitoring natural and human-caused changes in the environment, and places
for finding new and better methods to sustain, restore, and rehabilitate ecosystems. Finally, they are focal points for the sharing of information locally, between scientists, land managers, and local people; regionally among biosphere reserves concerned with similar interrelated environmental, land use, and environmental problems; and internationally, to provide a framework for cooperation especially between north and south.

The biosphere reserve is the newcomer to the lexicon of protected areas, the first biosphere reserves having been designated by UNESCO in 1976. As for the National Wilderness Preservation System, lands already in protected status form the backbone of the biosphere reserve network in most countries. Unlike wilderness areas, however, biosphere reserves have no legislative basis. Designation requires the voluntary concurrence of the site administrator, and carries solely a moral obligation to encourage scientific use and cooperation at the site and to protect its value for these purposes. Where available legal authorities for protection are adequate, the moral force of the designation can be persuasive. In the United States and increasingly in other countries, the biosphere reserve designation is being used to link protected areas having different management objectives and conserving a variety of the natural and managed ecosystems characteristic of a biogeographical province or subregion. These clusters of ecologically and functionally complementary sites are given a geographic name, like the California Coast Ranges Biosphere Reserve, which symbolically integrates them and provides a framework for cooperation in research and management.

The ideal biosphere reserve consists of a core area, a large self-regulating natural ecosystem which serves as a benchmark of regional and global environmental quality. Wilderness areas often make exceptionally good core areas in biosphere reserves because of their secure protection, lack of disturbance, large size, and suitability for baseline monitoring of major landscape units. Surrounding the core area are areas used for experimental manipulation and comparative research, the study of traditional uses by indigenous cultures, and areas for developing methods for rehabilitating degraded landscapes. Surrounding these information-generating areas of the ideal biosphere reserve is a large area of cooperation within which the information generated in the biosphere reserve is applied in managing regional ecosystems for a wide range of useful purposes. This area may vary in space and time, depending on the nature and extent of the cooperative activities being undertaken, and may not be included formally as part of the designated biosphere reserve. The below diagram depicts the various areas of an ideal biosphere reserve. In practice, these areas seldom occur as continuous tracts, so biosphere reserves must be constructed as assemblages of complementary protected areas in a particular region.
Thus, it should be fairly obvious that wilderness areas or national parks are essential and inviolate in their role as core areas of biosphere reserves but are themselves incomplete as biosphere reserves, which should also contain places for developing and demonstrating sustainable systems of resource development which conserve biological diversity and natural processes. Unfortunately, many U.S. biosphere reserves today consist solely of such core areas. U.S. MAB, with funding from several Federal agencies, is attempting to improve the situation by systematically reviewing particular geographic regions to identify the most qualified sites or groups of sites for nomination as biosphere reserves. In regions where biosphere reserves have already been designated, MAB is exploring opportunities for expanding and consolidating regional networks of complementary sites.

Last year, the U.S. and Canadian MAB National Committees convened a panel of scientists and protected area administrators to review the Lake Forest Biogeographic Province, which straddles the international boundary from Maine to Minnesota and includes a wide variety of northern hardwood and mixed coniferous forests. For evaluating the qualifications of sites and groups of sites as biosphere reserves, the panel subdivided this huge province into seven subregions. The final report, now being completed, will recommend the nomination of one biosphere reserve in each subregion. The westernmost subregion of northern Minnesota and adjacent Ontario already contains Isle Royale National Park, an existing biosphere reserve which is widely recognized for its long-term research on the dynamics of predator-prey relationships. The panel’s recommendation here will be to create an expanded biosphere reserve by linking of Isle Royale with Voyageurs National Park and part of the Superior National Forest (any area to be determined on the basis of Forest Service review), in the U.S., and with the Quetico Provincial Park in Canada. The multi-site linkage, for which no name was suggested, is considered to provide the strongest possible candidate, although each individual site is judged a strong candidate in its own right. In the adjacent subregion, which includes central and northern Wisconsin and upper peninsular Michigan, the panel will recommend a linkage of several nearby sites to fulfill the multiple functions of a Superior Uplands Biosphere Reserve, namely the Sylvania Recreation Area in the Ottawa National Forest (for its old growth northern hardwoods, pristine lakes and swamps), the Argonne Experimental Forest (for its history of experimental silvicultural research), and the northern unit of Northern Highlands State Forest including 13 state scientific areas and the Trout Lake Station of the University of Wisconsin. The recommended biosphere reserve would also include the Notre Dame Environmental Research Center, which is widely recognized for its contributions to limnological research. Collectively, these areas conserve excellent examples of the region’s characteristic terrestrial and aquatic ecosystems, as well as many of its outstanding research sites.
Once the panel's report has been reviewed and approved by panel members and by U.S. MAB, the concurrence of the administrator of each candidate site will be solicited by the U.S. MAB Secretariat at the Department of State. Although MAB biosphere reserve personnel are glad to come to the region to provide briefings, site administrators will be responsible for arranging for consultation with interested agencies, organizations and the public. Sites receiving endorsement will then be nominated by U.S. MAB for consideration by the International MAB Bureau, which meets annually. The only exception would be in a case where failure of one or more administrators to concur diminishes the qualifications of the resulting biosphere to the point of nonviability. If the MAB Bureau approves the nominations, each administrator receives an official certificate of designation, signed by the Director-General of UNESCO. The entire process, from the first convening of the panel to official designation, normally takes about two years.

