

March, 1983

MAN AND THE BIOSPHERE PROGRAM
PROJECT 8: Conservation of Natural Areas
and the Genetic Material They Contain

Purpose of the Project

The project was established to provide the basis in the natural and social sciences for selection, management, and intelligent use of protected areas for the sustainable conservation of the world's ecosystems. The project recognizes the growing importance of these sites as places for conserving the world's natural genetic heritage, for keeping track of naturally occurring and human-caused changes in the world's ecosystems, for developing better ways of managing ecosystems to meet human needs and as places for the continuing renewal of the human spirit.

The principal emphasis of the project is on the establishment of a world network of biosphere reserves, and on the effective use of the network to improve the well-being of human populations.

Specifically, each biosphere reserve is an important conservation unit, containing a representative sample of the characteristic ecosystems of one of the world's major biogeographic regions. It provides places for long-term monitoring of these ecosystems in their natural, undisturbed condition. These areas, called core zones in MAB parlance, provide baseline scientific information on changes in ecosystem structure and processes over time, as well as benchmarks against which to assess the effects of human manipulations. They also provide sites for educational programs for the public and special groups interested in natural history and the conservation of natural ecosystems. In the United States, national parks, national monuments, and wilderness areas serve as core zones of biosphere reserves because of their suitability for monitoring and educational activities relating to undisturbed ecosystems.

Each biosphere reserve should also provide places for controlled experimental manipulation of ecosystems in order to develop improved methods for utilizing their renewable resources on a sustainable basis for human benefit. These management areas are called buffer zones, and may be utilized for experimental research in such fields as agriculture, silviculture and animal husbandry. Demonstration and training projects to provide information and skills to local populations and special interest groups are an important aspect of the biosphere reserve's mission in the buffer zones. In the United States, a number of experimental forests and experimental rangelands have been designated as biosphere reserves because they fulfill the mission of the biosphere reserve in these important areas.

The Existing Biosphere Reserve Global Network

The first biosphere reserves were unilaterally established by the United States, Austria, France, and the Philippines in 1974. Nomination and designation procedures were put into effect by the international MAB organization in 1976, and the network has grown steadily since that time. As of the present date, the network consists of 215 sites in 58 countries. The United States has largest domestic network with 38 sites, followed by Bulgaria with 17, the United Kingdom with 13, and Australia with 11. About 64 percent of the units are in developed countries, and major underrepresentation exists in many of the developing countries of tropical and subtropical regions of Asia, Africa, Latin America, and the Pacific Basin. The attached map shows the nations presently participating in the Biosphere Reserve Project and the number of reserves in each.

Biogeographic Classification and Representation of Biosphere Reserves

In 1975, the international MAB program adopted a classification system delineating 192 biogeographic provinces which provide the basis for biosphere reserve selection. The United States has lands within 20 of these provinces, and biosphere reserves have been designated in 17. Because the international classification system does not work well in coastal areas, the United States has developed a separate classification, which delineates twelve regions in which the coastal ecosystems of the U.S. and its territories are included. U.S. Biosphere Reserves have been designated in five of these regions.

Selection Procedure

Biosphere reserves are nominated by the National Committees of the 101 nations presently participating in the MAB Program. Once each year, the MAB Bureau, consisting of representatives from 5 participating nations (the U.S. is a permanent representative of the Bureau) reviews nominations in light of the selection criteria and recommends sites for official designation by UNESCO.

In the United States, US-MAB convenes an ad-hoc interdisciplinary team of authorities on the natural ecosystems of a particular biogeographic province for the purpose of identifying and evaluating candidate sites. Following review and endorsement of a team's recommendations by the U.S.-MAB Project Directorate on Biosphere Reserves, which provides overall direction for MAB Project 8, the nominations are transmitted to the chairman of the U.S. National MAB Committee, who, after obtaining the concurrence of the site administrators, presents the nominations for action by the MAB Bureau.

Selection Criteria

Biosphere Reserve nominations are judged on the basis of how well they fulfill each of four essential criteria:

Selection Criteria (Continued)

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Representativeness: The extent to which the site contains the ecosystems characteristic of a biogeographic province.

Diversity: A measure of the number of ecological communities and, to a much lesser degree, the species and types of physical features, occurring within the province.

Effectiveness as a Conservation Unit: The degree to which the site assures long-term conservation of the species, physical features, and processes of a self-sustaining ecosystem.

Naturalness: The extent to which the site contains areas free from the influences of human activities.

Other factors which may influence the qualification of a site for nomination include the presence of unique natural features, suitability for research and educational purposes, and the administrator's willingness to use the site to fulfill the multiple missions of a biosphere reserve.

Status of the U.S. Biosphere Reserve Network

Since 1976, 38 biosphere reserves have been officially designated in the United States. Twenty-two are large undisturbed natural areas, or "core zones" averaging 338,000 hectares (about 836,000 acres) in area; 13 are experimental research areas or "buffer zones" of modest size, averaging 20,000 hectares (about 49,000 acres) in area; and three contain both types of areas. (See attached table.) The network contains many of the old-line units of the National Park System, such as Everglades, Great Smoky Mountains, Sequoia-Kings Canyon, Isle Royale, and Denali National Parks. Several of the experimental research sites, such as the Hubbard Brook Experimental Watershed in New Hampshire and the Andrews Experimental Forest in Oregon, have pioneered major advances in our understanding of ecosystems and how they function. Most of the sites have a long history of ecological observation and research, and ten were participating sites in the International Biological Program before becoming biosphere reserves. Four have been selected to receive major grants for interdisciplinary research through the long-term ecological research program of the National Science Foundation.

Because biosphere reserves have no independent legal status in the United States, protection and management must be accomplished under the legal authorities of their administrators. Nevertheless, the international recognition which biosphere reserve designation represents provides a major incentive for effective protection, use of the site for research, and increased collaboration among scientists, institutions, and nations.

Designation of Multiple-site Biosphere Reserves

A single biosphere reserve designation can be given to a number of complementary sites, under a variety of administrators, and thereby serve to foster scientific cooperation among them. A prototype, recently recommended

approved by their administrators, and by the International MAB Bureau, they will be designated as administrative units within a single California Coast Ranges Biosphere Reserve. This symbolic integration of major ecosystem conservation and research sites in a biogeographic region is a unique aspect of biosphere reserve designation, and one which can serve as a catalyst for improving communication as well as the cost effectiveness and impact of ecological research programs in addressing ecosystem management and rural development problems. The U.S. MAB Program intends to utilize this approach to encourage the integration of ecosystem research activities in other biogeographic regions of the country.

Program Benefits

The biosphere reserve represents a new dimension in global conservation. The full benefits of the project which is still in its early development, will be realized progressively as the network grows and is utilized to achieve its multiple missions. However, we have sufficient experience with biosphere reserves to demonstrate their value in:

- o Conserving genetic resources, including the wild progenitors of commercially important timber and crop species.
- o Providing sites for demonstration projects involving scientific research, resource management, and rural development.
- o Serving as a moral force for secure protection of the designated areas.
- o Serving as focal points for interdisciplinary scientific collaboration involving the natural and social sciences.
- o Encouraging increased scientific cooperation between conservation areas and experimental research areas in the same region.
- o Encouraging cooperation at the local, regional, national, and international levels in solving ecosystem management and land use problems.
- o Encouraging standardization of ecological monitoring methodologies.
- o Fostering public support of conservation through education.

Attachments:

Map of the world showing distribution of biosphere reserves
Table of biosphere reserves in the United States

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