

THE MAB PROGRAM: What It Means To The World And To NPS

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In essence, MAB is a way of approaching problems that recognizes the intimate interrelationship that exists among natural ecosystems, human behavior and value systems, and the advancement of human civilization. It takes full cognizance of a world increasingly dominated by our human species, which alone possesses the intelligence to sustain the world indefinitely or to alter, perhaps forever, its resource-providing ability. MAB operates on the premise that an understanding of these relationships must underlie any attempt at problem management.

Most institutions, governmental and non-governmental, have been established to pursue sectorial objectives and their survival depends on how well these usually short-term objectives are achieved. Given this framework, institutions tend to cooperate with one another only to the extent they can do so without appearing to compromise their objectives. The long-term public interest often takes a back seat to the short-term interests of individual institutions, especially if these are able to control allocation of material and fiscal resources. Yet national governments and intergovernmental organizations like the United Nations are duty-bound to further the broad public interest in ways that satisfy immediate material and social needs without compromising the future. Few would disagree that the track record in this direction has been less than exemplary. Despite enormous material productivity, the quality of human life in much of the world attests the failure of traditional institutions to deal with population growth, environmental pollution, mismanagement of natural ecosystems, and inequitable distribution of resources.

To deal with such growing disasters in numbers and on a scale unprecedented in the history of the human race will require balanced problem-solving approaches, the necessary first step to which is more and better information. Without such information, problem-solving becomes guesswork, bias enters the picture, and mistakes are too frequently assured. In addition, information must be available at the right time and in intelligible form if it is to be used effectively.

MAB RATIONALE

MAB was established 10 years ago by the United Nations Educational, Social and Cultural Organization (UNESCO) to improve the use of the natural and social sciences in helping governments deal with growing environmental and resource management problems. It developed in a climate of heightened public awareness that these problems, left unchecked, would threaten the well-being of human civilization, if not its very survival. This same climate heralded a new U.S. era of governmental concern and the creation of new laws and institutions to protect the environment and prevent hazards to the health and well-being of people. It also resulted in a new awareness of the need to balance environmental, social, and economic considerations in reaching decisions.

The National Environmental Policy Act (NEPA) of 1969 set the tone. It required Government to "utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and decision making which may have an impact on man's environment." The essence of MAB is to help provide the government-connected scientific support necessary to implement this policy, at all levels including the global scale. It is the science/government tie that offers the next toehold by which rational, science-based intelligence may further penetrate the public decision-making process.

ROOTS IN THE IBP

Many of the people involved in MAB's early planning also were involved in the International Biological Program (IBP), the first international effort to apply the principles of the rapidly evolving science of ecology toward improving our understanding of how the world's major ecosystems are structured, how they utilize energy, and how they metabolize the chemical constituents of the environment.

Although IBP is now history, its "big biology" approach firmly established the ecosystem as a basic unit of study in ecology, supplementing the traditional emphasis on populations and communities. In so doing, it gave us a new conceptual framework for assessing natural and human-caused changes and new tools for land management, many of them involving use of the computer.

In some respects, MAB is the successor to IBP. However, it differs importantly in its strong problem-solving orientation (vs. IBP's emphasis on basic studies); its focus on the interplay between natural resources, human activities, and human value systems (vs. IBP's predominant emphasis on natural systems); and the involvement of both the scientific community and the users of scientific information — particularly government administrators at all levels of organization (vs. IBP's management by scientists.)

Thus, although MAB has roots in IBP and deals with many of the issues that mission-oriented institutions do, it is one of the few scientific organizations in the world that operates as a voluntary cooperative effort between government agencies and the scientific community. It exists for the primary purpose of enabling effective communication between scientists of different disciplines and between scientists and decisionmakers.

UNIQUE ORGANIZATION

MAB's global program is given general direction by an International Coordinating Council (ICC), which meets annually to review accomplishments, recommend priorities, and coordinate activities. It contains representatives from UN organizations (such as FAO and UNEP), nongovernmental organizations (such as the IUCN), and some of the national MAB committees from participating countries. These committees, now operating in 101 nations, consist of scientists, government officials, and conservation organization representatives. They operate autonomously within the broad ICC framework, and often cooperate on regional and global scientific and education projects of common interest.

The ICC has established 14 MAB project areas: 1 through 7 deal with the structure, function, and resource management problems of the world's major natural ecosystems; 9 through 14 deal with human influence on these ecosystems. Project 8 — perhaps most active and visible at present — deals with the conservation of genetic and ecological resources and establishment of a global system of Biosphere Reserves for long-term monitoring and problem-oriented research.

In the U.S., directorates have been established for 12 of the 14 MAB projects. Similar situations exist in the Soviet Union, the Federal Republic of Germany, and other countries. Day-to-day administration is performed by MAB secretariats. A small secretariat within the U.S. National Commission for UNESCO at the State Department provides financial and administrative support to the MAB directorates for help in research, publications, workshops, etc.