The designation of a site as a biosphere reserve is a call for action to increase its use for scientific and educational purposes. Operating within the context of a biosphere reserve, wilderness areas, national parks, wildlife management areas, multiple use areas, and other included sites should strengthen their research and cooperative activities. New biosphere reserve objectives should be developed to complement the traditional objectives of the included administrative units. In this manner, a particular landscape could operate simultaneously and compatibly as a wilderness area and as the core of a biosphere reserve, and thereby contribute to meeting spiritual and social, as well as informational and material needs. Far from compromising the basis for conservation, the designation reinforces conservation by demonstrating an expanded role of the included units in serving society.

The biosphere reserve concept is evolving rapidly as we gain the experience of its applications in the field under different ecological, social, cultural, and institutional conditions. Much is being written. An Action Plan, adopted last December by MAB's International Coordinating Council, sets forth the objectives of the international network and 35 initiatives for enlisting international and domestic support for developing biosphere reserve functions. Also last year, the first international conference on the management of biosphere reserves was held at the Great Smoky Mountains National Park Biosphere Reserve to explore the management implications of biosphere reserve status. (If you would like to receive copies of these documents, and progress reports on the biosphere reserve project, please contact the MAB Secretariat, Department of State OES/ENR(MAB), Washington, DC 20520).

The designation of a biosphere reserve in northern Wisconsin should be a source of pride, a catalyst for marshalling technical and financial resources to solve problems, and a framework for cooperation on many levels. We in MAB look forward to working with administrators, interested institutions, and the public.
in promoting appreciation of the special role of biosphere reserves in conservation developing a model biosphere program in the region.

(Dr. William Gregg has worked as an ecologist for fourteen years with the National Park Service, and presently serves as cochairman of the United States MAB Project Directorate on Biosphere Reserves).
CONCEPTUAL CATEGORIZATION OF SOME PROTECTED AREAS WITH RESPECT TO HUMAN NEEDS

KEY:
BR = Biosphere Reserve
MF = Managed Forests
NP = National Parks
RA = Recreation Area
RNA = Research Natural Area
WA = Wilderness Area
The ideal biosphere reserve conserves all of the representative ecosystems of a particular natural region. It contains the greatest possible diversity of physical and biological resources. It carries out a wide range of research, education, training, and demonstration activities in contiguous or nearby areas. Together, these activities provide the knowledge and skills needed to conserve biological diversity while enabling the ecosystems to be managed on a sustainable basis for a wide range of amenities and commodities.

**Area of cooperation** (indefinite boundary)
(Human settlements, forests and rangelands, and other uses managed to achieve greatest possible harmony with the purpose of the biosphere reserve)

**Rehabilitation Area**
(Experimentation and management to restore degraded landscapes)

**Core Area**
(Baseline monitoring area: National park, wilderness area, wildlife sanctuary, or similar protected conservation unit)

**Experimental Research Area**
(Manipulative research to improve sustainability of managed ecosystems: training for specialists and local users)

**Traditional Use Area**
(Conservation and study of harmonious land uses, typically by indigenous cultures)