

The Biosphere Reserve
and its
Relationship
to other
Protected Areas



UNION INTERNATIONALE POUR LA CONSERVATION DE LA NATURE ET DE SES RESSOURCES
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FOREWORD

This report was prepared for UNESCO by IUCN's Commission on National Parks and Protected Areas.

Many people have contributed material or suggestions which were used in the preparation of this report, including individuals implementing Biosphere Reserve sites and programmes, among the contributors are Dr. R.F. Dasmann, Dr. J. Franklin, Mr. V.C. Gilbert, Dr. H. Henke, Mr. R. Jingu, Dr. K. Miller, Mr. N. Munro, Dr. D. Poore, Mr. K. Thelen. The paper has been reviewed and commented on by UNESCO officers including Dr. M. Batisse, Dr. F. di Castri and Dr. B. von Droste.

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Harold K. Eidsvik
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THE BIOSPHERE RESERVE AND ITS RELATION TO OTHER PROTECTED AREAS

THE MAB PROGRAMME

Launched by the General Conference of Unesco at its sixteenth session in 1970, the broadly based ecological programme on Man and the Biosphere (MAB) aims to "develop within the natural and social sciences a basis for the rational use and conservation of the resources of the biosphere and for the improvement of the relationship between man and the environment; to predict the consequences of today's actions on tomorrow's world and thereby to increase man's ability to manage efficiently the natural resources of the biosphere".

To achieve this broad objective, the MAB Programme has adopted an integrated ecological approach to the analysis of man's interactions with different types of ecosystems or human use systems. The approach emphasizes the importance of study of the structure and functioning of ecological systems and their mode of reaction when exposed to human intervention; it stresses the impact of man on the environment but also the impact of the environment on man. MAB is primarily a programme of research and training. It is not a programme of management, but rather seeks to provide the objective scientific information - from within both the natural and social sciences - on which sound management can be based. It is oriented to the solution of concrete practical problems of management and conservation of renewable natural resources.

The programme is supervised and guided by an International Co-ordinating Council, which is intergovernmental and representative in character. The "cornerstones" of the Programme are its National Committees, which have been established in 95 countries. It is these National Committees which are mainly responsible for the planning, financing and implementation of MAB field projects and biosphere reserves which, in short, constitute the main goal of the whole Programme.

There are fourteen major international themes or project areas in the MAB Programme, of which two main types can be distinguished. Certain themes have a geographic basis and focus on man's interactions with particular types of ecosystem or physiographic unit (e.g. tropical forests, arid zones, mountain systems). The others relate to particular impacts or processes of major world-wide significance (e.g. conservation, environmental perception, pest management, interrelations between environmental transformations and demographic changes). Evidently, there is an interaction between these two types of international themes. This is especially true for the world-wide network of biosphere reserves, under establishment within the framework of MAB Project 8, which will include on a representative basis samples of all major types of ecosystems for in situ conservation and provide sites for baseline research activities important to other MAB project areas. In fact, in situ ecosystem conservation, integrated ecological research and environmental training activities in biosphere reserves are at the very centre of the MAB Programme and complementary to other conservation and ecological research efforts.

MAB 8 AND BIOSPHERE RESERVES

Background

At its first meeting in 1971 the International Coordinating Council (ICC) for MAB recognized the need for an international network of protected areas. These would provide a number of important functions within the MAB programme: notably the conservation of genetic resources; sites for research and monitoring; and possibilities for education and training. From this arose MAB Project 8 "The conservation of natural areas and the genetic material they contain".

The conservation of natural resources, that is to say the self renewing capacity of clean air and water, soil fertility and gene pools, is the very foundation of the biosphere reserve programme. Conservation in itself is not sufficient. Without monitoring and research there will not be enough knowledge to detect what is happening to mankind and his environment, to decide in what direction to go and to adopt appropriate measures to get there. Education and training are necessary to make everyone aware of the choices that confront them, to provide skilled manpower for research and monitoring and to ensure that there are people with the knowledge, skill and wisdom to implement the required policies.

Characteristics of Biosphere Reserves

After the second session of the ICC in 1973, a panel on MAB Project 8 was convened by UNESCO in Switzerland in cooperation with FAO and the International Union for the Conservation of Nature and Natural Resources. This panel discussed the classification and inventory of protected areas, the criteria for their selection and the uses to be made of them (UNESCO, 1973). Later, in May 1974, A Task Force was called together by UNESCO to devise criteria and guidelines for the selection of Biosphere Reserves (UNESCO, 1974).

The characteristics of the biosphere reserves were summarized by the Task Force (UNESCO 1974 a):

1. Biosphere reserves will be protected areas of land and coastal environments. Together they will constitute a world-wide network linked by international understanding on purposes, standards and exchange of scientific information.
2. The network of biosphere reserves will include significant examples of biomes throughout the world.
3. Each biosphere reserve will include one or more of the following categories:
 - (i) Representative examples of natural biomes.
 - (ii) Unique communities or areas with unusual natural features of exceptional interest. It is recognized that representative areas may also contain unique features, e.g. one population of a globally rare species; their representativeness and uniqueness may both be characteristics of an area.

- (iii) Examples of harmonious landscapes resulting from traditional patterns of land-use.
- (iv) Examples of modified or degraded ecosystems capable of being restored to more natural conditions.

(At the 5th session of the ICC (UNESCO 1977) it was stressed that: "Each biosphere reserve will generally have a non-manipulative core area, in combination with areas in which baseline measurements, experimental and manipulative research, education and training can be carried out. Where these areas are not contiguous they can be associated in a cluster).

