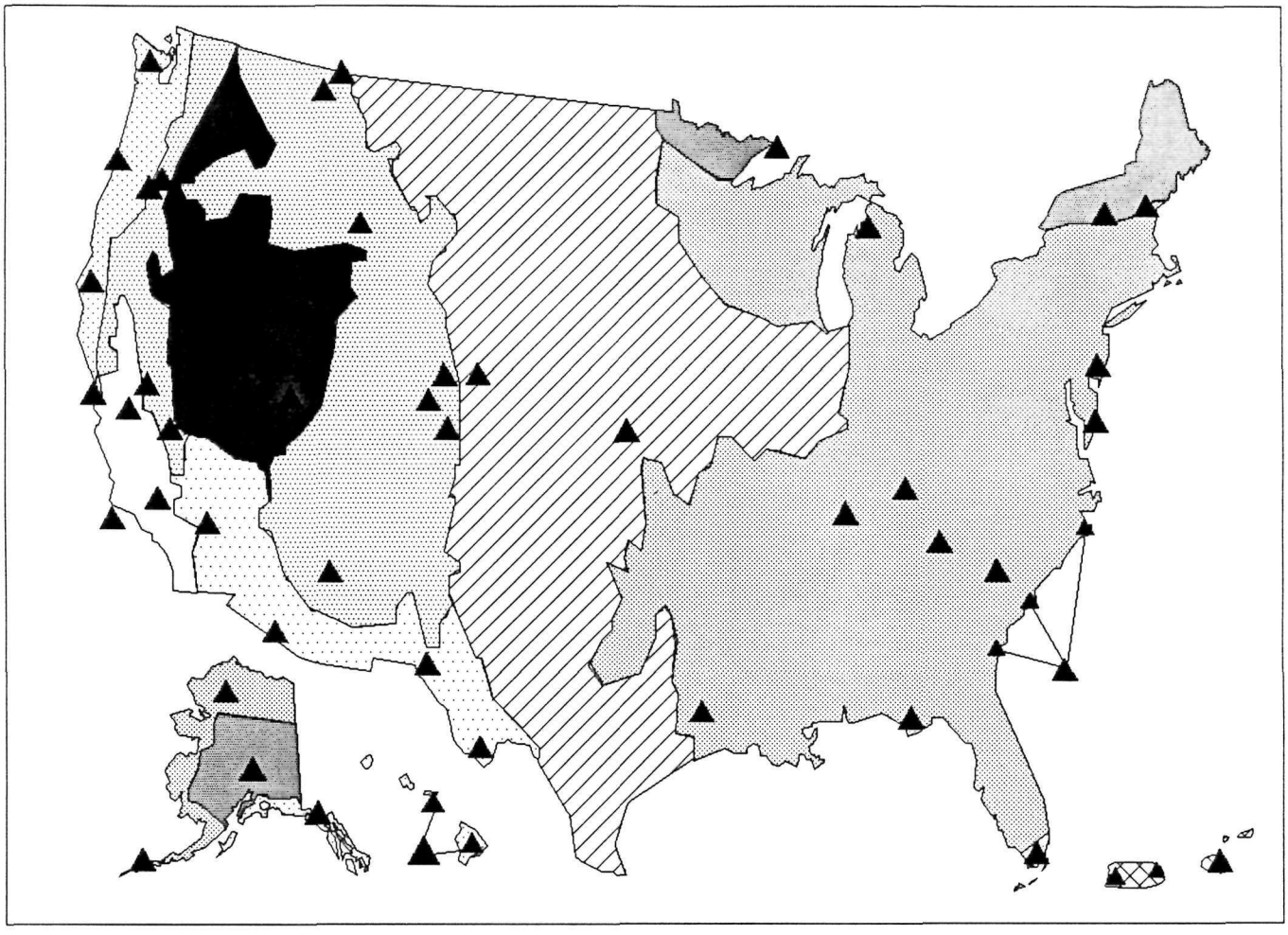
Caroline--- This still needs work but covers most of the ground I think is important. Several Action Items need text, and one of then (#10) I agreed to do & will fax Monday (I rather think this one fits better under Outreach--participation as a sort of logical extension of regional programs). I've supplied some crude budget estimates--however I didnt have your chart, so years may be off. I've edited rather liberally & you surely wont need to use it all. I stopped boldfacing--except in a few places where your attention is really needed. There's still a fair amount of redundancy. Items 1,2,& 3 are closely related & we may want to either combine two or more or hone the differences. Bob's introductory text for sustainable development needs to show how Items 8, 9 and perhaps also 4 relate. A feel we should get endorsement for US participation in the World Parks Congress under Item 15 (an item to be resolved in October. I hope). The attached disk includes the charts I prepared except for Cover Map, potential BR Map (not included in your pkg) and "Trends in Ownership" which are on Freelance here (let me know whether you or Bob need these). Bob has the consultation hierarchy chart--but it could be redrafted in a more polished form if we keep it. I hope all this is helpful.

Bill 10-4-91

U.S. BIOSPHERE RESERVE ACTION PLAN

DRAFT



U.S. Man and the Biosphere Program

October 1991

Writing group:

Robert Woodmansee, Colorado State University, Co (chair)

Laurie Wayburn, Pt. Reyes Bird Observatory, CA

William Gregg, National Park Service, Washington, DC

Caroline Bledsoe, University of California-Davis

UNITED STATES BIOSPHERE RESERVE PROGRAM

ACTION PLAN

Draft

(insert map of biosphere reserves)

U.S. Man and the Biosphere Program
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Robert Woodmansee, Colorado State University, CO (Chair)
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TABLE OF CONTENTS

SUMMARY

This Biosphere Reserve Action Plan focuses on the developing the role of the U.S. Biosphere Reserves (USBR) in the future of our biosphere. USBR are uniquely designed to help people, agencies and organizations work together to preserve our ecological and biological heritage, and, at the same time, to demonstrate sustainable human uses of the biosphere. This document provides a rationale for the particular role of biosphere reserves in achieving a sustainable biosphere. It sets forth a Mission Statement for the U.S. Biosphere Reserve Program, establishes program goals, and outlines a four-year Plan containing 16 Action Items for U.S. MAB development and support to accomplish the Program Mission and goals.

The Plan is based substantially on the concepts and recommendations developed between October 1990 and April 1991 by the Coordinating Committee for Biosphere Reserves. The Committee was established by the U.S. MAB National MAB Committee in January 1990 to coordinate program activities relating to biosphere reserves within the U.S. MAB Program.

List of Action Items and Time Schedule

Action Item	1992 $$	1993 $$	1994 $$	1995 $$
RESEARCH & MONITORING				
1 Network of Networks	30	50	75	100
2 International BR Assessment	10	0	0	0
3 USBR Inventory & Monitoring	0	25	50	100
4 Socioeconomic Knowledge Gaps	0	30	0	0
CONSERVATION				
5 Managers' Meeting	40	0	0	0
6 USBR Network Adequacy	0	50	50	50
7 Def. of Ecosystem Conservation				
SUSTAINABLE DEVELOPMENT				
8 Sustainable Ecosystem Concepts	20	0	0	0
9 Sustainability Symposium	0	0	40	0
10 Internationally Paired BR	0	0	25	50
OUTREACH				
11 USBR Intern Program	0	20	30	40
12 Regional Partnerships	0	40	80	120
13 USBR Communication Network	35	40	50	60
14 International Linkages	15	25	40	50
PROGRAM IMPLEMENTATION AND COORDINATION				
15 BR Steering Committee	20	20	20	20
16 BR Program Office	50	100	100	150
TOTAL	220	400	560	740

INTRODUCTION

One of the great feats of humankind since the advent of the industrial revolution has been our ascension as an environmental driving force that rivals geologic and cosmic events. Humans have the capacity to alter the environment of the earth through influences on the chemical composition of the atmosphere, use of land and oceans, and introduction of human-induced disasters (e.g. nuclear accidents, oil spills, massive deforestation). On more regional scales, humans contaminate ground and surface waters, change soil fertility, eradicate genetic resources, and dramatically alter food, fiber and fuelwood production and distribution patterns. These problems are related directly or indirectly to human population growth, demographic shifts and human requirements for resources.

Society is aware of the magnitude of human intervention, and nations are beginning to understand that human use of the earth and its resources may be limited. Consequently, the concept of sustainability of the ecosystems in our biosphere is being discussed by many nations and many organizations. Much of this discussion is focused on the specific concept of sustainable development.

