GUIDELINES FOR THE SELECTION AND COORDINATION OF BIOSPHERE RESERVES IN THE UNITED STATES

DRAFT

U. S. Man and the Biosphere Program

March, 1989
These guidelines describe the process for selecting areas in the United States for nomination as units of UNESCO's International Network of Biosphere Reserves. The guidelines describe selection criteria, the roles and spatial organization of biosphere reserves, the development of programs for coordinating the functions of biosphere reserves, and the responsibilities of biosphere reserve administrators.

I. BACKGROUND

I.A. UNESCO’s Man and the Biosphere Program

The International Network of Biosphere Reserves is a project of the Man and the Biosphere (MAB) Program of the United Nations Educational, Scientific, and Cultural Organization (UNESCO). The MAB Program is a nationally based intergovernmental program of research, training, demonstration, and information-sharing. Launched in 1971, the purpose of MAB is to provide the knowledge, skills, and attitudes needed to build harmonious relationships between Man and Nature.

I.A.1. Organization

MAB is one of several intergovernmental programs coordinated through the UNESCO’s Science Sector. The International MAB Secretariat, located in the Division of Ecological Sciences at UNESCO’s headquarters in Paris, coordinates MAB’s activities with other UNESCO programs, cooperating United Nations agencies and international nongovernmental organizations, and national MAB organizations in participating countries.

General guidance for the intergovernmental MAB program is provided by the International Coordinating Council of the Program on Man and the Biosphere (ICC). The Council establishes international goals and priorities, coordinates international cooperation among UNESCO Member States participating in the MAB Program, coordinates the MAB Program with other international scientific programs, and serves as a forum for technical consultation with international nongovernmental organizations. The Council also is responsible for reporting on MAB activities to the General Council of UNESCO, the international agency’s governing body. The International MAB Secretariat serves as the Council’s administrative arm, and its reports facilitate the Council’s deliberations. The Secretariat administers funds allocated to MAB in the UNESCO budget in accordance with the Council’s guidance, as well as funds in trust provided by donor countries for MAB activities.
Figure 1. INTERNATIONAL ORGANIZATION OF THE MAN AND THE BIOSPHERE PROGRAM

(adapted from UNESCO 1987 A Practical Guide to MAB UNESCO, Paris, 40p.)
The elected officers of the Council comprise the Bureau of the International Coordinating Council. The MAB Bureau meets several times between Council sessions to review the progress of the MAB Program, approve technical reports commissioned by the Council, approves biosphere reserve nominations, and recommend actions for the Council's consideration.

I.B. The International Network of Biosphere Reserves

Biosphere reserves focus on the general theme of conserving natural areas and the genetic material they contain. Each site is envisioned as a permanent logistic base for research, demonstration, and training to support conservation of natural ecosystems and their genetic resources within the context of rational and sustainable economic development in a particular biogeographical region. In 1976, the ICC approved formal designation procedures. The "Action Plan for Biosphere Reserves," approved by UNESCO in 1984, sets forth the characteristics of biosphere reserves and a series of nine objectives and 35 actions for consideration by governments and international organizations in developing their multiple roles. The ICC presently places increasing emphasis on developing the functions of existing biosphere reserves and, in particular, strengthening cooperation through the international network. Criteria for designation have been strictly applied by the MAB Bureau to help ensure that new biosphere reserves will be scientifically productive and become effective catalysts for integrating conservation and development. In recent years, biosphere reserves have increasingly served as an aegis for cooperation among protected areas. By June 1989, there were 276 biosphere reserves in 71 countries, including many of the world's outstanding conservation areas and centers for research on natural and managed ecosystems. The United States has the largest domestic network, with 44 biosphere reserves including 84 protected areas under Federal, state, local, and private administration (See Appendix A).

I.C. National MAB Organization

On the national level, MAB activities are coordinated by an autonomous National MAB Committee. As of April 1989, National MAB Committees were established in 114 countries. Each committee is responsible for organizing its own domestic MAB program, and coordinating the national contribution to the international MAB program through participation in comparative studies, interdisciplinary pilot projects, cooperative international training programs, and/or the international network of biosphere reserves. The National MAB Committee is responsible for preparing and recommending a national program for the approval of the national government, and for maintaining links with the International MAB Secretariat, other National MAB Committees and with other governmental and nongovernmental programs at the national and international levels.

National MAB Committees are responsible for nominating biosphere reserves, and coordinating their functional development and participation in cooperative projects involving other sites in the network. Many intergovernmental organizations (e.g., United
Nations Environment Programme, Food and Agriculture Organization) and international nongovernmental organizations (e.g., International Union for the Conservation of Nature and Natural Resources, Conservation International) actively participate in the biosphere reserve program and are potential sources of technical and financial assistance, particularly in developing countries.

I.D. The United States Man and the Biosphere Program

The U.S. Man and the Biosphere Program was initiated in 1973. The U.S. National Committee for Man and the Biosphere was established under the general auspices of the U.S. National Commission for UNESCO under the authority of the 1946 Act that authorized U.S. participation in UNESCO. Since the U.S. government administratively withdrew its membership in UNESCO in December 1984 and subsequently dissolved the Commission, the U.S. National Committee for MAB has operated autonomously under the 1946 legislation, which remains in force.

In January 1989, the U.S. National Committee stated that the mission of the U.S. MAB Program is "to foster harmonious relationships between humans and the biosphere through an international program of policy-relevant research which integrates social, physical and biological sciences to address actual problems." The program's activities shall be broadly interpreted to include "catalytic conferences and meetings, education and training, and the establishment and use of biosphere reserves as research and monitoring sites."