4. Each biosphere reserve should be large enough to be an effective conservation unit, and to accomodate different uses without conflict.
5. Biosphere reserves should provide opportunity for ecological research, education and training. They will have particular value as benchmarks or standards for measurement of long-term changes in the biosphere as a whole. Their existence may be vital to other projects in the MAB programme.
6. A biosphere reserve must have adequate long-term legal protection.
7. In some cases biosphere reserves will coincide with, or incorporate, existing or proposed protected areas, such as national parks, sanctuaries or nature reserves.

Since the concept has been refined and matured as UNESCO and the countries participating in the project have gained experience. It has now been tested in practice and by discussion in a variety of meetings of experts, both international and regional. A list of these and a number of key references are given in the Appendix. The concept has the great advantage of being flexible and it is likely that it will continue to evolve as experience grows.

THE SPECIAL FOCUS OF BIOSPHERE RESERVES

There are already many national and international programmes for protecting areas of land or of water for various purposes. Among these programmes are the preservation of nature (samples of unique or representative ecosystems, or the habitats of rare or endangered species), the safeguarding of archaeological or historical monuments and sites, or of cultural landscapes (areas which have been moulded by human activity in special and characteristics ways) or the maintenance of beauty or solitude in the landscape. To match these purposes there is a multitude of different terms, many of them embodied in national legislation, to describe areas that have been set aside for particular reasons or are used in particular ways. But, although the purposes are usually identifiable, the usage of the terms varies widely and in a confusing manner between one country and another; and attempts to standardise have met with only limited success. What then is special about "biosphere reserves" and what is the justification for introducing yet another new concept?

There are six special features:

- (a) The emphasis in selection is on representative samples of major ecosystems rather than on those that are exceptional;
- (b) they form an international network in which the international character is ensured by an exchange of information and personnel through MAB committees and MAB Technical notes;
- (c) they provide for manipulative research in portions of the reserves;
- (d) they combine conservation, research education and training as major objectives;
- (e) they play an integrative role with local populations whose social and economic activities comprise a significant management input;
- (f) they focus their efforts on the relationship between man and the biosphere.

These features give a different character and emphasis to the biosphere reserve, which justifies a special term of international validity.

Conservation of ecosystems and genetic resources

As the network of biosphere reserves becomes gradually established they will make a very important contribution to the conservation of ecosystems and of their component species.

The biosphere reserves network is not meant to replace other conservation efforts, but it should support and complement them. As will be explained later, existing protected areas, whether in National Parks, Strict Nature Reserves or any other recognized category of legally protected areas, may become part of a biosphere reserve without changing their legal status. But incorporation in a biosphere reserve will, it is hoped, add to their value and standing.

The biosphere reserve network is not intended, by itself, to meet all local needs for conservation of ecosystems, species and genetic resources. It is an international network and its sights should be set accordingly - to include the most important representative ecosystems. To meet local conservation needs fully, it must be supplemented by a network of finer mesh providing more detailed coverage of variations in ecosystems. A system of this kind is proposed, for example, in the Biogenetic Reserves of the Council of Europe or the Virgin Jungle Reserve of Malaysia.

In selecting biosphere reserves emphasis should be on samples of representative ecosystems rather than on those that are rare or unique. Although it is important to obtain samples of undisturbed, climax or zonal formations where these still exist, selection should not be confined to these. In many parts of the world most of the characteristic species occur in ecosystems that have long been modified by human use (for example many of the sub-tropical grasslands and the maquis and garrigue of Mediterranean countries). It is also important that samples of these should be safeguarded.

The aim should be, therefore, to select within each area that is biogeographically distinct biosphere reserves which encompass: the types of zonal (climax) ecosystem with variations of them associated with differences of soil, drainage, altitude, etc.; samples of azonal ecosystems (wetlands, alluvial and tidal flats, intermittent water bodies in arid regions, etc.) and examples of communities modified and maintained by human use.

Monitoring and research

If they are to fulfill the purposes of the MAB programme, biosphere reserves should be able to accomodate the following kinds of work:

- (a) Monitoring and non-manipulative research and zonal and azonal ecosystems, both unmodified and modified by man, to study the processes and changes occurring without human intervention.
- (b) Continuous observations on physical processes, for example weather and pollutants. Biosphere reserves are recommended sites for stations contributing to the World Weather Watch; and observations in (a) - (c) can contribute to the UNEP GEMS programme.
- (c) Research into the scientific basis for ecosystem conservation; for example, the management required to maintain viable populations of species and the best arrangements and sizes for nature reserves.
- (d) Manipulative research to investigate the effects of various kinds and degrees of human use or interference.
- (e) Restorative research, designed to study ways of rehabilitating degraded ecosystems or restoring the climax where this has disappeared.

These questions are discussed in greater detail in di Castri and Loope (1977), Johnston et al (1977) and Krinitsky (1977).

Particularly valuable are any areas which have already been the subject of long continued observations, measurements or research.

Exchange of information

Another vital element in the idea of the biosphere reserve is the international exchange of information about research. This will prove most fruitful, and it will possible to extrapolate results most readily, if broadly comparable sites are studied in different parts of the world. This is an important reason for stressing representative rather than unique sites. It also underlines the importance of using the vegetation formation as a main criterion in selecting biosphere reserves. Studies such as those on the tundra biome in the IBP have well illustrated the great value of conducting studies on similar formations in different parts of the world.

Facilities for education and training

This is an essential and highly important part of the whole MAB programme which should be borne in mind when selecting areas for biosphere reserves, in drawing their boundaries and in determining their management.

The reserves should become permanent places for demonstration and popularization of environmental subjects. The programme should promote environmental awareness among the general public as well as among school children and young people through visual demonstrations. Such a programme will necessitate public access as well as modest facilities to carry out the educational activities of the programme.