The dictionary definition of sustainability is the process of nourishing or supporting. Ecosystem sustainability is thus defined as the process of nourishing or supporting a grouping (system) of home environments (eco) through the interaction of six categories of basic factors: physical and biological properties, climate and water, energy, economic viability, cultural viability, and organizational and political viability. Sustainable development focusing specifically on human uses of ecosystems, can be defined as the process of ensuring that "development meets the needs of the present without compromising the ability of future generations to meet their own needs." (World Commission on Environment and Development).

These definitions reflect recognition that:
- humanity needs to use natural resources
- the environment must not be irreversibly damaged in using resources
- there is need to provide for future uses and to maintain options for future generations

There are, in such a complex issue as ecosystem sustainability, many different viewpoints. Unraveling the complexity of viewpoints in a logical and thoughtful manner is the challenge of the 1990's and the next century for natural resource managers. This unraveling requires consideration of more than just biological and physical relationships. It requires that the human social and economic implications of resource protection and use be brought into the equation.

Thus, the concept of ecosystem sustainability is dependent on many factors, including the biological and physical potential of a site, the management goals and practices for the site, and the viewpoints of stakeholders at the site. Modern society must decide which ecosysems are needed. The concept of sustainability must become an important part of our policy and management decision making process. This concept of ecosystem sustainability, applied to areas of global importance in conserving ecosystems and biological diversity, provides the basis for the following Mission of the U.S. Biosphere Reserve Program (USBRP):

MISSION STATEMENT

The mission of the U.S. Biosphere Reserve Program is to establish a network of areas of significant value for conserving ecosystems and biotic diversity, and to encourage and facilitate cooperative programs and supporting organizational infrastructure that provide the knowledge, skills, and attitudes necessary for sustaining these ecosystems in the context of local, regional, and global change.

In order to accomplish this mission, the U.S. Man and the Biosphere Program (USMAB) will assist the administrators and other stakeholders in U.S. biosphere reserves to implement, coordinate and integrate the following biosphere reserve roles:

Research and Monitoring Role, focused on the creative use of the natural and social sciences to support conservation of minimally disturbed and naturally functioning ecosystems and their biotic diversity within the context of sustainable human uses of ecosystems;

Conservation Role, focused on sustaining representative minimally disturbed and naturally functioning ecosystems of a terrestrial or coastal/marine biogeographical area and their biotic diversity.

Sustainable Development Role, focused on developing the theory and demonstrating the practice of sustainable human uses of ecosystems,

Outreach Role, focused on creating and sustaining cooperative frameworks for sharing information regionally among biosphere reserve stakeholders; and for utilizing national and international biosphere reserve networks for technology development and transfer, comparative studies, and information systems.

The above roles are consistent with the functions of biosphere reserves described in Action Plan for Biosphere Reserves (UNESCO 1984) and the subsequent elaboration of the roles of biosphere reserves in operational guidelines for the MAB program (UNESCO 1987). While there is no ideal balance among the four roles, at least some activity in each area will be required to achieve ecosystem sustainability.

Individual USBRs differ markedly in their emphasis on the roles. In recent interviews, the administrators of selected biosphere reserves were asked to describe the relative importance of each role in their management today and to project the balance five years hence (Figure 1, Appendix 2). Olympic National Park focuses on ecosystem protection, but plans to strengthen outreach (participation of local people and interagency cooperation) to help address regional resource issues such as the management of regional fisheries and old growth forests. The Jornada Experimental Range, a Long-term Ecological Research Site, has a strong research component, but wants to strengthen outreach to regional resource users of desert rangelands. The Central California Coast Biosphere Reserve, which is organizing a regional biosphere reserve program involving many stakeholders, strongly emphasizes outreach now, but will focus more on other functions as public participation and support for the biosphere reserve increases. The New Jersey Pinelands Biosphere Reserve, designated because of its innovation in regulation of ecosystem uses, stresses sustainable development through its comprehensive regional plan. However, more emphasis on strengthening resource protection is expected as suitable lands now available for development are infilled and the development pressures make the long-term effectiveness of regulation alone as a conservation tool increasingly problematical. The Southern Appalachian Biosphere Reserve, for which the first regional MAB organization was established in 1988, reports efforts to implement all functions, with somewhat more emphasis on outreach, and expects an even more balanced program in the future. All respondents viewed biosphere reserve functions as dynamic, and expected the emphasis to change during the next five years, generally in the direction of more balanced implementation. Interestingly, Olympic National Park indicated that the establishment of a regional biosphere reserve organization would probably change the outyear projection in favor of increased emphasis on experimental research and sustainable development, which the park has limited ability to implement.

Figure 1. Present and Future Management Emphasis of Selected U.S.Biosphere Reserves (insert pie diagrams)

OLYMPIC NATIONAL PARK
National Park Service

JORNADA EXPERIMENTAL RANGE
Agricultural Research Service

CENTRAL CALIFORNIA COAST
Federal, State, Local Administrators
Regional MAB Organization Pending

SOUTHERN APPALACHIANS
Federal Administrators
Regional MAB Organization

NEW JERSEY PINELANDS
Complex Administration

U.S. BIOSPHERE RESERVE PROGRAM GOALS

The four functional roles of biosphere reserves provide the basis for establishing long-term goals for the USBRP. These goals provide program direction and the framework for developing the Action Plan, which includes 16 Action Items for implementation by U.S. MAB between 1992 and 1995. As Action Items are completed, new Action Items will arise and goals will be reevaluated.

RESEARCH AND MONITORING: To facilitate research and monitoring that support sustainable conervation and ecosystem use in U.S. Biosphere Reserves

The USBRP will encourage and facilitate research, monitoring, integration and synthesis of data in order to understand ecosystem sustainability, and will support experimental demonstrations of the principles of sustainability.

CONSERVATION: To improve the scope and utility of U.S. Biosphere Reserves for conservation of biological diversity.

The USBRP will seek a sensitive balance between ecosystem preservation and human development and use in biosphere reserves. By demonstrating how to incorporate biological diversity and protection of significant conservation areas as key components of ecosystem sustainability, biosphere reserves will contribute to the theory, practice and policy of conservation at the local, regional, national, and international levels. The Program will encourage conservation in USBR that reflects the reality of changing regional and global environments. The Program will seek to provide a cooperative framework for developing realistic conservation goals and assessing policy and management options for responding to environmental change.

3. **ENVIRONMENTAL EDUCATION: To promote education for sustainable conservation and ecosystem use**

The USBRP will encourage and facilitate environmental education that enables stakeholders to support, participate in, and pursue conservation of biological diversity within the context of sustainable types, intensities, and patterns of human uses.

4. **REGIONAL PARTNERSHIPS: To foster an integrated ecosystem approach in biosphere reserves through cooperative institutional frameworks involving agencies, organizations, and individuals that can contribute to biosphere reserve functions**

The USBRP will seek to provide opportunities for biosphere reserve administrators, policy makers, developers, conservationists, scientists, and local communities to work together to implement and coordinate biosphere reserve roles. The program will encourage professional and institutional relationships that expand the area of influence of biosphere reserves beyond the designated sites. It will provide forums for discussing regional resource issues and building consensus on regional conservation and ecosystem use goals, and will facilitate cooperative biosphere reserve programs,

5. **EXPANDED PUBLIC INVOLVEMENT: To facilitate the involvement of stakeholders in U.S. Biosphere Reserve activities.**

The USBRP will encourage the involvement of many groups and individuals in USBR activities. The USBRP will foster development and use of flexible, culturally and institutionally appropriate

methods and processes for consultation, involvement, and consensus-building.

6. **COMMUNICATION NETWORKS: To encourage communication among U.S. Biospheres Reserves, and between U.S. Biosphere Reserves and other national and international networks**

The USBRP will seek to establish a communication network among USBR, and foster linkages between USBRs and other national and international networks, thereby creating a functional "network of networks", for the purpose of promoting sustainable conservation and ecusosyem use.

THE ACTION PLAN

The following 16 Action Items are proposed for further development by U.S. MAB for implementing the goals of the USBRP during the period from 1992-1995. The Action Items are designed to be funded and administered by USMAB, either in full or in cooperation with other agencies and organizations. They are consistent with strengthening the functional capabilities of USBRs to enable them to benefit from the methodologies and research results of the core research programs of the U.S. MAB Directorates, and to serve as sites for Directorate research.

The below 14 Action Items are listed according to the biosphere reserve role to which it principally relates, although several Action Items relate to more than one role. Two additional Action Items relating to USBRP administration are included in the following section.