The U.S. National Committee for MAB is responsible for establishing national program goals and priorities, coordinating the U.S. MAB program with the research and development programs of domestic agencies and institutions, and exchanging information and developing cooperative projects with other National MAB Committees. Under a 1980 memorandum from the U.S. Office of Management and Budget, responsibility is vested in the Department of State for coordinating the program's international activities, and in the Departments of Agriculture and the Interior for coordinating its domestic activities. Partial funding for the U.S. MAB program is provided through an appropriation under the Foreign Assistance Act to maintain the benefits to the United States associated with U.S. involvement in scientific programs and networks formerly supported through the U.S. contribution to UNESCO. The funds support U.S. participation in scientific activities on direct country-to-country basis. The remaining funding, used for both domestic and bilateral activities, is provided by participating agencies and institutions. Current funding entities are the Department of State, Department of Agriculture (Forest Service), Department of the Interior (National Park Service), National Aeronautical and Space Administration, National Oceanic and Atmospheric Administration, and the Smithsonian Institution.
Figure 2. ORGANIZATION OF THE UNITED STATES MAN AND THE BIOSPHERE PROGRAM

Federal Agencies
Academia
Private Sector

U.S. NATIONAL COMMITTEE FOR MAN AND THE BIOSPHERE

U.S. MAB Executive Committee

U.S. MAB SECRETARIAT Dept. of State

DIRECTORATES
- High Latitudes
- Temperate
- Tropical
- Coastal and Marine
- Human Settlements

Agriculture
Aquatic and Wetlands
Aridlands and Desertification
Biological Diversity
Biosphere Reserves
Cultural Diversity
Global Change
Sustainable Use and Development

Cross-cutting Themes

Agroecosystems
Aquatic Ecosystems
Biological Diversity
Biosphere Reserves
Cultural Diversity
Global Change
Sustainable Use and Development

The National Committee for Man and the Biosphere (see Figure 2) is a coordinating committee of the Department of State and the Executive Director. It is composed of representatives from various government agencies, academia, and private sector organizations. The primary goal of the Committee is to coordinate and promote activities related to the global protection and conservation of biological diversity and the sustainable use of biological resources. The Committee works with international partners to achieve these objectives and to ensure that the United States contributes to the global efforts in this area.
National Committee members from the funding cosponsors comprise the U.S. MAB Executive Committee. The Executive Committee oversees the national MAB program, recommends program priorities to the National Committee, and administers the annual MAB grant program. Planning, technical review, and implementation of projects in particular areas of MAB interest is the responsibility of the U.S. MAB Directorates. In the U.S., there are five Directorates. The Directorates are geographically based and consist of natural and social scientists from government, research institutions, and academia, and other specialists. Appointments are approved by the National Committee. Each Directorate receives funds for general administration, and may seek project funds through the national grant program.

The grant program is the principal means for funding research, symposia, workshops, and special projects. In administering the grant program, the U.S. MAB Program seeks to contribute toward the following general research priorities identified by the ICC in 1986:

- Ecosystem function under different intensities of human impact;
- Management and restoration of human-impacted resources;
- Human investment and resource use; and
- Human response to environmental stress.

Grants are awarded for projects that address resource issues of national or international importance, are consistent with MAB's international research priorities, or that promote the selection and functional development of the International Network of Biosphere Reserves. The annual call for preproposals is published in the U.S. MAB Bulletin and various professional journals in late summer for grants to be awarded the next fiscal year. The Executive committee reviews preproposals, solicits full proposals for those of greatest interest, arranges for peer review of the full proposals, and awards grants in early summer. The Directorates are responsible for reviewing proposals for technical merit and relevancy to the goals and priorities of the MAB program, and endorsing those of particular interest. To be eligible for funding through the MAB grant program, proposals must be endorsed by at least one Directorate.

The National Committee has identified seven cross-cutting themes to be considered in developing the Directorates' programs (see Figure 2). Each Directorate includes one or more specialists on aspects of themes that are appropriate to the Directorate's mission and program objectives.

To support the U.S. MAB Program, the Department of State staffs a secretariat in the Bureau of Oceans, Environmental, and Scientific Affairs. The Secretariat includes an Executive Director, program officer, and support staff, and is responsible for assisting the National MAB Committee, the Executive Committee, and the Project Directorates in administering the national MAB Program. The Secretariat coordinates the publication of the U.S. MAB Report series and the U.S. MAB Bulletin for disseminating information on U.S. MAB activities.
The National Committee has established the Coordinating Committee on Biosphere Reserves as an arm of the U.S. MAB Secretariat to coordinate the U.S. Biosphere Reserve Program (see Figure 2). The Committee includes representatives of government agencies, nongovernmental organizations, and academic institutions having experience in planning and administering biosphere reserves. The Committee is responsible for developing guidelines relating to biosphere reserves, recommending areas for nomination by the National Committee, and arranging forums for promoting and developing the biosphere reserve program. The Coordinating Committee periodically reviews the status of the U.S. network including recommending sites for designation, and prepares an annual plan for the biosphere reserve program for the National Committee's approval. The Coordinating Committee maintains the U.S. Biosphere Reserve Directory and automated database of basic information on U.S. biosphere reserves. Finally, it coordinates technical review of manuscripts from biosphere reserves and recommends to the National Committee those suitable for inclusion in U.S. MAB publications. The National Park Service provides a MAB Program Coordinator and support staff to support the activities of the Coordinating Committee on Biosphere Reserves.

I.E. Regional MAB Programs

In the United States, Regional MAB Programs provide the aegis for cooperation among agencies, institutions, and organizations in developing the knowledge, skills, and attitudes to support a continuing process of integrating conservation and sustainable economic uses in a particular biogeocultural region. The region should be readily distinguishable in terms of the ecological communities and species as well as the physical features, resource uses and natural processes it includes. To the extent possible, the region should include human populations having long-established relationships with regional ecosystems exemplified in harmonious traditional patterns of resource use.