In the U.S., as in most countries, Federal agencies are the lifeblood of MAB. Its ability to support better management depends upon the willingness of these agencies to participate in planning and developing projects and to contribute toward their financing. Support for MAB has grown steadily. The 35-member U.S. National Committee now contains representatives from 10 Federal agencies; additional membership on MAB directorates brings Federal agency participation to 19. Nearly all U.S. agencies responsible for natural resource management and environmental protection are taking part in the development of MAB, but participation in the funding is less universal.

FINANCIAL SUPPORT

Federal agencies can support MAB in three ways: First, through internal means such as direct funding of MAB publications, workshops, etc., or by allocating personnel to be used by MAB in furthering an agency's mission; second, through financial or personnel assistance to the U.S.-MAB Secretariat or to the international Secretariat in Paris; third, by supporting the MAB Consortium, which awards research grants for projects that further the missions of participating agencies and MAB project directorates.

The Department of State, the Forest Service and NPS have been the principal agencies staffing and funding the U.S. MAB Program. The Department of State provides office space and funding for the MAB Secretariat and funds for MAB workshops, publications and research through the directorates. The Forest Service provides funding, details a full-time position to the Secretariat, and presently is the major contributor to the Consortium. The NPS has long supported all of MAB's institutions. Between 1973 and 1978, it detailed a position to the MAB Secretariat in Paris to help develop the Biosphere Reserves project. In 1979, it established a MAB Coordinator position in the Washington office to promote use of MAB within the Service and other bureaus, to plan and coordinate MAB's Biosphere Reserves project, and to work with field offices in developing strategic science programs for the NPS-administered Biosphere Reserves. Since 1975, the Service has directly supported domestic and international workshops related to development and scientific use of the MAB Biosphere Reserve network, and to various joint NPS-MAB publications. In FY 1981, the NPS supported both Secretariat-administered projects and the Consortium. Funds from MAB's three principal supporters, plus some additional funds, gave U.S.-MAB a total operating budget of about \$930,000, enough to conduct significant work but hardly sufficient to make MAB a major influence in today's major resource management decisions.

NEW OPPORTUNITIES

In 1979, the Forest Service entered a partnership with MAB by establishing a consortium linking the agency with several MAB project directorates. The purpose is to award relatively long-term grants for the kinds of research not easily carried out by the agency itself. Particular emphasis is placed on multidisciplinary, problem-oriented research dealing with the interplay between human activities and natural ecosystems and often involving collaboration between investigators in two or more countries. (The Consortium, in these cases, pays for the U.S. side of the project.)

The intent is to focus scientific attention on problems of interest to the Forest Service and thereby to develop new approaches to complex forest management problems of regional, national, and international importance. The Consortium thus provides a new avenue for research funding, and for the Forest Service an opportunity to improve the coverage and impact of its research program. By pro-

viding peer review of submitted proposals, MAB helps assure high quality research and maximum problem-solving effect.

In March 1979 Office of Management and Budget (OMB) and the Office of Science and Technology Policy issued a joint memorandum supporting the MAB concept and assigned responsibility for international coordination to the Department of State and for domestic coordination to the Departments of Agriculture and the Interior. The memo directed various Federal agencies to work together on a plan for developing and using MAB's capability. To implement the memorandum at Interior, the Secretary assigned lead responsibility to the Asst. Sec. for Fish & Wildlife & Parks and he encouraged and provided oversight for MAB development.

In 1980, NPS, Heritage Conservation and Recreation Service (HCRS) and the U.S. Fish and Wildlife Service (USFWS) strengthened their support of MAB by signing the Consortium Charter, which contains a provision that signatories will provide funding to the extent of their ability. The three bureaus together matched the contribution of the Forest Service in FY 1980 and planned to do so again in FY 1981, although USFWS withdrew support at the eleventh hour because of budget cutbacks.

In the past two years, 26 projects totalling about \$1 million have been funded by the Consortium. The majority of projects interest more than one agency, enhancing the overall cost effectiveness. In FY 1981, 7 of the 10 funded projects were relevant to the NPS mission, and 4 are being carried out wholly or partially in NPS Biosphere Reserves. Since NPS provides only 21 percent of the funding, the Service investment is expected to be highly cost effective.

A good probability is that State's Agency for International Development (AID) will join the Consortium, substantially increasing funding and providing additional support for bilateral projects. Some of these will likely be cooperative projects involving NPS biosphere reserves. At this writing, although individual agency contributions fluctuate, the trend seems to be toward progressively increasing agency support.

THE GRANT PROGRAM

All natural and social scientists, in and out of Government, are eligible to compete for Consortium research funds. However, in FY 1982, Federal employees will be required to develop proposals cooperatively with one or more scientists in private institutions; the Consortium will make no awards to Federal agencies. Grants will be for periods of up to three years in amounts not to exceed \$60,000 total. The grants will be for problem-oriented research, for resource inventories and monitoring undertaken as part of such research, as well as for innovative syntheses of scientific information focused on major current resource management policy issues. Preparation of plans, guidelines, handbooks, and similar non-research proposals will not be considered.

FY 1982 guidelines for grant applications are available from the Regional Chief Scientists. The deadline for submission of proposals to the MAB Secretariat is January 29. Awards will be made in June 1982.