RESEARCH AND MONITORING

The USBRP will encourage, promote and foster research and related monitoring on designated USBRs to develop and integrate knowledge of the six basic factors of ecosystem sustainability (see Introduction). These activities will include original data gathering where essential information is deficient or non-existent, including the documentation of local knowledge; analysis and interpretation of information where data or experience exist but integration has not occurred, and modeling studies where the dynamic interaction of factors is required for understanding. Additionally, research focusing on consensus building processes, institutional arrangements and organization, communications and networking will be necessary to implement the Mission. Emphasis will be placed on areas of research that transcend factors and disciplinary and organizational boundaries.

Particular emphasis will be given to research and monitoring in USBRs that includes one or more of these characteristics:

- o broad spatial scales, such as landscape or regional studies
- o long time frames
- o inclusion of social and economic aspects
- o use of new technologies, such as geographic information systems

Special attention will be given to the precise definition of spatial and temporal scales associated with each problem. For example, research conducted and conclusions drawn about the conservation and sustainability of biological diversity at the patch or landscape (site) scales may be quite different than those drawn about the multi-landscape or regional scales. Likewise, careful attention will be given to insure that appropriate and compatible levels of biological, physical, social, and institutional organization are selected for study.

I SUGGEST DELETION OF THE NEXT 2 PARAGRAPHS

Research that focuses on the landscape and regional scales of integration will be emphasized for the USBRP but specific studies at lower and higher levels will be encouraged where those studies contribute directly to answering questions related to sustainability of key landscape and regional ecosystems.

New technologies that will support the research activities will be encouraged and fostered. Examples are geographic information systems, computerized decision support systems, advanced modeling systems and model libraries, and computer-based teleconferencing. With adequate support these technologies can be linked.

Finally, to insure knowledge acquired from research is transferred to managers and policy makers, the USBRP will require that appropriate workshops, forums, demonstrations, and other application oriented communications be made available for practitioners. In exchange, managers and policy makers will provide information to assist researchers in responding to their their needs.

ACTION ITEMS

o ACTION ITEM 1. Participate in a small pilot project in a "network of networks" to study ecological aspects of global change.

Although USBRs have existed for many years, little coordinated research has been done within this potential network. In order to facilitate the development of a truely functional network, participants from various reserves should work together on a common project. This project should have scientific value, be simple in concept and execution, and inexpensive. Such a project (Ecological Networks) is being proposed by the Ecological Systems and Dynamics (ESD) Task Group of the U.S. Global Change Working Group established by the Committee on Earth and Environmental Sciences (CEES) to coordinate interagency research on global change. The research hypothesis and pilot research project will be selected in 1991. In 1992, the design of project will be finalized, coordinated with interested administrators, and implemented in biosphere reserves and other ecological research areas networks.

o ACTION ITEM 2. Participate in an international assessment of biosphere reserves to carry out inventory and monitoring activities.

The design of inventory and monitoring programs in USBR requires an up to date assessement of capabilities and available data sets. An international assessment will assist U.S. and international sites to identify priorities and opportunities for cooperation. EuroMAB, an organization of representatives from European National MAB Programs, has initiated an assessment in response to a proposal developed by representatives of the national MAB organizations of Germany, Spain, the U.S.S.R. and the U.S. at the September, 1991 EuroMAB meeting. To assist this effort, the project will summarize relevant information from BR nominations, the results of a 1988 international survey of BR (available as an automated database at Yale University), and information on BR inventory and monitoring to be provided by EuroMAB representatives by the end of 1991. This information will be considered in identifying biosphere reserves to participate in a pilot inventory and monitoring project involving U.S. and European BR, perhaps in cooperation with Action Item 1 above.

o ACTION ITEM 3. Begin a modest program of inventory and monitoring of biodiversity in US Biosphere Reserves.

In order to assess whether USBR ecosystems contain a representative sample of biodiversity, it is necessary to know, in a simple manner, what the current "level of biodiversity" is. The project will establish standards and methodologies for inventory of species and ecological communities and the management of biological inventory data in USBR, and will draw upon the

experience gained in existing programs (e.g., National Park Service Inventory and Monitoring Program, Nature Conservancy's Heritage Conservation Program, the Smithsonian-MAB Biodiversity Program, and the National Science Foundation's Long-Term Ecological Research Programs involving BR core areas). USBR will be encouraged to complete their biological inventories and develop hypothesis-driven monitoring of biological diversity.

CAROLINE--I'm not sure what the USMAB role should be here. I dont see USMAB supporting basic data collection. Use of selected USBR for research on the relationship between biodiversity and ecosystem processes as proposed by Otto Solbrig would be a more attractive project.

o ACTION ITEM 4. Identify gaps in knowledge of social, cultural, and economic factors for understanding ecosystem sustainability in U.S. Biosphere Reserves

(supply text)

CONSERVATION

Biological diversity is the variety and variability of life at all levels of biological organization. It encompasses the genetic diversity within species, species diversity within within geographic areas, and ecosystem or habitat diversity providing the physical context for species survival and evolution. Human cultural diversity, which embodies the variety of human uses, relationships, perceptions and attitudes with respect to the various levels of biological organization, is considered a component of biological diversity.

Biogeocultural areas (BGCA)provide an appropriate context for characterizing, understanding, and managing biological diversity under changing environmental, social, and economic conditions, human institutions and their policies, and the cultural traditions, values, and aspirations of local people. The USBRP can provide a consultative framework for natural and social scientists to develop methodologies for identifying BGCAs most suitable for developing models for conserving biological diversity. The program can promote the use of regional biosphere reserves to empower local stakeholders with the knowledge and pride of heritage required to establish goals and objectives for conserving the biological diversity of their BGCA, as well as the skills required to plan and implement a cooperative program of action.

U.S. biosphere reserves play a major role in protecting biological diversity due primarily to the large size and strict protection of core areas. For example, the 30 National Park Service units in the U.S. network provide habitat for more than half the U.S. vascular flora. If the BGCAs representing the potential "areas of cooperation" surrounding all 47 U.S. biosphere reserves were included, the species, community, and landscape diversity would be truly impressive.

The USBRP will emphasize conservation at the landscape, or regional ecosystem level in biosphere reserves. Conservation at this scale benefits significantly from the interdisciplinary and consultative approaches of MAB. Effective conservation programs at this scale are few, and opportunities for advances significant. The flexible spatial configuration and cooperative organization of regional biosphere reserves can help support planning and management at this scale. In general, species conservation, the traditional mainstay of conservation, is the province of agencies and organizations with long-established programs. U.S. MAB's role at this level is should properly focus on pilot projects that demonstrate principles of ecosystem sustainability. U.S. MAB is likely to have a limited involvement in conservation of genetic diversity, except in cases especially relevant to ecosystem sustainability, such as the maintenance of traditional cultivars in traditional agricultural systems.

o ACTION ITEM 5. Convene a national workshop of USBR managers in 1992 to determine how USBR can be more effective in the conservation of biodiversity

The need for cooperative, regional approaches in conserving biological diversity is well recognized. Most protected areas are demonstrably too small, or have inappropriate boundaries, to maintain viable populations of certain species. Fragmentation of surrounding habitats due to human use and development, in concert with other regional and global changes, present ever increasing threats to the biological heritage of the biogeographical provinces containing USBR. USBR can play a key role in developing information, technologies, and attitudes to enable protected area administrators to work with others to find appropriate solutions for these problems. The increasing number of cooperative regional programs to maintain particular ecosystems, habitats, and species attests to the growing interest of managers in regional approaches in protection and management. MAB's emphasis on interdisciplinary research, education, and demonstration complements programs focused on protection (e.g., the Nature Conservancy's bioreserves program) or regional management coordination (e.g., Greater Yellowstone Coordinating Committee). The public controversy associated with "vision statements" in such areas as the Greater Yellowstone Area and the Adirondacks, underscores the complexity and challenges in these approaches.

Of the 91 administrative sites in the 47-unit USBR network, nearly two thirds are strictly protected, either wholly or substantially, as core areas (e.g., national parks, nature reserves, wilderness areas). An original goal of UNESCO's BR program was to assist managers to better protect such areas through cooperative activities that foster compatible human uses in the surrounding areas. The potential benefits of USBR in enabling protected area managers to work with others in developing integrated programs of research, education, and demonstration need to be explored and developed. The proposed workshop will bring together biosphere reserve managers, MAB Directorate members, and outside conservation and "sustainability" specialists to identify how BR can better help BR managers address interrelated environmental, resources use, and socioeconomic problems affecting biological diversity. The workshop, to be convened in the spring of 1992, will provide a forum for USBR managers to become familiar with recent USBR accomplishments and the Directorates' core research programs on ecosystem sustainability, and to participate in the development of the Action Plan before final USMAB approval.

o ACTION ITEM 6. Examine the existing "coverage" of US ecosystems by the current Biosphere Reserve system and determine whether additional reserves should be added.