A Regional MAB Program provides a framework for achieving the purpose of MAB and developing the multiple roles and objectives of biosphere reserves. A Regional MAB Program requires the existence of one or more biosphere reserves as permanent centers for MAB research and educational activities. If a biosphere reserve is lacking, the Program is developed concurrently with nomination of a biosphere reserve. In either case, a regional MAB program is based on a feasibility study conducted under the auspices of the U.S. National MAB Committee (see Section II).

The first regional MAB program was established in August 1988 in the Southern Appalachians. The program involves an interagency agreement establishing a Regional MAB Cooperative to coordinate the participation of Federal and state agencies representing conservation, science, and economic development sectors; the designation of permanent and ad hoc committees to plan and implement MAB research, educational, and demonstration projects; the establishment of a nonprofit regional MAB foundation to raise funds for MAB projects and facilitate participation of the private sector; and the staffing of a secretariat, funded jointly by members of the Cooperative, to administer the
cooperative regional program in the Southern Appalachian Biosphere Reserve, and maintain links with the national MAB program.

**FIGURE 3. ORGANIZATION OF THE SOUTHERN APPALACHIAN MAN AND THE BIOSPHERE PROGRAM**

**SAMAB COOPERATIVE FOUNDATION**
National and State Agency signatories (Executive committee)

**SAMAB COORDINATING OFFICE**
Executive Director, Staff located at Great Smoky Mtns. Natl. Park Biosphere Reserve

**COMMITTEES**

<table>
<thead>
<tr>
<th>Environmental Education and Training</th>
<th>Research and Monitoring</th>
<th>Resource Management</th>
<th>Public Affairs</th>
<th>Sustainable Development</th>
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<td>USFS, TVA</td>
<td>TVA, NPS</td>
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**COOPERATIVE PROJECTS**

- Biological Diversity
- Community/Regional Strategies
- Environmental Education
- Ecosystem Data Base
- Global Change
- Tourism
The U.S. National MAB Committee approves the establishment of Regional MAB Programs. Once established, Regional MAB Programs develop their own program priorities consistent with the objectives of the participating agencies and institutions and the mission of MAB. The National MAB Committee reviews the Regional MAB Programs from time to time for general consistency with the mission of MAB and provides technical assistance through the MAB Directorates in developing research and educational programs. The Committee approves manuscripts submitted by the Regional MAB Programs, and recommended by the U.S. MAB Coordination Committee on Biosphere Reserves, for inclusion in U.S. MAB publications. Although most projects are funded by the participants in the Regional MAB Program, the National Committee may provide grants for projects of national or international interest.

II. GUIDELINES FOR SELECTION OF BIOSPHERE RESERVES

II.A. Definitions

Administrator: the agency, organization, individual, or other entity solely or primarily responsible for managing the ecosystems of a protected area included in a biosphere reserve.

Biogeographical province: a large terrestrial or aquatic area delineated on the basis of physiography, climate, and biota.

Biogeocultural region: an area within a biogeographical province, distinguishable on the basis of some combination of physiography, climate, vegetation, characteristic species, natural processes, human populations, and characteristic resource uses.

Biosphere reserve: an international designation by the United Nations Educational, Scientific, and Cultural Organization for the purpose of encouraging conservation of natural areas and their genetic resources, the integration of conservation and economic development, long-term monitoring, interdisciplinary research, and cooperation in finding solutions for interrelated environmental, land use, and socioeconomic problems. Each biosphere reserve must include one or more protected areas for ecosystem conservation and to serve as a benchmark for ecosystem study.

Biological diversity: the variety of life in a given geographical area at all levels of organization, expressed in terms of the numbers and variations in ecological communities, species, populations, and genetic composition.

Core area: a legally delineated area in a biosphere reserve, strictly protected from human disturbance under strict conservation objectives, that is managed to maintain or, in some cases, to restore, the natural biological diversity characteristic of a biogeographical province and to serve as a benchmark for studying the structure and function of natural ecosystems. A core area typically includes relatively small areas used only for baseline environmental monitoring and long-term ecological research as well as larger areas...
supporting uses, primarily educational and recreational in nature, that are compatible with maintaining conservation and scientific values.

Protected area: a legally delineated nature reserve, multiple use area, planning district, Indian reservation, other administrative or management unit regardless of ownership where human uses and activities can be regulated to maintain natural ecological processes and elements of natural biological diversity.

Regional MAB Program: a cooperative program within a biogeocultural region involving agencies, institutions, and organizations that facilitates development of the conservation, logistic, and development roles of a biosphere reserve.

Transition area, or zone of cooperation: a multiple use area surrounding the designated core area(s) and zone(s) of managed use of a biosphere reserve. The transition area is usually not delineated as a designated part of a biosphere reserve, but varies in space and time depending on the cooperative activities being undertaken. The terms "transition area" and "zone of cooperation" are interchangeable.

Zone of managed use: a legally delineated management unit, planning district, or other area where human uses and activities can be effectively managed to maintain or restore natural biological diversity and ecological processes. The zone ideally adjoins or surrounds a core area.