In addition to public education the opportunity to link reserves with interdisciplinary training through seminars based on on-going research activities must not be over-looked.

The promotion of close collaboration between the natural and social sciences which will facilitate a better understanding of the need for a balanced management of the environment would be most desirable.

THE SELECTION OF BIOSPHERE RESERVES

The ideal and the practical

By November 1978, a total of 144 biosphere reserves had been established in 35 countries. There is considerable variation in the character and quality of the sites. This is understandable with a new and flexible concept.

It has transpired at regional meetings that many countries would welcome guidance on how to choose sites which would best fulfill the objectives of biosphere reserves nationally and would at the same time make the most valuable contribution to the international network.

The 1977 regional workshops in Side/Turkey and Australia/New Zealand accordingly set to work to define the characteristics of an ideal regional network. The earlier USA/USSR symposium on biosphere reserves had already done much to clarify the nature of an ideal biosphere reserve.

The characteristics of the biosphere reserve were first summarized by the 1974 Task Force (UNESCO, 1974a). These have not been altered since, but later discussions have stressed certain features and have helped to clarify others.

Present thinking is that the biosphere reserve should ideally contain the following elements:

- (a) An area of the main ecosystem or ecosystems to be protected. This should be large enough to be self-sustaining and be surrounded by a "buffer" area to screen it from surrounding forms of land use. It should, if possible, represent the ecosystem in a climax state including natural seral stages leading to the climax. If the climax community no longer exists, it should contain the sub-climax communities in as natural a state as possible. In this case, part of these sub-climax communities should be set aside to proceed by natural succession towards the climax. This is known as the "core area".
- (b) One or more areas in which the ecosystem has been or could be modified for different forms of land use (e.g. timber extraction, grazing) in which the effects of human use can be assessed against the natural changes occurring in the "core area". Some of these could be harmonious landscapes resulting from traditional patterns of land use. In contrast to the core area, it should be possible to carry out

manipulative research in these zones. The contrast between the manipulative area and the core, and the comparative research that can be done on these two, is one of the essential features of the biosphere reserve.

- (c) In some instances, areas may be added which contain degraded ecosystems. These can serve two purposes. They can be used for experiments in rehabilitation; and small portions can be retained in their degraded state as demonstration areas, to show the damage that can be done by unwise land use and to illustrate the extent of recovery.
- (d) If it is not possible to include all of these zones, the reserve should contain at least a protected core area surrounded by a buffer zone.

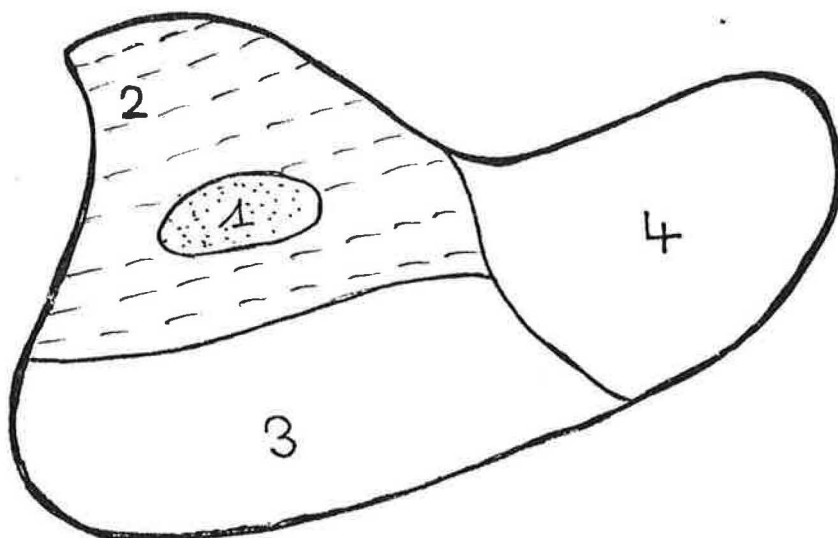
In all circumstances it is important that each of the components should be a satisfactory unit for management so that, as far as possible, the factors affecting its development are under the control of the authority administering it. In some biosphere reserves there will be a resident population within the reserve, in others there will be people living adjacent to the reserve. In both cases it is crucial to involve these people in management decisions related to the reserve. There is a two fold objective in this approach, one to learn from the traditional practices of the people in the management of natural resources and second to engender in the people an appreciation of the resource relationships which exist. With an integrated approach the benefits of a biosphere reserve can be shared with all peoples.

SPATIAL ORGANIZATION OF BIOSPHERE RESERVES

The generalized biosphere reserve

Ideally all the components making up the reserve should be contiguous; and, of course, they must all belong to the same biome. Such an arrangement is illustrated in Figure 1.

Figure 1. A generalized biosphere reserve. All four types of management zones are contiguous. Variations on this model are shown in Annex 2 of MAB Publications No.22. The entire reserve lies within the same biological region.