The original goal of designating at least one biosphere reserve in each biogeographical province is now within sight of fulfillment. As of October 1991, Biosphere Reserves have not been designated in the 20 of the 24 terrestrial and nine of the 12 coastal/marine biogeographical provinces represented in the U.S.. Two of the former are tranborder provinced in which Mexico has established a biosphere reserve.

However, it is not known to what extent the current distribution of US MAB/BRs is a sufficient base for research and monitoring, and demonstration of ecosystem sustainability. It is likely that there are ecosystems that should be added to the current network of reserves. In addition, many existing USBR would benefit from association with functionally complementary sites to implement BR roles. An evaluation of the adequacy of the U.S. network with respect to biosphere reserve roles will enable USMAB to establish objectives for network completion. The evaluation will include an assessment of the utility of existing biogeographic classification systems in selecting biosphere reserves. It will identify opportunities for establishing new biosphere reserves, as well as expanding and consolidating existing BR, to improve the functional capabilities of the network. The recommendations of the evaluation will provide the basis for determining the appropriate nature and level of USMAB support for completing

the USBR network.

o **ACTION ITEM 7. Define ecosystem level of conservation**
I dont remember this one, and am not sure why it's included. This would seem a good candidate for deletion.

SUSTAINABLE DEVELOPMENT

(add text - Woodmansee)

o **ACTION ITEM 8. Identify factors in ecosystem sustainability in U.S. Biosphere Reserves**

(add text - Woodmansee)

o **ACTION ITEM 9. Encourage integration of social and economic science into biological science within reserves.**

A symposium for USBR managers and specialists will be held in 1994 or 1995 to communicate on the insights and practical management applications resulting from the MAB Directorate core projects, and other interdisciplinary research and demonstration projects, that are developing models for ecosystem sustainability in areas of significant conservation value.

o **ACTION ITEM 10. Develop an international program of "pairing or twinning" of biosphere reserves for the purpose of sharing ideas about environmental sustainability.**

Consider the funding of a few pairs in 1993 as a pilot program. Directorates could serve as the focus for such international pairs. (NOTE history of BR nominal (Everglades-Donana-Sian Kaan) and substantive pairing (Beaver Creek-La Michilia for watershed and wildlife management, U.S. and Soviet BR for biodiversity research and multimedia pollutant monitoring, Glacier-Waterton for ecosystem, Big Bend-Jornada-Mapimi) Cross-site comparisons and collaborations will be encouraged where they also directly contribute to enhanced understanding of sustainability of specific ecosystems or they clearly contribute to synthesis of general principles of sustainability.

(CAROLINE--I WILL WRITE THIS UP WITH A PARTICULAR FOCUS ON TRANSBORDER BR WITH CANADA, MEXICO, USSR, BRITISH VI)

OUTREACH: EDUCATION, PARTICIPATION, AND COMMUNICATION

Education. The primary educational role of US MAB will be to encourage the use of biosphere reserves for projects relating to ecosytem sustainability from a conservation perspective. This educational component will be developed sequentially, beginning with a focus on helping managers of biosphere reserves to provide a common base of knowledge (see Action Items 5 and 9) and to provide a forum, through cooperative regional programs, for dialog among the many stakeholders in USBR. The latter programs should place particular emphasis on the education of young people, and coordination with existing educational programs such as "kids environmental education and monitoring network" coordinated by TERC (**SPELL OUT FULL NAME**).

This educational process in USBR should lead to a more informed public and greater support for consultative approaches as conflicts are resolved and consensus achieved. A goal of the educational activities is to establish an ethic of sustainability in the BR region and, through linkages among BR, to foster this ethic nationally and internationally. At the national level, the USBRP should seek to develop a cadre of scientists and managers familiar with

BR concepts who will effectively represent and promote the BR approach to ecosystem sustainability. (CHECK COLO DRAFT FOR ADDL TEXT)

ACTION ITEMS

o ACTION ITEM 11. Establish Biosphere Reserve Intern Program

(Add text -- Bledsoe)

Participation.

The effective conservation of biological diversity within the context of sustainable ecosystem uses requires the participation of a broad public constituency in the biogeocultural area. MAB can provide a neutral consultative framework for identifying resource issues, documenting and utilizing local knowledge, planning and implementing research and related public education on priority regional issues, and providing informational products to the responsible decisionmakers that have widespread public support. In fact, MAB may be the most suitable aegis for bringing together appropriate people to develop the theory, the practice, and the ethic of ecosystem sustainability.

During the past several years, USBR stakeholders have devised various models for organizing government and private sector participants in regional biosphere reserve programs. Agencies and organizations that do not manage land are specifically encouraged to participate. In various ways, these emerging organizations provide a means to link the enablers of a biosphere reserve program--i.e., the entities having scientific, technical, or financial resources--with the benefiting clients. The organizational models reflect differences in the resource issues, institutional complexity, and institutional relationships in the particular region, as well as the size of the biosphere reserve and the number of designated units. In 1990, the regional organization in the Southern Appalachians became the first to officially affiliate with the U.S. MAB Program. Since then, stakeholders have recommended nonprofit structures (Central California Coast and Champlain-Adirondack Biosphere Reserves), an integrated government-private sector cooperative (Land Between the Lakes Area) and a special committee within a regional development district (Mammoth Cave Area) for organizing their regional biosphere reserve. These organizations uniquely facilitate continuing dialogue among conservation, research, and economic development agencies and community interests.

THE FOLLOWING MATERIAL COULD PERHAPS BE DELETED..

Apart from the obvious benefits of personal contact in dispelling barriers to communication, the consultative linkages within regional MAB organizations can help protect beneficial programs by expanding their constituency, especially long-term programs that require many years to realize their full benefits . The involvement of private sector organizations and community leaders in regional MAB organizations is especially encouraged to strengthen the local public constituency for biosphere reserve programs.

The administrators of U.S. biosphere reserves are encouraged to enlist the participation of potential stakeholders in cooperative projects that address ecosystem sustainability and biodiversity issues.

ACTION ITEMS

o ACTION ITEM 12. Examine the usefulness of alternative approaches for establishing "regional partnerships" for planning and implementing biosphere reserves programs

During the past fifteen years, the model for biosphere reserves has shifted from an overlay on existing protected areas to organized regional associations of complementary administrative units working together to implement biosphere reserve roles. In recent years, existing biosphere reserves have been consolidated and regional cooperative organizations established to implement biosphere reserve programs. Steering committees and ad hoc groups are coordinating feasibility studies for developing regional organizations and programs in areas containing existing biosphere reserves as well as to support nominations for new biosphere reserves (see Appendix 3). The organizations illustrate flexible adaptation to different local conditions and needs.

The USBRP depends on innovative applications of the theory and practice of consultation, consensus-building, and partnership development, including the efforts of biosphere reserve administrators to plan and establish regional organizations. **U.S. MAB should continue to consider proposals for USMAB cost sharing in feasibility studies for establishing regional BR programs, according to appropriate evaluation criteria on a competitive basis. (I SUGGEST WE SAY THIS SO AS TO HELP MAINTAIN MOMENTUM IN A FEW REGIONAL EFFORTS)** However, in view of the growing interest in regional approaches, it is time for USMAB to examine the existing and potential usefulness of the organizational models being developed. The assessment will enable the USBRP and other cooperative programs to share experience and accomplishments, provide a basis for formulating U.S. MAB policy, and determining the appropriate nature and level of USMAB support for the planning, organization, and implementation of regional BR programs.

Communication. Achievement of the mission of biosphere reserves requires effective communication on many levels. The biosphere reserve program should provide a forum for bringing together people with different viewpoints, understandings, and attitudes; for dispelling barriers to communication; and for facilitating consensus on the goals and objectives of a biosphere reserve program using state-of-the-art concepts and methodologies for consultation and conflict resolution. Communication will involve linkages at the local (site), regional, biome, national, and international levels to help address problems in sustainability involving various spatial and temporal scales (Figure). Effective communication will depend on MAB's role in providing appropriate forums for communication at these levels. It will also depend on MAB's facilitation and maintenance of information systems that enable opportunities for cooperation to be identified and, once initiated, sustained. It will require the availability of high quality media, an effective reporting system, and a steady stream of professional and popular publications that foster the interest and support of stakeholders at the local, national, and international levels.