II.B. Roles of Biosphere Reserves

Biosphere reserves are selected on the basis of their potential for achieving three interrelated roles. The conservation role has to do with ability and potential to maintain the natural ecological processes and biological diversity characteristic of a particular biogeocultural region. A model biosphere reserve should include sufficient natural habitat, in suitable patterns, managed to maintain the region's diversity of native species, including, to the greatest extent possible, wide-ranging mammals and other species requiring large habitat areas. The logistic role has to do with the ability and potential to generate and share useful information for addressing environmental problems in the biogeocultural region, the larger biogeographical province, and at the global level. A model biosphere reserve should include natural areas that are extensively monitored on a continuing basis to characterize natural ecological conditions, processes, cycles, and trends; as well as areas that are experimentally manipulated to clarify the effects of natural and human-caused influences, and develop resource management methods. It should provide substantial facilities and a base of operations for scientific, educational and training activities, and should participate in national and international monitoring and research programs. The development role has to do with the ability and potential to demonstrate sustainable types, levels, and patterns of economic uses of ecosystems. A model biosphere reserve should be a center for discovering and testing ways to apply ecological principles in the development process, for demonstrating cooperative approaches for integrating biological conservation and development, and for providing training and extension services to improve the economic well-being of local people.
The successful integration of all three roles normally requires cooperation among several to many protected areas, as well as the participation of government agencies, scientists and educators, economic development interests, conservationists, community leaders, and interested members of the public. The designation of biosphere reserves, in concert with the establishment of Regional MAB Programs, provide a framework for consultation and cooperation in planning and implementing research, educational, and demonstration projects under the aegis of MAB.

II.C. Spatial Organization of Biosphere Reserves

The MAB Council has adopted a flexible zonation scheme that is widely adaptable to different ecosystems, land and sea use patterns, and protected area systems. The zonation categories are used descriptively to depict the general roles of officially designated areas within the biosphere reserve, as well as the adjacent areas. Through periodic revision, the zonation can be used to monitor the development of these roles in response to changes in management emphasis, addition of new areas, and expansion of cooperative activities. MAB zonation categories typically coincide often coincide with the boundaries of protected areas or with an existing management zones or specially designated area within protected areas that are delineated in accordance with the administrator's established planning and management procedures.

National MAB Committees should include in each biosphere reserve nomination a map delineating the zonation of all areas recommended for official designation as parts of the biosphere reserve.

II.C.1. Core Area.

Two types of core areas may be distinguished:

II.C.1.a. Core Area - Conservation. A Conservation Core Area includes as many of the characteristic natural ecosystems of a biogeocultural region as possible. It should include sufficient redundancy to ensure protection against the effects of catastrophic disturbance. The size of a Conservation Core Area varies with the condition and scale of the ecosystems involved, human population density, the history of resource use, and the availability of suitable protected areas.

Areas potentially suitable as Conservation Core Areas include, but are not limited to, primitive areas and legislative wilderness, natural areas and nature sanctuaries, and areas administratively designated for special protection (e.g., areas of critical environmental concern in areas administered by the Bureau of Land Management, portions of marine sanctuaries strictly regulated to control disturbance and maintain natural processes).
II.C.1.b. Core Area - Monitoring. A Core Monitoring Area consists of strictly protected areas that are intensively managed for scientific purposes of a primarily observational nature, typically on a long-term basis. Included are areas administratively designated for observing natural phenomena and conditions, pollution monitoring sites, small watersheds for integrated ecological research, and experimental areas subject to small-scale manipulations to improve understanding of ecological processes or the dynamics of plant and animal populations. The disturbance caused by manipulations in a Monitoring Subzone must be fully and quickly reversible following termination of the experiment.

Areas potentially suitable as Core Monitoring Areas include, but are not limited to, research natural areas (Federal administration) and control watersheds and other minimally manipulated research sites within larger areas used for experimental research.

II.C.2. Zone of Managed Use

A zone of managed use, sometimes referred to in MAB literature as a buffer zone, is an area where human uses and activities can be effectively managed to maintain elements of natural biological diversity. The zone should be an officially designated component of each biosphere reserve. The zone of managed use usually adjoins or surrounds one or more core areas and is managed in harmony with maintaining the conservation and scientific values of the core area(s).

The boundary of the zone of managed use, together with one or more associated core areas, often corresponds to one or more autonomous management units, such as national forests, national parks, or planning districts. For example, the zone of managed use in a national park would usually include all or most of the area outside the park's natural zone (i.e., the Core Area) and would include developed areas, intensively used recreation areas, transportation corridors, historic zones, and various inholdings and special use areas subject to regulation by the National Park Service. In a national forest, it could include managed forests and multiple uses outside one or more core wilderness areas.

The zone of managed use can include established multiple use areas not contiguous with a core area where human uses are regulated to maintain elements of biological diversity, such as by establishing protected corridors in which recreational uses are restricted during the seasonal migrations of wildlife. In estuarine and marine areas, the zone of managed use could include areas specially regulated to minimize environmental contamination and overexploitation of ecosystems, such as estuarine sanctuaries, and watersheds that are legally regulated to protect estuarine and marine ecosystems.

The zone of managed use includes experimental research, as well as educational, training, and demonstration activities supporting all of the roles of the biosphere reserve. It is a focus of efforts to develop methods to restore degraded ecosystems to quasi-natural conditions or sustainable economic productivity. The zone of managed use may include a wide range of administrative areas, including, but not limited to, managed wildlife areas, demonstration areas, experimental research areas (e.g., Long-term Ecological Research
Sites), planning districts, and multiple use areas. It may include portions of Indian reservations and other areas where traditional and subsistence uses may be documented and the lessons learned applied to advantage in contemporary resource management and economic development.

Note: The term "buffer zone" has been used in the earlier MAB literature to refer to the zone of managed use and the zone of cooperation in biosphere reserves. Since 1984, the term has been used more narrowly to refer to a zone of managed use managed so as to protect or "buffer" an adjacent core area. The term is not used here because of its varied meanings and applications.