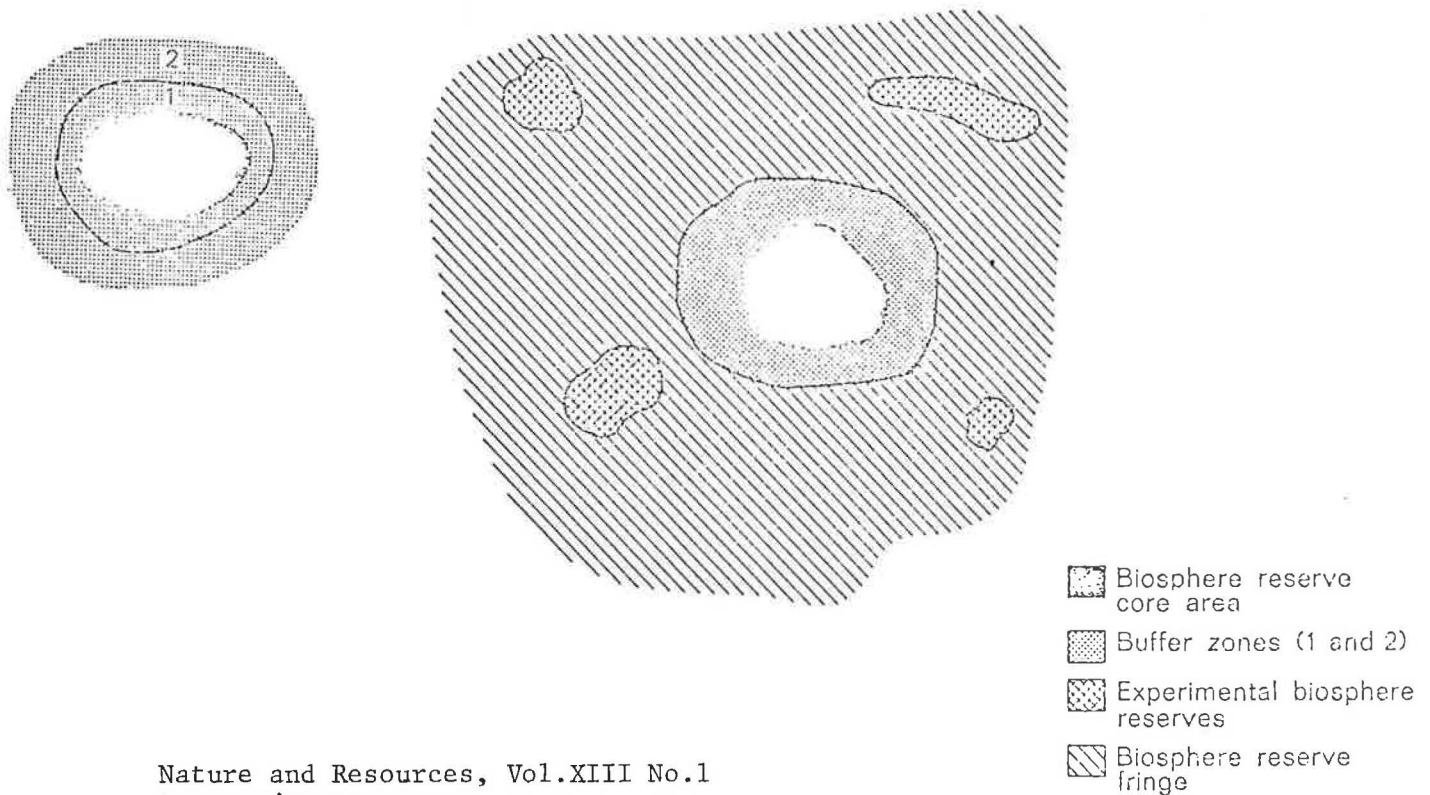


1. Natural or Core Zone: Managed for minimum human interference, to serve as a baseline for the biological region; research, educational and training activities are carefully controlled and must be non-manipulative.
2. Manipulative or Buffer Zone: Managed for research, education and training activities and manipulative methods and techniques are permitted. Traditional activities including timber production, hunting, fishing and grazing are permitted in a controlled manner.
3. Reclamation or Restoration Zone: Managed to study and reclaim lands and natural resources where heavy natural or human-caused alteration has passed ecological thresholds, where biological processes have been interrupted or where species have become locally extinct.
4. Stable Cultural Zone: Managed to protect and study ongoing cultures and land use practices which are in harmony with the environment. Local residents and their activities are to continue, but new technologies may be strictly controlled.