INSERT FIGURE ON LEVELS OF COOPERATION FROM THE COLORADO DRAFT

Problems of ecosystem sustainability are complex, and often involve complex, unexpected interactions. Increasingly scientists are studying these complex systems using a team approach. For example, in a coniferous old growth forest, understanding how forest cutting patterns affect productivity and biological diversity within a the the particular social and economic context requires a team of forest ecologists, soil scientists, landscape ecologists, invertebrate biologists, social scientists, and many others. The understandings developed by an interdisciplinary team working at an individual sites can be expanded, and new insights gained, through communication with other teams working on other sites in a network. Comunication in biosphere reserves will involve a "network of networks" approach to link scientists working in biosphere reserves and other domestic and international scientific networks to address research hypotheses in relating to complex problems of ecosystem sustainability.

Regional MAB organizations provide permanent forums that enable stakeholders in individual biosphere reserves to identify with biosphere reserve goals and work together toward implementing them. An important role of these organizations is to promote sustainability by communicating the understandings and methodologies

developed through biosphere reserve programs in ways that meet the needs of the participating agencies and organizations, biosphere reserve managers, and local people.

ACTION ITEMS

o ACTION ITEM 13. Strengthen coordination of the Biosphere Reserve network by developing mechanisms for communication among biosphere reserve managers, other stakeholders in biosphere reserves, and other regional and national networks

USBRs should not work in isolation. They should join with existing networks of scientists, managers, others who are interested in conservation and sustainable development of ecosystems. There are many possible mechanisms to make these links to other persons and groups. USMAB should evaluate in particular the following:

a) A newsletter to support reserve managers in their activities, inform managers and users of national and international biosphere reserve activities, inform persons about research and monitoring programs, and encourage networking among users of reserves.

b) An electronic mail system to make communication and datasharing simple and easy, as well as encourage interest groups to form and develop projects in reserves.

c) Publication of an information synthesis on USBR and development of public media on the USBRP **(CAROLINE-I ADDED THIS)**

d) Support for USBR representatives to attend meetings of other networks, and enable representatives from other networks to attend U.S. forums for developing biosphere reserve roles.

ADDITIONAL ITEM IN COLORADO DRAFT--could be here or separate item.

To foster interest and healthy competition in implementing biosphere reserve goals, the U.S. National MAB Committee should consider establishing an awards program to recognize innovation and excellence in implementing goals of the Action Plan.

ACTION ITEM 14. Expand international linkages between USBRs and the international Biosphere Reserve community.

One of the unique strengths of the MAB program is the international linkages, which allow sites in a country to be a part of a global network. As USBRs become more active, one possible mechanism would be expanded representation in international meetings and activities (e.g., MAB/BR councils, European MAB meetings, the Northern Science Network meetings, etc.). USMAB, or its partiocipating agencies, should support USBRP specialists invited by IUCN to participate in a BR Symposium and Workshop at Fourth World Parks Congress in Venezuela (Februray 1992) (Bledsoe, Wayburn, Gregg, Dahl, Woodmansee?)

IMPLEMENTATION

o ACTION ITEM 15. Establish a Biosphere Reserve Steering Committee to Coordinate Implementation of the Action Plan

The U.S. Biosphere Reserve Action Plan is a blueprint for future development of a functional network of U.S. Biosphere Reserves. The National MAB Committee should periodically review the success and progress in achieving the goals of the plan. To assist the National Committee in this review, a Biosphere Reserve Steering Committee is proposed. The SC would consist of USBR managers,

offficials responsible for BR programs in participating agencies and organizations, and scientists working in USBR. The SC would oversee the implementation of the Action Plan, coordinate the participation and support of USBR constituencies, and make program and policy recommendations to the National Committee. At the end of 4 years, the SC will comprehensively evaluate the Action Plan and recommend a future course of action.

o ACTION ITEM 16. Establish a Program Office for Coordination of the U.S. Biosphere Reserve Program.

In order to carry out the proposed Mission, goals and specific Action Items, it is necessary to have a USBRP Program Office, with appropriate professional staff provided by USMAB or its individual participating agencies. The responsibilities of this center would include carrying out National Committee directives; official representation of the BR Program; coordination and review of USBR nominations, research and other proposals and special studies; preparation of program guidelines and status reports; assistance to the MAB Directorates and USBR administrators relating to the USBRP; development of public media and a USBR Information System; and general program administration. During the last 15 years, the National Park Service has administered the BR nomination process and assisted the State Department in general USBRP administration, with additional assistance provided by the Forest Service and NOAA's Marine Sanctuaries Program on specific projects (e.g., U.S.-U.S.S.R. bilateral research and coastal/marine BR program, respectively). These agencies should jointly develop terms of reference, and recommend agency responsibilities, for the Program Office.

Time Schedule and Funding

The 16 proposed Action Items are expected to be underway or completed by Fiscal Year 1995. Table X identifies the recommended year of initiation and duration of each Action Item, and a rough estimate of USMAB budget requirements in each fiscal year. The timeframes and budgets will be revised in the detailed proposals for each Action Item. Projects will be selected on the basis of competitive review.

List of Action Items and Time Schedule

Action Item	1992 $$	1993 $$	1994 $$	1995 $$
RESEARCH & MONITORING				
1 Network of Networks	30	50	75	100
2 International BR Assessment	10	0	0	0
3 USBR Inventory & Monitoring	0	25	50	100
4 Socioeconomic Knowledge Gaps	0	30	0	0
CONSERVATION				
5 Managers' Meeting	40	0	0	0
6 USBR Network Adequacy	0	50	50	50
7 Def. of Ecosystem Conservation				
SUSTAINABLE DEVELOPMENT				
8 Sustainable Ecosystem Concepts	20	0	0	0
9 Sustainability Symposium	0	0	40	0
10 Internationally Paired BR	0	0	25	50
OUTREACH				
11 USBR Intern Program	0	20	30	40
12 Regional Partnerships	0	40	80	120
13 USBR Communication Network	35	40	50	60
14 International Linkages	15	25	40	50
PROGRAM IMPLEMENTATION AND COORDINATION				
15 BR Steering Committee	20	20	20	20
16 BR Program Office	50	100	100	150
TOTAL	220	400	560	740

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Batisse, Michel. 1986. Developing and focusing the biosphere reserve concept. Nature and Resources 22 (3): 1-10. UNESCO, Paris, France.

Gregg, W.P., S.L. Krugman, and J.D. Wood. 1987. Proceedings of the Symposium on Biosphere Reserves, September 11-18, 1987, Estes Park, Colorado. 4th World Wilderness Congress for Worldwide Conservation. Published by National Park Service, Washington D.C. 291 pages.

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UNESCO. 1987. "A Practical Guide to MAB". MAB/UNESCO, Paris, France.

UNESCO. 1991. "Ecology Chronicle, 24 windows on the Man and the Biosphere Programme, 1989-1990. Edited by H. Brabyn and M. Hadley. MAB/UNESCO, Paris, France.

APPENDICES

2.1 Milestones in the International and U.S. Biosphere Reserve Programs

International Program	U.S. Program
1971	
o UNESCO launches MAB, including Project 8: "Conservation of Natural Areas and the genetic Material They Contain" (first reference to BR)	
1972	
o Stockholm Conference endorses global network ofrepresentative ecological areas	o U.S. National MAB Committee established
1974	
o BR selection guidelines published	o BR Directorate established
o Nixon-Brezhnev Summit Communique endorses BR	
o National Committees designate first BR	o Unilateral USMAB designation of 19 Federal sites as BR
1976	
o First official UNESCO BR designations	o 26 Federal sites officially designated
	o First U.S.-U.S.S.R. BR symposium
	o Regional workshops initiate BR planning (5 through 1978)
1978	
o Guidelines for Ecological Monitoring developed (International Workshop)	o Extramural grant program in BR (continued through 1981)
1979	
	o First non-Federal BR designated
1980	
	o 2nd U.S.-U.S.S.R. BR Symposium
	o U.S. National MAB Plan emphasizes regional projects
1981	
o 10-year MAB Conference stresses BR functions (82% of BR are national parks)	o World's first coastal BR Program initiated
1983	
o First BR Congress (Minsk, USSR) develops blueprint for Action Plan	o Regional BR research program initiated in U.S. Virgin Islands
	o First multi-agency BR designated (California Coast Ranges)
1984	
o Action Plan for BR establishes 9 BR program objectives and action agenda	o First BR Managers' Conference
	o U.S. withdraws from UNESCO
1986	
o First European MAB Conference on BR	

Milestones in the International and U.S. Biosphere Reserve Programs--continued

1987	
o MAB operational guidelines clarify conservation,logistic, and development roles of BR	
o UNESCO adopts new MAB research priorities	
o Several nations initiate BR planning	
o World Wilderness Congress underscores BR role in demonstrating sustainable	

ecosystem use
o MAB Canada approves first national BR plan

1988

- o Smithsonian-MAB Biodiversity Program
- o First regional MAB/BR organization established in So.Appalachians

1989

- o Reorganized U.S. MAB initiates integrated program of policy-relevant research.