II.C.3. Transition Area (Zone of Cooperation)

Core areas and zones of regulated use are surrounded by a transition area, or zone of cooperation, that extends the benefits of the biosphere reserve into the larger biogeographical region. It is the principal area for involving local people in cooperative demonstration, training and environmental education programs under the aegis of MAB. It is

Figure 4. IDEALIZED BIOSPHERE RESERVE ZONATION

KEY:

- CORE AREA
- ZONE OF MANAGED USE
- TRANSITION AREA

Human Settlements
Research Station
Monitoring
Education and Training
Tourism and Recreation
Figure 5. HYPOTHETICAL BIOSPHERE RESERVE ZONATION IN A COMPLEX LANDSCAPE
where the practical benefits of cooperation to integrate conservation and economic development, and address regional resource problems, are demonstrated. Here MAB seeks to foster attitudes conducive to maintaining the region's biological diversity, as well as community pride based on appreciation of the value of traditional relationships between local people and their ecosystems.

The transition area is normally not designated as a delineated component of the biosphere reserve, but varies in space and time according to the cooperative activities taking place. These activities determine its functional limits, which generally coincide with the area of concern for the Regional MAB Program that provides the cooperative framework for implementing the multiple roles of biosphere reserves. It ultimately includes a full range of ownerships, economic uses, and activities, and may eventually encompass the entire biogeocultural region.

II.C.4. Diagrammatic Representation of Biosphere Reserve Zonation

Figure 4 depicts an idealized biosphere reserve zonation. Figure 5 shows a hypothetical zonation of a landscape containing areas administered for various purposes by multiple administrators.

II.D. Nomenclature

The name of a biosphere reserve should be selected to identify the biogeocultural region. It should reflect the natural or cultural values of the region, and the "sense of place" of its residents. Examples include the Southern Appalachian, Champlain-Adirondack, and Noatak Biosphere Reserves. Such nomenclature facilitates the nomination of additional protected areas as units of a biosphere reserve when conditions permit.

Most biosphere reserves designated prior to 1986 were named after national parks and other strictly protected conservation areas. Naming U.S. biosphere reserves after administrative areas is no longer permitted. Inclusion of existing biosphere reserves named after administrative areas, as well as additional protected areas, within multiple-site biosphere reserves named after a biogeocultural region is encouraged.

II.E. Criteria for Selecting Biosphere Reserves

II.E.1. Essential Criteria

UNESCO's criteria for selecting biosphere reserves are contained in MAB Report No.22, "Report of the Task Force on Criteria and Guidelines for the Choice and Establishment of Biosphere Reserves" (UNESCO, 1974). These guidelines identify four essential criteria relating to the conservation role of biosphere reserves. The essential criteria apply
II.E.1.a. Representativeness

Representativeness is a means of measuring the presence of natural processes and ecological interactions characteristic of a particular biogeographical province. The ecosystem is the basic functional unit of representativeness in a biosphere reserve. The site(s) should encompass at least one minimally disturbed ecosystem suitable for generating baseline information on ecological conditions, cycles and trends. In upland areas, an ecosystem normally is delimited by the hydrographic boundaries of a watershed. In coastal and marine areas, the seventeen ecosystems identified in Ray et al., "Interim Guidelines for Identification and Selection of Coastal Biosphere Reserves" (U.S. MAB Report No.6, 1981) are recommended as the basis for determining representativeness.

II.E.1.b. Diversity

Diversity is a measure of the variety of physical and biological features occurring at the site(s). The site(s) should include the greatest possible variety of the natural ecosystems, communities, and species of the biogeographical region. Priority should be given to ecosystem diversity in order to include the greatest possible range of ecological gradients, processes and interactions associated with the maintenance of the region’s biological diversity. Centers of endemism and other areas of exceptional species richness should be included to the extent practicable, as well as habitats for rare, threatened, and endangered species, species of ethnobiological importance, and the wild relatives of economic species.

II.E.1.c. Naturalness

Naturalness is a measure of the absence of previous and contemporary human disturbance of the site(s). The site(s) must include a sufficiently large minimally disturbed area to serve as a core area for long-term ecological monitoring in the region. Unmodified “pristine” natural areas should be given priority as core areas. If such areas are not available, areas in later stages of recovery from prior disturbance may be considered. To the extent practicable, site(s) should be remote from local sources of air and water pollution and areas of rapid urbanization.

II.E.1.d. Effectiveness as a Conservation Unit

The biosphere reserve should be an effective conservation unit. Important factors include size, shape, location with respect to natural barriers, and the effects of internal and external human influences, as well as the management objectives and capabilities of the site administrator.
Optimum size depends on the type of ecosystem and the requirements of the species involved. The ideal area is large enough to be self-regulating and fulfill the habitat requirements of wide-ranging species resident in the region to the greatest extent possible. The positive correlation between the size of the area and species diversity should be considered. Inclusion of contiguous protected areas under different administrators is encouraged to provide the largest possible conservation area. The inclusion of migration corridors, riparian corridors, and similar areas is also encouraged to strengthen the reserve's conservation role.

A biosphere reserve should include sufficient redundancy of habitats to protect against loss of species as a result of severe natural or human-caused disturbance. Upland site(s) should include complete catchments to minimize effects of adjacent land use.

In assessing conservation effectiveness, the capability and willingness of responsible authorities to regulate human uses and activities to maintain ecological health is an important consideration both within the site(s) and in the surrounding area. This is particularly important in marine areas, where the effectiveness of regional regulation rather than in situ protection of specific site(s) largely determines conservation possibilities.

Sites where immediate or potential adverse human influences have a high potential for effective resolution should be favored. If the site(s) has been disturbed by previous human uses, the potential for restoring natural conditions should be considered.