The cluster biosphere reserve

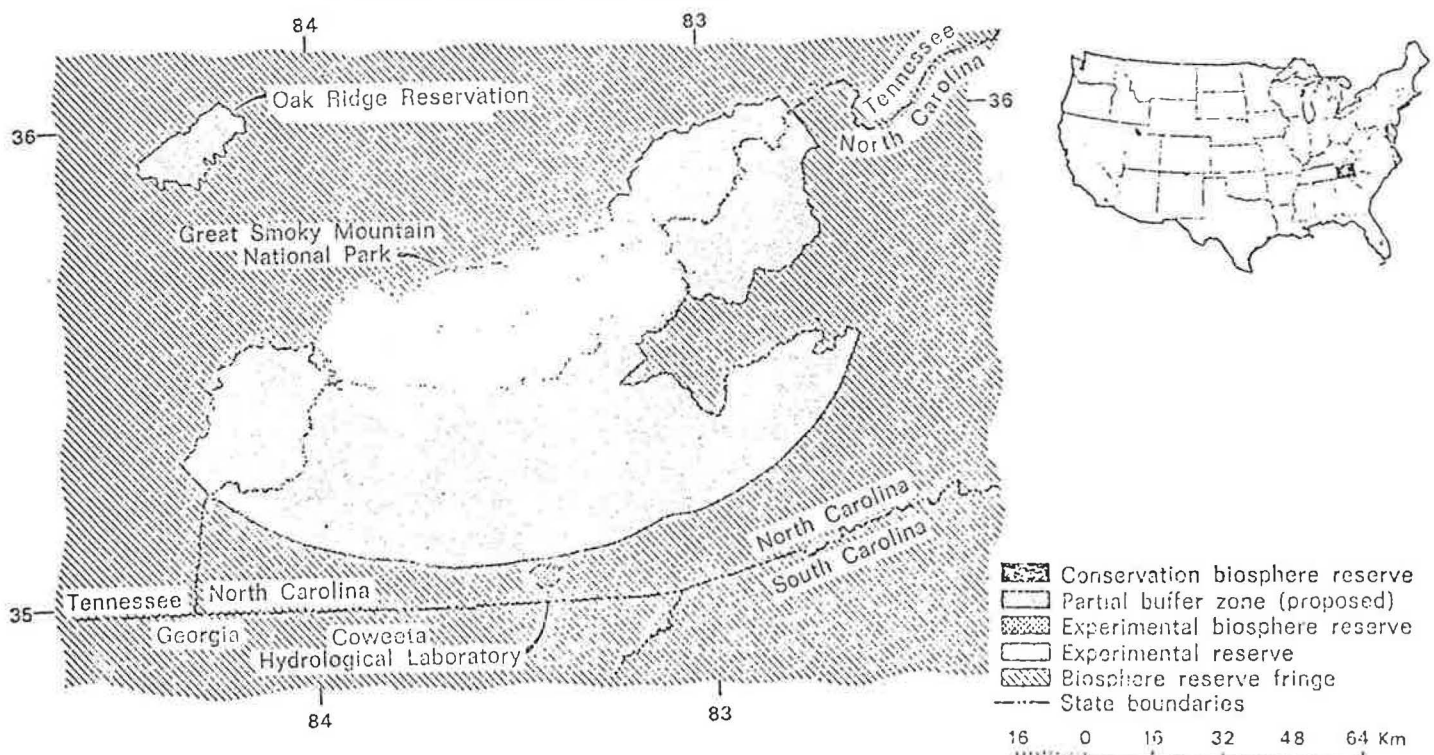
It may not always be possible, however, to have all the elements in close contact with one another. In many countries the large areas necessary may no longer be available. For example, there may be a suitable core area in a Strict Nature Reserve or National Park. Areas for manipulation may exist in national or state forests, in experimental catchments or in range management stations; and "cultural" or degraded areas may also be at a distance. In this case the biosphere reserve could be formed of areas separate from one another, provided that other essential criteria are met - adequate legal control, manageability and sufficient buffering of the core area. Such an arrangement is illustrated in Figure 2 and 3.

- Figure 2. a) Generalized biosphere reserve showing the core and buffer zone concept. No development is permitted in the core areas and uses are strictly controlled. Buffer zones are used for research and education purposes and public use is limited. Manipulations could be carried out in buffer zones, most appropriately in buffer zone 2;
- b) Diagrammatic representation of a biosphere reserve cluster. Core-buffer zone concept is extended to include geographically separate reserves which can provide the opportunity for controlled manipulations while also better representing regional variability. Fringe areas are shown between and surrounding the reserves.



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Figure 3. Example of a biosphere reserve cluster from the southern Appalachian region, south-eastern United States. The major conservation type reserve is the Great Smoky Mountain National Park. Partially surrounding it is a buffer zone. Nearby experimental reserves are the Coweeta Hydrological Laboratory and the Oak Ridge Environmental Research Park. Fringe areas include additional tracts which can augment studies carried out within the biosphere reserve cluster.



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The ideal network of biosphere reserves

The ideal network of biosphere reserves would consist of at least one biosphere reserve, meeting the conditions set out above, in each of the major zonal and azonal ecosystems of the world. Although 144 biosphere reserves have been established as of November 1978 much remains to be done to complete this network.

There are two ways of approaching the problem of selection; one is from the distribution of species of plants and animals, leading to the definition of regions that are biogeographically distinct; the other is from the structural formations of vegetation and the associated animals - biomes. Both are valuable.

Those who put the main emphasis on the preservation of the greatest number of species and on genetic diversity tend to put more stress on the former. Those who are interested especially in the comparative analysis of ecosystems, tend to emphasize the latter. In fact, if the network of biosphere reserves is to be complete, both need to be taken into consideration; and it does not matter very much which is considered first. It is possible to look at each biogeographical province*, identify the major ecosystems that occur in it, and select a biosphere reserve in each. Equally one can consider one of the major formation types of vegetation and ensure that a sample is selected as biosphere reserve in each part of it which is biogeographically distinct.

At the Unesco regional workshop on Techniques for Selection of Biosphere Reserves held in Australia and New Zealand, October/November 1977, the following procedures were recommended:

- (a) Establishment of a national or regional interdisciplinary working party to develop an appropriate system of ecosystem classification suitable for MAB 8 projects (it was suggested that this should refine the Udvardy classification for local use and define the major ecosystems in each country).
- (b) Application of such a classification system of major ecosystems to the land resources of the national territory to provide maps and descriptions of the major ecosystems.
- (c) Assessment of existing resources to identify gaps in the coverage of major ecosystems, to add new reserves or supplement existing reserves to meet biosphere reserve criteria.
- (d) Nomination of biosphere reserves to encompass the range of major ecosystems within the national territory, considering programmes in adjoining countries with similar ecosystems.

It will be seen from this that the establishment of an ideal network of biosphere reserves requires each nation to make an assessment of its main ecosystems and the extent to which these are or are not conserved. It also requires a considerable degree of regional cooperation, to ensure that the efforts of adjoining nations are complementary to each other and that, between them, the coverage of major ecosystems is complete.

* The classification of biogeographical provinces (Udvardy, 1975) has been produced by IUCN with the assistance of UNESCO to help in the selection of biosphere reserves.

It will, naturally, not be possible to complete such a network of truly satisfactory biosphere reserves immediately. It should, however, be the constant aim of appropriate national organizations including MAB committees to work towards this ideal, both in the form of each of their national reserves and in the contribution they make towards the international network.