1990

- o U.S. MAB establishes committee to improve BR coordination
- o U.S. MAB publishes guidelines for regional MAB organizations
- o First Directrorate core research program initiated in 2 U.S. BR

1991

o EUROMAB Conference endorses BR inventory and monitoring program

- o Second Directorate core research program initiated in 3 BR
- o Draft BR Action Plan stresses BR role in ecosystem sustainability
- o Linkage of BR and other ecological research sites initiated in cooperation with U.S. Global Change Research Program

1992

o World Parks Congress (BR Symposium)
o United Nations Conference on Environment and Development

2.1 List and Characterization of US Biosphere Reserves

Name, Year Designated, Category, Status, No.Sites, Administrator
(see explanation of codes)

Aleutian Islands National Wildlife Refuge, AK 1976. I, x (1) FWS
Big Bend National Park, TX 1976. III, d (1) NPS
Big Thicket National Preserve, TX 1981. I, x (1) NPS
Beaver Creek Experimental Watershed, AZ 1979. II, x (1) FS
California Coast Ranges, CA 1983. IV, x (10) BLM,FS,NPS,State,TNC,Univ.

Carolinian-South Atlantic, NC-SC-GA 1986. IV,x,(13) FWS,NOAA,NPS,States, private
Central Gulf Coastal Plain, FL 1983. IV,e,(1) State
Cascade Head Exper. Forest and Scenic-Research Area, OR 1976. II,x,(1) FS
Central California Coast, CA 1988. V,o(10) FWS,NPS,NOAA,state,local
Central Plains Experimental Range, CO 1976. II,x,(1) ARS

Champlain-Adirondack 1989. V,o,(3) Complex ownership.
Channel Islands, CA 1976,1986. IV,d,(2) NPS,NOAA
Coram Experimental Forest, MT 1976. III,d,(1) FS
Denali National Park and Preserve, AK 1976. I,x,(1) NPS
Desert Experimental Range, UT 1976. II,x,(1) FS

Everglades National Park/Fort Jefferson National Monument, CA 1976. I,f,(2) NPS
Glacier Bay-Admiralty Island, AK 1986. IV,x,(2) FS,NPS
Glacier National Park, MT 1976. III,d,(1) NPS
Guanica State Forest, PR 1981. I,f,(1) State
Hawaiian Islands, HI 1980. IV,x,(2) NPS

Fraser Experimental Forest, CO 1976. II,d,(1) FS
H.J. Andrews Experimental Forest, OR 1976. II,x,(1) FS
Hubbard Brook Experimental Forest, NH 1976. II,e,(1) FS
Isle Royale National Park, MI 1976. I,x,(1) NPS
Jornada Experimental Range, NM 1976. III,d,(1) ARS

Konza Prairie Research Natural Area, KS 1976. I,x,(1) TNC
Land Between The Lakes Area, TN-KY 1991. V,o,(1) TVA
Luquillo Experimental Forest, PR 1976. II,x,(1) FS
Mammoth Cave Area, KY 1990. V,o,(1) NPS
Mojave and Colorado Deserts, CA-NV 1984. IV,d,(5) BLM,FS,NPS,State,Univ.

New Jersey Pinelands, NJ 1983, 1988. V,*,(many) Complex ownership
Niwot Ridge, CO 1979. II,d,(1) FS
Noatak, AK 1976. I,d,(2) NPS
Olympic National Park, WA 1976. I,d,(1) NPS
Organ Pipe Cactus National Monument, AZ 1976. I,f,(1) NPS

Rocky Mountain National Park, CO 1976. I,d,(1) NPS
San Dimas Experimental Forest, CA 1976. II,e,(1) FS
San Joaquin Experimental Range, CA 1976. II,e,(1) ARS
Sequoia and Kings Canyon National Parks, CA 1976. I,d,(2) NPS
South Atlantic Coastal Plain, SC 1983. IV,e,(1) NPS

2.2 List and Characterization of US Biosphere Reserves --continued

Name, Year Designated, Category, Status, No.Sites, Administrator

Southern Appalachian, NC-TN 1976,1988. V,o,(3) DOE,FS,NPS
Stanislaus-Tuolumne Experimental Forest, CA 1976 II,x,(1) FS
Three Sisters Wilderness, OR 1976. I,x,(1) FS
University of Michigan Biological Station, MI 1979. II,e,(1) Univ.
Virgin Islands National Park. VI 1976. I,f,(1) NPS

Virginia Coast Reserve, VA 1979. V,*,(1) TNC
Yellowstone National Park, MT-WY 1976. I,x,(1) NPS

47 Biosphere Reserves, 91 Aministrative Sites

Explanation of Codes

Category

I. Protected Natural Areas. An area managed strictly for conservation and designated wholly or primarily as a core area.

II. Research Reserve. A protected area managed primarily for manipulative research to understand ecosystem processes or support development of sustainable ecosystem uses.

III. Biosphere Reserve Cluster. An association of separately designated administrative units that cooperate in implementing biosphere reserve roles. (Clusters of Category I and II Areas provided the basis for many initial U.S. biosphere reserve nominations in 1976)

IV. Multi-site Biosphere Reserve. A biosphere reserve cluster including two or more administrative units designated together as a single biosphere reserve. (Designated primarily between 1980 and 1986. Intersite cooperation is usually more extensive than in Category III)

V. Regional Biosphere Reserve. An association of admini- strative units, designated together as a single biosphere reserve and participating in an organized, cooperative program involving multiple agencies and nongovernmental entities. (Most designated since 1988. Full development model; often incorporates one or more sites from Categories I-IV)

Status

d = discussion of biosphere reserve program underway
e = expansion recommended in MAB study
f = feasibility assessment for BR program in progress
o = regional program with BR organization proposed or established
* = regional program with BR objectives, without BR organization
x = biosphere reserve program planning not yet initiated

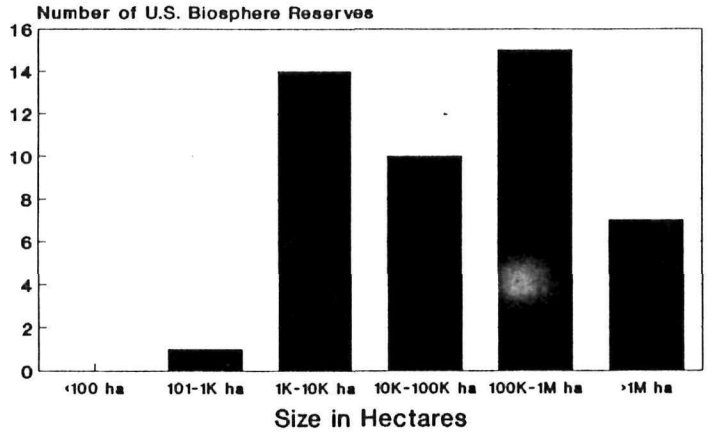
Explanation of Codes -- continued

Note: Planning for regional biosphere reserves is also underway in areas that do not presently have designated biosphere reserves. Feasibility assessments are in progress in the Ozark Highlands, Catskill Mountains, and Gulf of Maine. Discussions on developing a regional biosphere reserve are ongoing in the Central Appalachians, Colorado Plateau, Central Idaho, Lake Superior Basin, North Cascades, and Upper Rio Grande Valley.