II.E.2. Other Criteria

The following criteria must be substantially satisfied for an area to be nominated as a biosphere reserve:

II.E.2.a. Research and Educational Value

This criterion has to do with the actual and potential value of the site for research and education. Favorable considerations include:

- a long history of environmental monitoring and multidisciplinary research and publications from the site in refereed journals;
- accessibility of field research sites, including sites that can be manipulated experimentally;
- substantial use of the site(s) by investigators from many agencies and institutions;
- participation in cooperative regional, national and international programs;
- the availability of significant research facilities; and
- a high level of sustained financial and logistic support from site administrator(s) for research, professional training programs, and public environmental education.
II.E.2.b. Value for Demonstration of Sustainable Uses

This criterion has to do with the actual and potential value of the site and its surrounding area in providing the basis for ecologically sustainable economic uses. Favorable considerations include:

- a substantial history and capability in research and development to support sustainable economic uses or rehabilitation of degraded ecosystems
- the availability of extension services for local people
- active cooperation with local people in planning and implementing demonstration, training, and management programs
- environmental education programs targeted on issues of regional concern
- a good history of environmentally based land use planning and effective regulation of land use by local jurisdictions
- availability of databases to support regional planning
- good regional information on history of human use and disturbance and factors involved in determining contemporary ecological conditions
- a surrounding region containing a harmonious landscape illustrating long-established patterns of rural land uses
- Native Americans or other traditional users practicing traditional agriculture, artisanal fishing, hunting and gathering, or other traditional or subsistence uses living within or near the site

II.F. Biosphere Reserve Identification and Selection Process

The process of selecting areas for nomination as biosphere reserves is coordinated by the Coordinating Committee on Biosphere Reserves and takes place in three phases. The first phase involves a technical biogeographical review to identify the protected areas that appear to be suitable for nomination with respect to the essential selection criteria. The second phase involves assessment of the feasibility of incorporating these areas into a Regional MAB Program. The final phase involves the review and approval of the biosphere reserve nomination that includes general terms of reference for a regional coordinating mechanism.

II.F.1. Biogeographical Review

A Biogeographical Review provides the scientific basis for subdividing a biogeographical province into biogeocultural regions for the purpose of nominating biosphere reserves. It also includes a preliminary identification of the configuration of protected areas within each biogeocultural region that appears to best satisfy the essential selection criteria.

Biogeographical Reviews are conducted by U.S. MAB as funds become available through the U.S. MAB Program or from outside sources. The U.S. MAB Coordinating Committee determines priorities for conducting Biogeographical Reviews, in cooperation with the appropriate U.S. MAB Directorate(s). Priority is normally given to biogeographical
provinces where protected area administrators, institutions, and members of the public have expressed interest in nominating particular sites as biosphere reserves.

Such interest should be communicated by writing to the Chairman, U.S. MAB Coordinating Committee on Biosphere Reserves, c/o the U.S. MAB Secretariat, Department of State.

II.F.1.a. Establishment of the Ad hoc MAB Review Panel

The Coordinating Committee on Biosphere Reserves appoints the chairperson for the ad hoc MAB Review Panel for a particular biogeographical province, as delineated for UNESCO by M.D.F. Udvardy in "A Classification of the Biogeographical Provinces of the World" (IUCN Occasional Paper No. 18, 1975), as revised and mapped in U.S. Geological Survey National Atlas Folio entitled "Ecological Research Areas" (U.S. Geological Survey 1985). For coastal regions, the delineation by Ray et al in "Interim Guidelines for Identification and Selection of Coastal Biosphere Reserves" (U.S. MAB Report No. 6, 1981) is used. As the agent of U.S. MAB, the chairperson is responsible for assembling a multidisciplinary panel of experts on the biogeography, ecosystems, protected areas, field research, and educational programs of the province.

II.F.1.b. Components of the Biogeographical Review

The panel normally meets twice. At the first meeting, the panel summarizes the distinguishing natural features, processes, and biota of the biogeographical province; provides the rationale for subdividing the province into biogeographical regions for biosphere reserve selection; identifies factors for use in comparing candidate sites with respect to essential selection criteria; identifies on protected areas that appear suitable as candidate sites; and assigns responsibility to panel members for obtaining information on candidate sites, and preparing preliminary site evaluations.

Following the first meeting, the panel chairperson notifies the administrator of each candidate site, provides information on MAB and the biosphere reserve program, and transmits a copy of the UNESCO site nomination form (Appendix B). The administrator notifies the panel chairperson on whether or not he or she wishes MAB to include the site in its review. If the response is affirmative, the responsible panel member assists the administrator as necessary in completing a draft of the nomination form and compiling any additional information needed to evaluate the site with respect to essential criteria. (The nomination form is completed unsigned in draft form as information to support the panel's review. If the site is ultimately recommended for nomination, the administrator will transmit the final form, signed, to the MAB Secretariat as the official record of concurrence).

At the second meeting, the panel reviews the administrators' draft nomination forms as well as the panelists' site evaluations. On the basis of the discussion, the panel reaches the best possible consensus on a recommended optimal configuration of complementary sites for review by their administrators as components of a potential biosphere reserve nomination.
Following the second meeting, the chairperson summarizes the panel's work in a report containing the following sections:

- Executive Summary
- Background (process used in preparing the report)
- Biogeographic Review (map and rationale for biogeocultural regions)
- Preliminary Evaluation of Candidate Sites
- Recommendation (map and rationale for a recommended configuration of sites)
- Appendix
  - Panel members
  - Correspondence

II.F.1.c. Distribution of the Ad Hoc Review Panel's Report

The panel chairperson submits the Review Panel's Report to the Chairperson of the U.S. MAB Coordinating Committee on Biosphere Reserves, who coordinates review by the Coordinating Committee and appropriate Directorates. The Committee works with the panel chairperson to address substantive concerns. Once such concerns have been addressed, the Committee approves the report and sends it to the Executive Director of the U.S. MAB Secretariat. The Secretariat requests review and comment on the report from the administrator of each site recommended as potentially suitable for nomination, and requests the administrator to cosponsor a Feasibility Assessment for a Regional MAB Program as an indication of interest in pursuing nomination.