LEGAL PROTECTION AND SECURITY

Biosphere reserves can succeed in protecting ecosystems and species, and in providing the localities for long continued research and monitoring, only if they are secure and if they can be managed consistently and effectively for these objectives. It is, therefore, essential that each country should afford adequate long term protection under law, and should provide the money and manpower necessary for management.

It may be possible to assure legal protection under existing legislation covering protected areas. Indeed it is probably better, in general, that there should not be new legislation specifically for biosphere reserves, because this is likely to harden the definition of the term "biosphere reserve"; and it would then be likely to assume different forms in different countries, each with the sanctity of law. This has happened, for example, to the term national park. If, however, there is good reason why a country would find it advantageous to enact legislation covering biosphere reserves, there is no compelling argument why it should not do so.

PROTECTED AREAS

Most countries have their own series of protected areas set up for various purposes and given names (National Park, National Forest, Forest Reserve, National Monument, etc.) whose exact definition varies from country to country. Although various attempts have been made to establish widely accepted definitions, criteria and standards, none of this has been wholly satisfactory. IUCN's Commission for National Parks and Protected Areas is preparing a new publication on this subject.

In spite of these difficulties, however, the purposes for which areas are protected do not vary much. The classification of protected areas developed by the Commission on National Parks and Protected Areas includes most of the following:

Nine types of protected areas are described, each distinguished by the purposes for which it is protected and the ways in which they are normally used. These are:

1. Scientific Reserve/Strict Nature Reserve
2. Parks
3. Natural Monuments/National Landmark
4. Nature Conservation Reserve/Managed Nature Reserve/
Wildlife Sanctuary
5. Cultural Landscape/Heritage Landscape
6. Managed resource area/Multiple use management area
7. Natural biotic area
8. Historical/Archaeological Areas
9. World Heritage Sites

1. Scientific Reserve/Strict Nature Reserve

The rapid alteration of a variety of natural environments has created a need for a category of management which will ensure areas free of human intervention and unnatural outside influence and available exclusively for scientific research and environmental monitoring. These specific natural areas are necessary to provide adequate locations for research where a complete understanding of natural processes can be attained and where full protection of ecosystems and their inherent species is maintained.

The objectives of a scientific reserve are to protect nature (communities and species) and maintain natural processes in an undisturbed state in order to have ecologically representative examples of the natural environment available for scientific study, environmental monitoring, education, and for the maintenance of genetic resources in a dynamic and evolutionary state. Research activities need to be planned and undertaken carefully to minimize disturbance.

These areas possess some outstanding ecosystems, features and/or species of flora and fauna of national scientific importance. These areas are generally closed to public access, recreation and tourism. They often contain fragile ecosystems or life forms, areas of important biological or geological diversity, or are of particular importance to the conservation of genetic resources. Size is determined by the area required to ensure the integrity of the area to accomplish the scientific management objective and provide for its protection.

Natural processes are allowed to take place in the absence of any direct human interference. These processes may include natural acts that alter the ecological system or physiographic feature at any given time such as naturally occurring fires, natural succession, insect or disease outbreaks.

2. Parks: National/Provincial/State

In general many of these areas have similar objectives; the conservation of nature or historic resources and the provision of limited facilities for scientific, educational and recreational use. They often contain several ecosystems which have not been materially altered by human exploitation. They may also contain cultural or historical areas. Frequently they can be distinguished, one from the other, only by the legal authority or legislation under which they are managed.

They are generally large and complex areas which are managed by dividing the parks into zones which define specific objectives for portions of the parks. The zones within these parks covered include various combinations of the following: strict nature reserves, managed nature reserve, recreation areas and cultural areas.

3. Natural Monument/Natural Landmark

Many countries possess natural features of particular scientific and educational interest; however, in many cases, they receive no special national recognition. These areas, however, may be susceptible to damage or adverse exploitation. The features might include outstanding examples of a country's natural heritage such as spectacular waterfalls, caves, craters, volcanoes, unique species of flora and fauna, sand dunes, etc. They would be of such scenic, scientific, educational and inspirational importance that they merit special designation and protection. There is a need to elevate their significance because of their uniqueness so as to afford these areas greater protection for both scientific and public enjoyment.

Management objectives are to protect and preserve nationally significant natural features because of their special interest or unique characteristics and to the extent consistent with this, provide opportunities for interpretation, education, research, and public appreciation.

This category normally contains one or more several specific natural features of outstanding national significance such as a geological formation, a unique natural site, animal or plant species or habitat which, because of uniqueness or rarity, may be threatened and should be protected. The specific feature to be protected ideally has little or no evidence of man's activities. These features are not of the size nor do they contain a diversity of features or representative ecosystems which would justify their inclusion as a national park.

4. Nature Conservation Reserve/Managed Nature Reserve/Wildlife Sanctuary

The purpose of these areas is to protect a species, a group of species, biotic communities, or physical features of the environment where these require specific human interference for their perpetuation and consequently would be in danger of disappearing in a strict natural area. The vegetation, animal life, or terrain in such an area may be managed and modified to afford near optimum conditions for the species, communities, or features of special concern. Although a wide variety of protected areas fall within this category, each must have as its primary purpose the protection of nature, and not, for example, the production of harvestable resources or the provision of outdoor recreation space.

5. Cultural Landscape/Heritage Landscape/Protected Landscape

These are areas set aside to protect landscapes created by past agricultural or pastoral activities and to maintain these activities as continuing ways of life. In addition to their anthropological interest, they may have important visual and aesthetic interest based on the quality of the landscape. They also may have high scientific interest as reservoirs of genetic materials associated with land use practices which are disappearing from lands managed by modern agricultural technologies. Through appropriate zoning such areas can be made available, in part, for tourism.