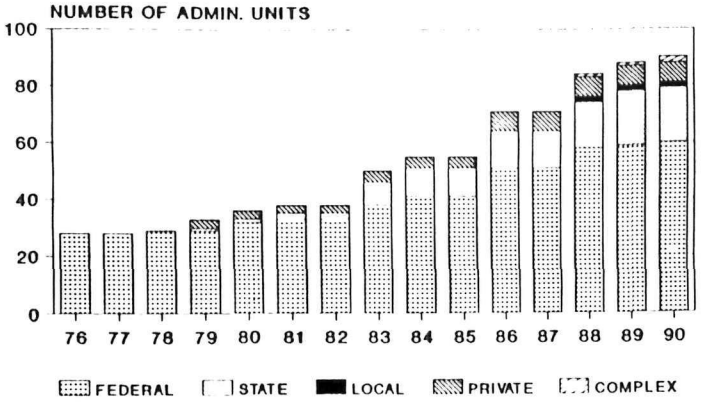
Number of Designated Sites in the Biosphere Reserve
Indicated in parentheses

Administrators of Designated Sites
ARS = Agricultural Research Service (Dept. of Agriculture)
DOE = Department of Energy
FS = Forest Service (Dept. of Agriculture)
FWS = U.S. Fish and Wildlife Service (Dept. of the Interior)
NOAA = National Oceanic and Atmospheric Administration
NPS = National Park Service (Dept. of the Interior)
TNC = The Nature Conservancy
TVA = Tennessee Valley Authority

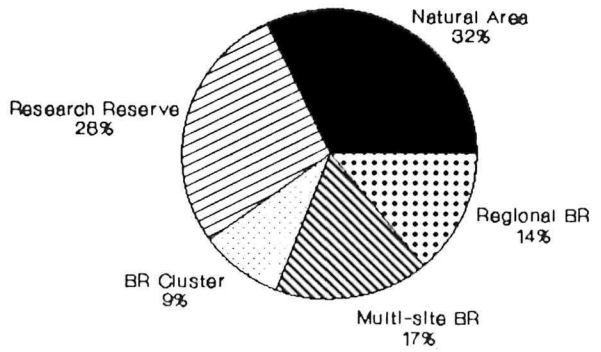
U.S. BIOSPHERE RESERVES
BREAKDOWN BY SIZE



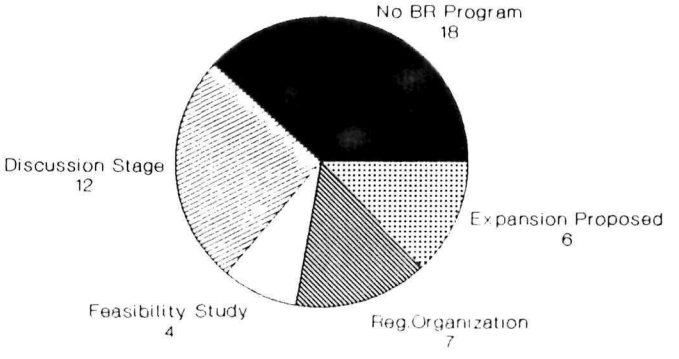
TRENDS IN OWNERSHIP
U.S. BIOSPHERE RESERVES



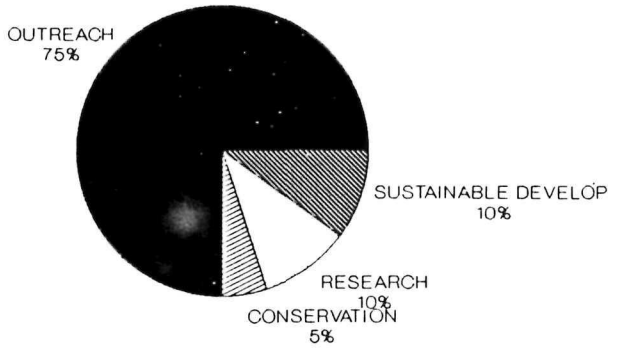
U.S. BIOSPHERE RESERVES
BREAKDOWN BY CATEGORY



U.S. BIOSPHERE RESERVES
BREAKDOWN BY STATUS

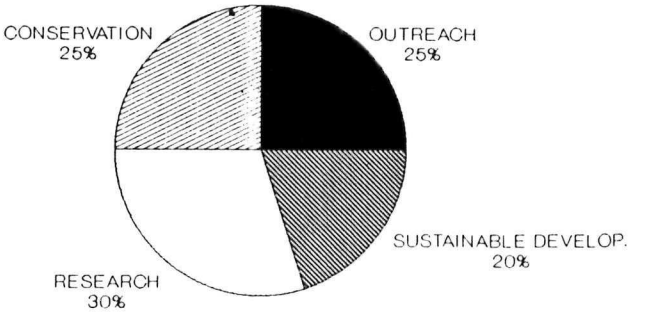


CENTRAL CALIFORNIA COAST
1991 (Now)

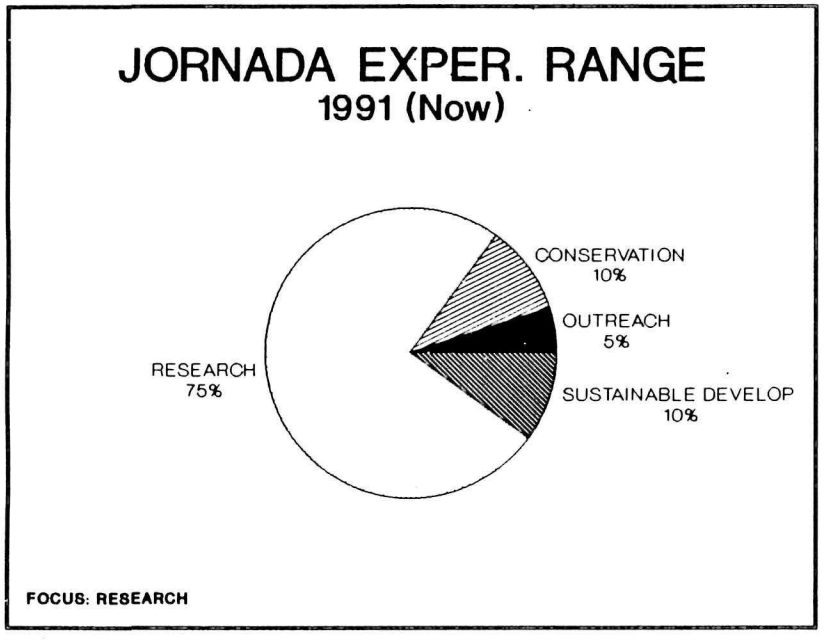


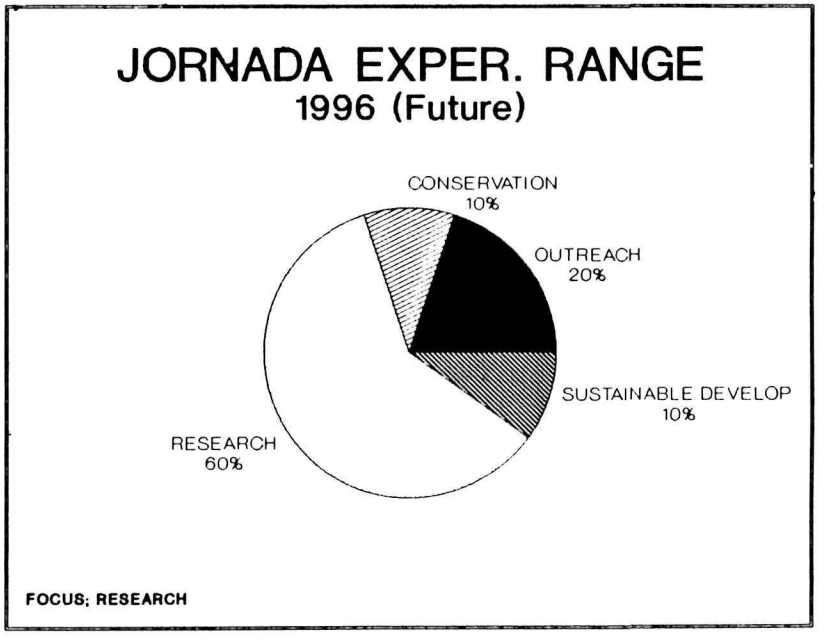
FOCUS: OUTREACH

CENTRAL CALIFORNIA COAST
1996 (Future)

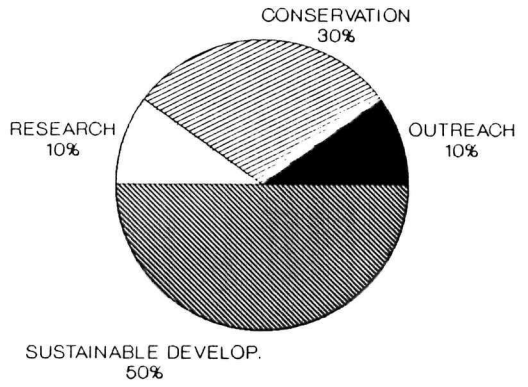


FOCUS: BALANCED


JORNADA EXPER. RANGE
1991 (Now)
CONSERVATION
10%
OUTREACH
5%
SUSTAINABLE DEVELOP
10%
RESEARCH
75%
FOCUS: RESEARCH

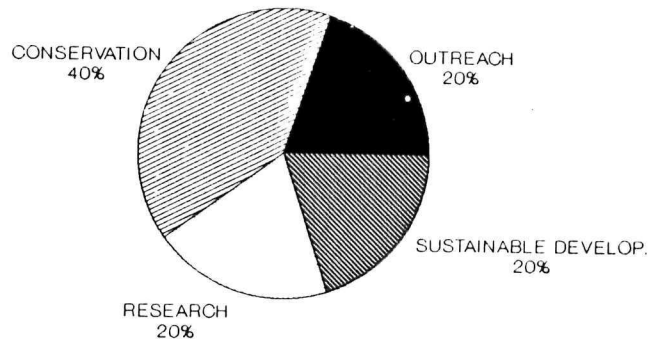

JORNADA EXPER. RANGE
1996 (Future)
CONSERVATION
10%
OUTREACH
20%
SUSTAINABLE DEVELOP
10%
RESEARCH
60%
FOCUS; RESEARCH

NEW JERSEY PINELANDS
1991 (Now)