Notice of the approval of a Review Panel's Report is published by the Department of State in the U.S. MAB Bulletin. Copies are available to members of the public on request.

II.F.2. Feasibility Assessment

A Feasibility Assessment provides the basis for selecting biosphere reserves for nomination and establishing a Regional MAB Program to carry out the multiple roles of biosphere reserves. A Feasibility Assessment is required to:

- nominate a new biosphere reserve in a biogeographical region where none presently exist
- substantially expand an existing biosphere reserve through the addition of complementary sites
- consolidate two or more existing biosphere reserves to form a single regional biosphere reserve
II.F.2.a. Initiation of a Feasibility Assessment.

Feasibility assessments are conducted by U.S. MAB as funds become available from the U.S. MAB Program or outside sources. The U.S. MAB Coordinating Committee on Biosphere Reserves is responsible for setting priorities and appointing project coordinators for Feasibility Assessments, in cooperation with appropriate U.S. MAB Directorates. Priority is given to biogeocultural regions where the administrators of existing biosphere reserves or sites identified in a Biogeographical Review have indicated interest in establishing a Regional MAB Program. Administrators, organizations, and members of the public wishing U.S. MAB to conduct a Feasibility Assessment should write to the Chairperson of the U.S. MAB Coordinating Committee on Biosphere Reserves, c/o the U.S. MAB Secretariat, Department of State OES/ENR(MAB), Washington, D.C. 20520.

II.F.2.b. Components of the Feasibility Assessment

The Feasibility Assessment consists of the following components:

- Description and delineation of the biogeocultural region.

This part describes and delineates a region that is cohesive in terms of its natural features, ecosystems, and human cultural traditions. To the greatest degree possible, the region should be readily distinguishable in terms of its physiography, ecological communities, and the diversity of its indigenous biota. It should include characteristic types and patterns of rural resource uses, including, where appropriate, examples of harmonious traditional uses and management practices of Native Americans and long-established rural communities. It should have a substantial history of research that provides a basic understanding of natural and managed ecosystems, as well as socioeconomic conditions and trends. Finally, the majority of inhabitants should identify with the region; people should have a strong sense of place based on longstanding relationships with its ecosystems. (In cases where a MAB Biogeographical Review precedes the Feasibility Assessment, this section supplements the justification for subdividing the biogeographical province into biogeocultural regions)

- Expansion/Consolidation of Existing Biosphere Reserves

This section documents the interests of protected area administrators and others in consolidating existing biosphere reserve sites in the region, or in integrating additional sites with an existing biosphere reserve, to form a multi-site biosphere reserve for a biogeocultural region. The documentation is based on the Project Coordinator's personal interviews with site administrators and prior communication between the administrators and U.S. MAB, if any. A brief evaluation of site qualifications with respect to MAB selection criteria should be included, and draft nomination forms, completed by site administrators with assistance as necessary from the Project Coordinator, appended to
the report. (This section is omitted in cases where a MAB Biogeographical Review precedes the Feasibility Assessment.)

0 Identification of priority resource issues of regional concern

This part documents the environmental, land use, and socioeconomic issues of greatest concern in the region. In view of their key potential role in a Regional MAB Program, special emphasis is placed on assessing the interests of administrators of existing biosphere reserve sites, sites considered potentially suitable for nomination by a Biogeographical Review Panel, or sites recommended for addition on the basis of interests expressed by their administrators during the process of conducting the feasibility assessment. The section is based primarily on interviews by the project coordinator with representatives of government agencies, nongovernmental organizations, the scientific community, economic development interests, and local community leaders. Special emphasis is placed on identifying regional issues of mutual concern to conservation, scientific, and economic development interests because these are likely to afford particular opportunities for cooperation.

0 Determination of interest in cooperation under the aegis of MAB

This part, also based on interviews, documents the interest of the various parties in using MAB as a framework for cooperation in developing and sharing information to support conservation and sustainable use of regional ecosystems. Particular attention is given to documenting the interest of the administrators of existing and proposed biosphere reserve sites.

0 Recommendation on institutionalizing a Regional MAB Program

Based on the identification of regional resource issues, the enthusiasm of various parties for MAB, and an analysis of institutional interests and capabilities, this part recommends an appropriate framework for institutionalizing voluntary cooperation under the aegis of MAB. The framework should include mechanisms for involving all interested parties, and for providing administrative support for developing the cooperative program. The framework should specifically provide for coordinating activities among the sites recommended for nomination as biosphere reserves. Recommendations are based on personal interviews and other information obtained by the Project Coordinator from interested parties. The Project Coordinator may convene various meetings and workshops involving potential participants to help reach consensus on a suitable coordination mechanism.

0 Biosphere Reserve Nomination Form

The Project Coordinator is responsible for preparing a consolidated biosphere reserve nomination form based on information from the draft nomination forms for individual sites prepared by site administrators.
II.F.2.c Administrative Review

II.F.2.c.1 MAB Review
The Project Coordinator submits the Feasibility Assessment and biosphere reserve nomination form to the Chairperson of the U.S. MAB Coordinating Committee on Biosphere Reserves, who arranges for review by the Coordinating Committee and the appropriate Directorate(s). The Committee Chairperson works with the Project Coordinator to resolve substantive issues and then sends the Feasibility Assessment and biosphere reserve nomination form to the U.S. National MAB Committee for approval.

II.F.2.c.2 Public Distribution of the Feasibility Assessment
Following approval by the U.S. National MAB Committee, the availability of the Feasibility assessment is published by the Department of State in the U.S. MAB Bulletin. Copies are available to the public on request.