6. Managed resource area/Multiple use management area

These are areas in which the conservation of nature forms only a part of a management plan which is primarily for the sustained production of, for example, water, timber, wildlife, pasture and outdoor recreation. Conservation is achieved when the elements are in balance and it is lost if one resource is unduly exploited at the expense of another.

7. Natural biotic area

These are essentially natural areas of which man is a component and obtains his livelihood by means that do not involve extensive cultivation or other major modifications of the vegetation and animal life. Normally public visitation would not be permitted in such areas, although zones in which tourism is acceptable are not necessarily ruled out.

8. Historical/Archaeological Areas

Areas protected because of their historical or archaeological value, in which the principal interest is usually associated with buildings, monuments, or other structures, found in villages, towns or cities. Activities permitted in these areas are those that do not impair the historical or archaeological values to be preserved, and normally include some level of tourism.

9. World Heritage Sites

The international "Convention concerning the protection of the World Cultural and Natural Heritage" (UNESCO 1972) provides for the designation of areas of "outstanding universal value" as World Heritage Sites. These exceptional areas must be recommended by the signatory nation responsible for the site and for declaration by the international World Heritage Committee. The sites will undoubtedly include many previously designated protected areas.

RELATIONSHIP OF BIOSPHERE RESERVES TO OTHER PROTECTED AREAS

In some instances biosphere reserves will be established specifically for the purposes of the MAB programme in place where there have previously been not protected areas. But, often a biosphere reserve is likely to profit from existing protected areas and include a part or the whole of those within its boundaries. As there will normally be no special legal category of biosphere reserve this can be done without any change in the administrative responsibility for managing the area.

Table 1. Shows how the different protected areas, or parts of them, can contribute to the various zones of biosphere reserve. The former are listed on the left (rows of the table), the latter above (columns). All biosphere reserves should include a core area and at least one of the above components.

For example, the core of the biosphere reserve may be provided by the whole or part of a strict nature reserve, managed nature reserve, wilderness area, historical area or the natural part of a national park. The cultural part of a biosphere reserve, on the other hand, can only be provided by a protected cultural landscape. Manipulative and degraded areas can similarly be derived from suitable parts of existing protected areas.

Possible relation to sites included on the World Heritage List

Sites which will be included in the World Heritage List are rather different from the other categories of protected areas considered above, because these sites will be recognized under international law - the Convention concerning the Protection of the World Cultural and Natural Heritage. The sites will be approved by the World Heritage Committee, set up under the Convention, according to criteria which have been established by the Committee. These criteria lay emphasis on the unique, outstanding character of the World Heritage sites in contrast to biosphere reserves which preserve representative samples of terrestrial and aquatic ecosystems.

Natural properties suitable for inclusion in the list must be of outstanding universal value as

- (a) examples representing the major stages of the earth's evolutionary history;
- (b) examples of geological processes, biological evolution and man's interaction with his natural environment;
- (c) unique, rare or superlative natural phenomena, formations or features or areas of exceptional natural beauty; or
- (d) habitats where populations of rare or endangered species of plants and animals still survive.

TABLE 1.

C O M P O N E N T S O F B I O S P H E R E R E S E R V E S

CATEGORIES OF PROTECTED AREA	Core	Manipulated Zone (natural) or Man-Modified	Cultural	Degraded
1. Strict Nature Reserve	X			
2. Parks (National, Provincial, State)	X			
3. Natural Monuments	X		X	
4. Managed Nature Reserve	X	X		X
5. Cultural Landscape		X	X	X
6. Natural Biotic Area		X		
7. Managed Resource Area		X		X
8. Historical/ Archaeological Areas	X		X	
9. World Heritage Sites	X	X	X	

It will be seen from these criteria, determined by the World Heritage Committee, that it would be possible for certain outstanding biosphere reserves to conform also to the criteria for World Heritage Sites.

SUMMARY AND CONCLUSION

- (a) The biosphere reserve is set up for a special combination of purposes which are not duplicated by any other category of protected areas.
- (b) Part or the whole of protected areas of other categories may be included in a biosphere reserve provided that they meet the criteria for inclusion. (For example, in the USA they include parts of National Parks, National Forests, Experimental Ecological Reserves, experimental catchments, etc., and in the UK existing National Nature Reserves).
- (c) This need not lead to any change in the legal status of such areas. For example, if they are within a National Park or Strict Nature Reserve, they can continue to be so.
- (d) It is hoped, on the other hand, that the biosphere reserve programme will make an important supplementary contribution to national programmes of conservation and of ecosystem research.
- (e) It is not expected that the biosphere reserve network, even when complete, will meet all the needs of biological conservation, nationally, regionally or internationally. They should be supplemented by other more detailed programmes.

The attempt to set up a world-wide network of biosphere reserves is a new and important initiative in our efforts to provide an assured future for mankind. The emphasis of the programme is on the relation between man and nature. To be successful it must preserve areas of undisturbed nature as genetic reservoirs and as standards against which change outside can be measured and judged. It must equally include man and his works. If handled imaginatively it should provide an excellent opportunity of increasing understanding of the problems of the biosphere and of involving people, especially local people, in conservation and research having a vital bearing on their own future.