FOCUS: SUSTAINABLE DEVELOPMENT

NEW JERSEY PINELANDS
1996 (Future)



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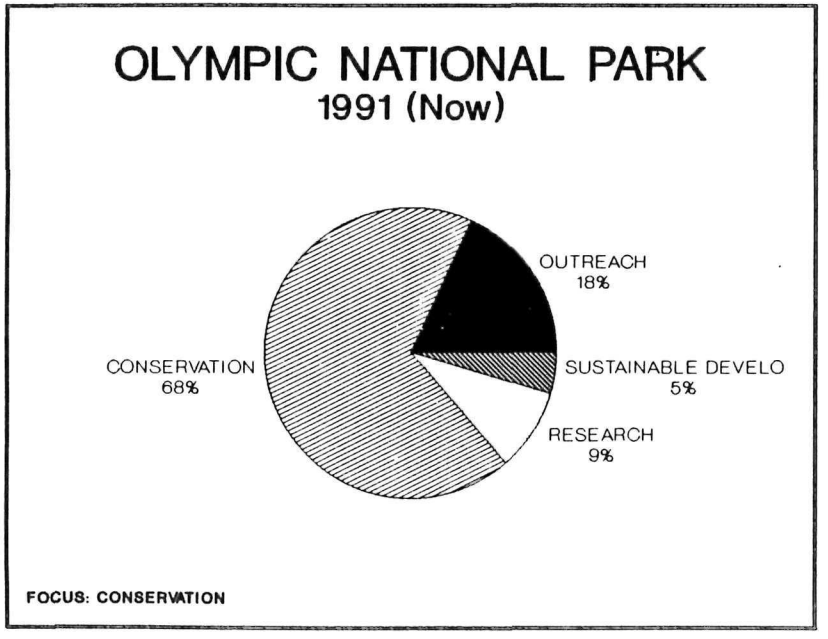
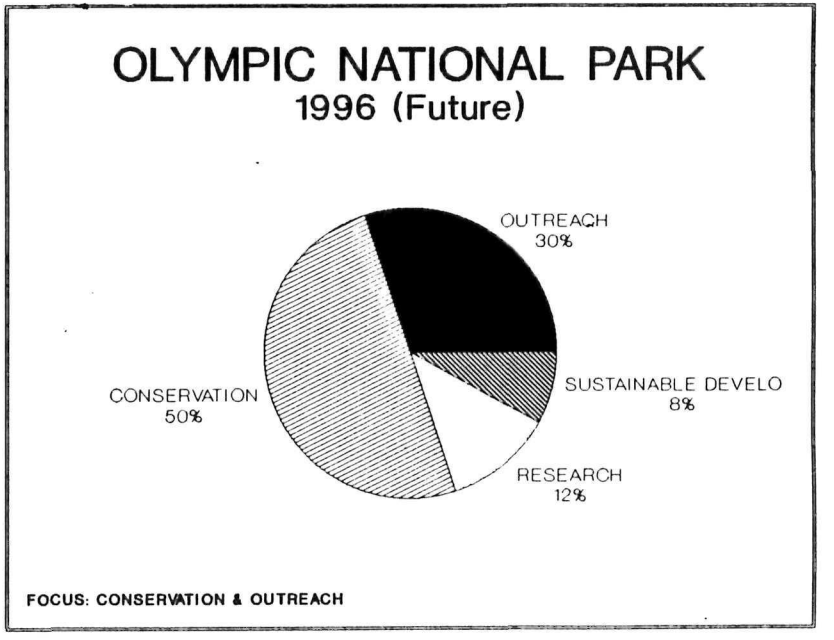
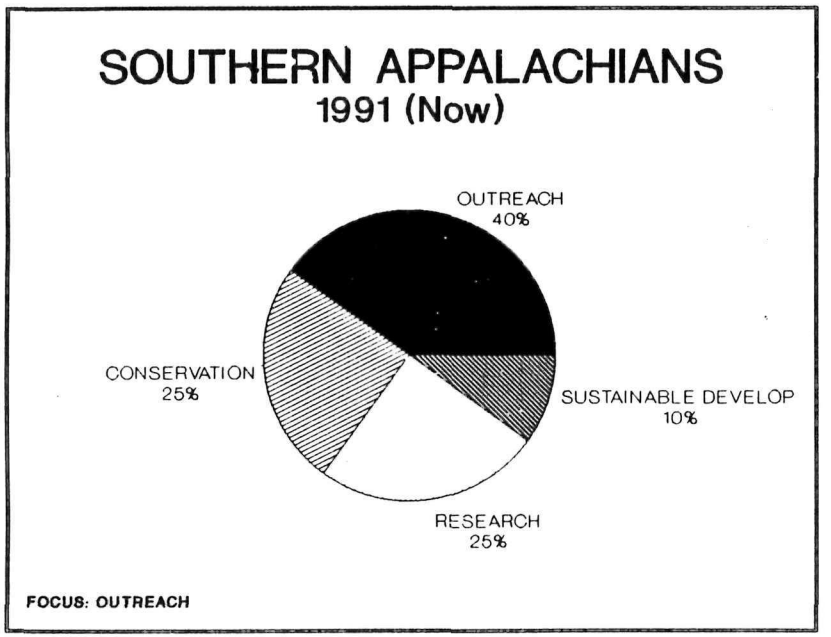
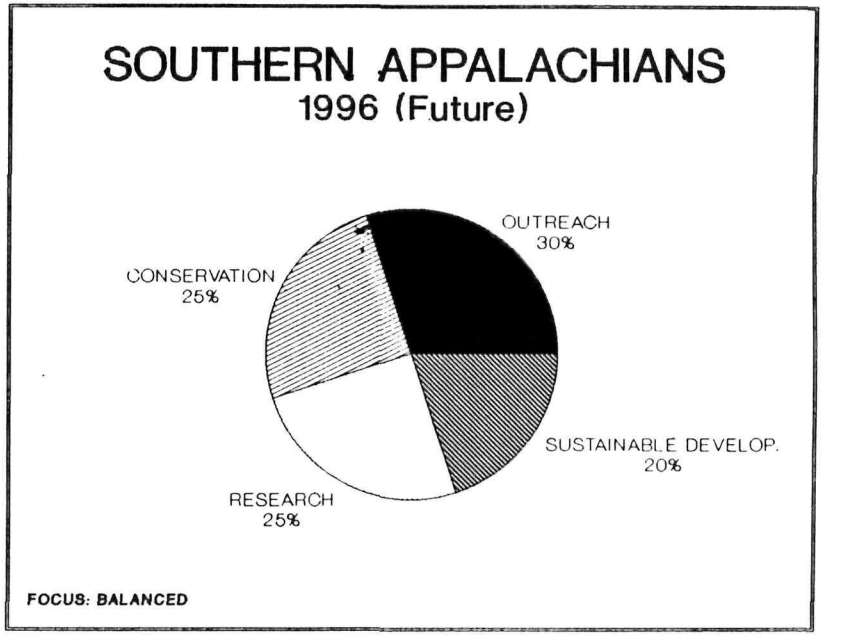

OLYMPIC NATIONAL PARK
1991 (Now)
OUTREACH
18%
SUSTAINABLE DEVELO
5%
RESEARCH
9%
CONSERVATION
68%
FOCUS: CONSERVATION


OLYMPIC NATIONAL PARK
1996 (Future)
OUTREACH
30%
SUSTAINABLE DEVELO
8%
RESEARCH
12%
CONSERVATION
50%
FOCUS: CONSERVATION & OUTREACH


SOUTHERN APPALACHIANS
1991 (Now)
OUTREACH
40%
CONSERVATION
25%
SUSTAINABLE DEVELOP
10%
RESEARCH
25%
FOCUS: OUTREACH


SOUTHERN APPALACHIANS
1996 (Future)
OUTREACH
30%
CONSERVATION
25%
SUSTAINABLE DEVELOP.
20%
RESEARCH
25%
FOCUS: BALANCED