II.F.2.c.3 Review by Potential Program Participants
The Feasibility Assessment provides sufficient documentation to satisfy UNESCO's requirement that information on the proposed mechanism for cooperation be included in a biosphere reserve nomination. Once U.S. MAB has approved the Feasibility Assessment and the proposed biosphere reserve nomination, the U.S. MAB Secretariat coordinates the review of these documents.

The Executive Director of the U.S. MAB Secretariat sends the Feasibility Assessment, including the consolidated biosphere reserve nomination form, to all potential participants in the Regional MAB Program for review.

The Executive Director of the U.S. MAB Secretariat also sends the nomination form for the particular site to the site administrator. The administrator is requested to review the nomination package and sign a declaration of commitment on the nomination form for the site. The declaration of commitment indicates the administrator's moral obligation to pursue the general objectives biosphere reserves contained in UNESCO's "Action Plan for Biosphere Reserves" (Nature and Resources 20(4):1-46).
II.G. Nomination and Designation Procedure

Once the letters of concurrence and the signed nomination forms for the individual sites have been received from all administrators, the Chairman of the U.S. National MAB Committee signs the consolidated biosphere reserve nomination form and transmits the nomination package to the Executive Director of the UNESCO MAB Secretariat, who arranges for technical review and approval by the MAB Bureau. Following the Bureau's approval, the Director-General of UNESCO signs an official designation certificate for each administrative site, which is forwarded to the U.S. MAB Secretariat for transmittal to site administrator. Following transmittal of the designation certificates to the site administrators, the U.S. MAB Secretariat publishes a notice of designation in the U.S. MAB Bulletin.

The UNESCO MAB Secretariat arranges for entering information contained in the consolidated biosphere reserve nomination form, and the forms for individual sites, into the MAB Information System, which is managed cooperatively by the International Union for the Conservation of Nature and Natural Resources and Yale University.

Figure 6 summarizes the process for nominating biosphere reserves and establishing Regional MAB Programs.

II.H. Delisting of Designated Sites

The U.S. MAB Coordinating Committee on Biosphere Reserves is responsible for reviewing the progress of U.S. biosphere reserves in fulfilling the objectives of the "Action Plan for Biosphere Reserves". Designated sites are responsible for implementing activities that contribute to the objectives listed in the Plan, whether through their own programs (apart from identification with MAB) or a part of cooperative Regional MAB Programs. Failure to contribute substantially to either the conservation, logistic, or development roles of the biosphere reserve within a decade of designation, or persistent failure to provide information on site activities in response to requests from U.S. MAB, may provide cause for delisting.

To delist an area, the Chairperson of the Coordinating Committee notifies the administrator of the nature of specific concerns and its intention to recommend delisting if these concerns cannot be addressed in a timely way. The administrator may concur in delisting, or work with the Committee to develop a mutually agreeable plan for addressing deficiencies. If such a plan cannot be developed, the Committee recommends delisting.

The Committee's recommendation for delisting, and appropriate justification, is forwarded to the U.S. National MAB Committee, which is responsible for approving a U.S. recommendation to delist. If the Committee approves, the recommendation to delist is forwarded to the Executive Director of the UNESCO MAB Secretariat for recordation.
III. RESPONSIBILITIES OF ADMINISTRATORS

Any actions to implement biosphere reserve concepts are strictly voluntary. The administrator’s existing authorities, planning procedures, and management guidelines determine how the concept will be implemented. Designation represents de facto recognition by MAB that the existing management framework is in harmony with the purposes of MAB.
Administrators have a moral responsibility to pursue the objectives of the "Action Plan for Biosphere Reserves" to the extent practicable within existing authorities and management objectives. Administrators of sites designated since 1985 have signed a commitment to do this in endorsing nominations, but the Plan is equally relevant to sites designated earlier. To achieve these objectives administrators should

- use biosphere reserves to facilitate maintenance of biological diversity within their biogeocultural regions
- foster innovative applications of social and natural sciences, including conservation science and landscape ecology, to provide the basis for integrating conservation and economic uses
- use biosphere reserves as bellwethers of natural and human-caused environmental changes, with emphasis on regional and global influences
- promote environmental education that fosters an ethic of conservation based on understanding of the interdependence of Man and Nature
- involve local people in planning research, educational, and demonstration programs
- share useful knowledge on the biosphere reserve through the MAB Information System, and cooperate with other biosphere reserves and research sites as well as with other networks that provide perspective on regional and global environmental problems.
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<th>Biogeographic province</th>
<th>Number of Administrative units</th>
<th>Area in hectares</th>
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BIOSPHERE RESERVES IN THE UNITED STATES
as of August 1989

1 Aleutian Islands
2 Big Bend
3 Cascade Head Exp. Forest
4 Central California Coast
5 Central Plains
6 Champlain-Adirondack
7 Channel Islands
8 Coram
9 Desert
10 Denali
11 Everglades (incl. Ft. Jefferson)
12 Fraser
13 Glacier
14 H.J. Andrews
15 Hubbard Brook
16 Jornada
17 Luquillo
18 Nootka
19 Olympic
20 Organ Pipe Cactus
21 New Jersey Pinelands
22 Rocky Mountain
23 San Dimas
24 San Joaquin
25 Sequoia-Kings Canyon
26 Stanislaus-Tuolumne
27 Southern Appalachian
28 Three Sisters
29 Virgin Islands
30 Yellowstone
31 Beaver Creek
32 Konza Prairie
33 Niwot Ridge
34 The University of Michigan Biological Station
35 Virginia Coast
36 Hawaii Islands
37 Isle Royale
38 Big Thicket
39 Guanica Commonwealth
40 California Coast Ranges
41 Central Gulf Coastal Plain
42 South Atlantic Coastal Plain
43 Mojave and Colorado Deserts
44 Carolinian-South Atlantic
45 Glacier Bay Adirondack Island

Other reserves