APPENDIX

References referring to Biosphere Reserves

- CNPPA, 1976 a. Criteria whereby properties forming part of the natural heritage may be included in the "World Heritage List". Report to UNESCO, IUCN, Morges (mimeo).
- CNPPA, 1976 b. The concept of biosphere reserves and its relationship to other national and international conservation efforts. Position Paper. Commission report. IUCN, Morges.
- CNPPA, 1977. The Biosphere Reserve and its relationship to other protected areas. IUCN, Morges.
- Dasmann, R.F., 1973 a. A system for defining and classifying natural regions for purposes of conservation. A Progress Report. IUCN Occasional Paper No. 7, Morges.
- Dasmann, R.F., 1973 b. Classification and use of protected natural and cultural areas. IUCN Occasional Paper No.4, Morges.
- di Castri, Francesco, and Loope, Lloyd, 1977. Biosphere reserves: theory and practice. Nature and Resources 13 (1) UNESCO, Paris.
- Franklin, J.F., 1976. The conceptual basis for selection of .S. biosphere reserves and features of established areas. US/USSR Symposium on biosphere reserves, Moscow, (mimeo).
- Gilbert, V.C., 1976. Biosphere reserves and national parks. Parks. 1:2.
- IUCN, 1971. United Nations list of national parks and equivalent reserves. Second edition. Publications New Series No.15, Hayez, Brussels.
- IUCN, 1974. Biotic provinces of the world. IUCN Occasional Paper No. 9, Morges.
- IUCN, 1975. World directory of national parks and other protected areas. IUCN, Morges.
- Johnson, Olson, Reichle 1976. Management of experimental reserves and their relation to conservation reserves : the reserve cluster concept, Oak Ridge, Tennessee, USA.
- Krinitzky, Vassity 1977. Research at USSR State reserves and their role in monitoring biosphere changes. Nature and Resources 13 (1). UNESCO, Paris.
- MAB CANADA, 1975. Report No. 6. Guidelines for selecting biosphere reserves in Canada. Department of the Environment, Ottawa, Canada.

Miller, K.R., 1976. Global dimensions of wildland management in relation to development and environmental conservation in Latin America. In: Regional Expert Consultation on Environment and Development. Bogota, Colombia 5, 10th July 1976. FAO, Santiago, Chile.

Poore, D., 1976. Biosphere reserves in northern and western Europe. Ms.

Udvardy, M.D.F., 1975. A classification of the biogeographical provinces of the world. IUCN Occasional Paper No.18, Morges.

UNESCO, 1971. International Coordinating Council of the programme on Man and the Biosphere (MAB). 1st session. Final Report. UNESCO, Paris.

**

UNESCO, 1972. Convention concerning the protection of the world cultural and natural heritage. General Conference. 17th session. Paris, 16th November 1972.

UNESCO, 1973. ICC of MAB. 2nd session. Final Report. MAB Report Series 10, UNESCO, Paris.

UNESCO, 1973. Expert Panel on Project 8: Conservation of natural areas and of the genetic material they contain. MAB Report Series No. 12. UNESCO, Paris.

UNESCO, 1974 a. Task Force on: Criteria and guidelines for the choice and establishment of biosphere reserves. MAB Report Series No. 22. UNESCO, Paris.

UNESCO, 1974 b. International Coordinating Council of the Programme on Man and the Biosphere (MAB). Third Session Final Report. MAB Report Series No. 27. UNESCO, Paris.

UNESCO, 1976. International Coordinating Council of the Programme on Man and the Biosphere (MAB). Fourth Session. Final Report. MAB Report Series No. 38. UNESCO, Paris.

UNESCO, 1977 a. MAB circular letter No. 12/77 re Side, Turkey.

UNESCO, 1977 b. Regional workshop on techniques for the selection of biosphere reserves. Australia and New Zealand. Draft final report. UNESCO, Australis / New Zealand, 1977.

UNESCO, 1977 c. International Coordinating Council of MAB. 5th Session. Project 8. Draft final report (MAB, ICC-5 Conf. 10). Implementation of Project 8. Vienna, 1977.

UNESCO, 1977 d. Scientific Workshop on biosphere reserves in the Mediterranean Region. Development of a conceptual basis and a plan for the establishment of a regional network. Draft report. MAB Report Series N°45.

**

UNESCO, 1972. Expert Panel on Educational activities under the MAB Report, Series 7, Final Report, Paris 1972.

List of meetings related to MAB Project 8

- 1973 : Expert panel on Project 8. Conservation of natural areas and of the genetic material they contain. Morges, 25-27 September (MAB Report Series No. 12)
- 1974 : Task force on criteria and guidelines for the choice and establishment of biosphere reserves. Paris, 20-24 May (MAB Report Series No. 22)
- 1975 : Regional meeting on integrated ecological research and conservation activities in northern Mediterranean countries. Potenza, 27-31 October (MAB Report Series No. 36)
- 1976 : Joint USSR/USA Symposium on biosphere reserves, Moscow, 4-18 May (Transaction can be obtained from the above MAB National Committees)
- 1977 : Workshop on biosphere reserves in the Mediterranean region: development of a conceptual basis and a plan for the establishment of a regional network. Side/Turkey, 6-11 June (MAB Report Series No. 45)
- 1977 : Unesco regional workshop on techniques for selection of biosphere reserves. Australia and New Zealand, 27 October-7 November (Joint publication of National Commissions for Unesco of Australia and New Zealand)
- 1977 : Rocky Mountain biosphere reserve workshop, Boulder, Colorado, 16-18 November. Three previous workshops were organized by the US MAB National Committee: eastern US at Gatlinburg, Tennessee, 3-5 November 1976; Southwestern U.S. at Tucson, Arizona, 30 March-2 April 1977 and northwestern U.S. at Corvallis, Colorado, 16-18 November 1977 (Reports of these national biosphere reserve workshops can be obtained from the US MAB National Committee).