THE MAB ARGUMENT

The MAB Program, as typified by the Consortium, is dedicated to effective use of national and international scientific and resource management capabilities to address problems of interest to domestic Federal agencies. It is not a foreign assistance program; it is not in any way controlled by international organizations. It does not require contributing agencies to lose control of their funds.

On the contrary, MAB provides a way for agencies to buy into a cost effective approach to solving problems through cooperation. It provides a means to develop new methods and perspectives with important bearing on future policies and operations. It provides a reasonable counterweight to the overwhelming tendency to focus scientific and management activities on immediate or short-term problems—often when it is either too late to solve the problem or too costly to afford the solution. Through a small investment, MAB can focus the collective wisdom of government, resource managers, and scientists in ways that can bolster our confidence and help us face up to the immense problems immediately ahead.

BIOSPHERE RESERVES

The benefits of science in supporting wise stewardship depend increasingly on how well we are able to understand complex cycles and trends, to compare these cycles and trends in selected locations, and to predict the effects of alternative land management and development policies. Because of the rapid pace of landscape alterations, our options are fast being foreclosed. Decisions on where we intend to collect baseline ecological data to support such scientifically based stewardship must be made quickly.

Biosphere Reserves and other protected research sites will play increasingly important roles as focal points for scientific studies. The 193 Reserves designated to date by UNESCO in 50 countries constitute the only internationally recognized system of conservation areas that have a common mission to carry out long-term research on the interrelationships between human activities and the world's major ecosystems.

The ideal Biosphere Reserve consists of a large conservation area (or core zone) for long-term baseline monitoring and one or more adjoining buffer zones where experimental manipulations may be scientifically studied and compared

with the core. In the U.S., this condition has been difficult to achieve, and the U.S. network consequently consists of Reserves managed primarily for one purpose or the other. Most of the nation's major biomes have at least one Reserve of each type, but they are far from adequate to represent the diversity work site requirements within major biomes.

MAB has begun a systematic effort to evaluate potential sites in each biome and complete the U.S. network by 1984... no small task. Most of the 36 existing U.S. Biosphere Reserves are managed by the NPS (15) and the Forest Service (14). Qualifying Federal sites do not exist for many of the still unrepresented ecosystem types, and future expansion will have to focus more on sites under state, local, and private administration. Biosphere Reserves consisting of multiple sites under the same or different administrators are likely to become the rule. A precedent for this type of reserve was set recently by the nomination of the 12-unit Big Thicket National Preserve.

The NPS's Biosphere Reserves are large, natural areas, most of which have long histories of monitoring and research, in-house scientists and resource management specialists, and some scientific support facilities. All are beset by threats—an average of 35 per Reserve, according to the 1980 State of the Parks Report. They represent exceptional sites for long-term baseline studies, for research and development projects in ecosystem modeling, resource inventory, monitoring, research and data management; for professional training and public education relating to major environmental issues, and for cooperative activities with other agencies and bilateral projects with other nations.

In the last few years we have begun the groundwork for these kinds of actions by soliciting the broadest possible involvement from the scientific community and other agencies to develop programs for the Reserves.

PROTOTYPE STUDY

In August 1980, a prototype study was begun in Great Smoky Mountains NP Biosphere Reserve to develop a comprehensive assessment of available data bases, facilities, existing and planning research, and opportunities for interinstitutional cooperation to detect and deal with ecosystem management problems. The Service contracted with Southern Appalachian Research and Resources Management Cooperative, a linkage of Federal agencies and southeastern universities, to prepare a four-phase assessment, completed in October 1981. An annotated bibliography for the park and its immediate vicinity was developed; a preliminary summary of the coverage, methods, and importance of available literature on particular subjects was prepared and the package was sent to leading authorities for review and recommendations.

The overall effort involved more than 90 scientists and provided a comprehensive, updatable reference on scientific activity in the park, as well as a framework for developing a phased, balanced science program. Similar assessments are planned in FY 1982 for Isle Royale, Glacier, Channel Islands, and Organ Pipe Cactus Biosphere Reserves. Initial assessments are being funded by the NPS Washington office, in cooperation with regional and park staffs and will be used with resources management plans to support programming of work from both WASO and field sources.

Progress on other fronts includes elaborate pollutant monitoring in the Great Smoky Mountain and Olympic Biosphere Reserves, and ecosystem modeling as a management tool. Major bilateral projects are underway or planned with Canada, Mexico, and the Soviet Union. Cooperative programs are operating between the Olympic and Cascade Head Biosphere Reserves in pollutant monitoring and between the Great Smoky Mountains and Coweeta Reserves in nutrient cycling and wild boar ecology. Public communication was the subject of a MAB workshop in July 1981, and recommendations to improve the use of the Reserves in providing information will be available soon.

GENETIC DIVERSITY

Two major MAB-sponsored conferences being convened to address the growing problems relating to conservation of genetic resources are discussed in detail elsewhere in this issue.

The workshops bring together for the first time at the national level scientists and managers to develop the basis for dealing with what may be the most significant problem facing the world for the remainder of this century. The all but certain need for more active management of genetic resources and environments to prevent extinctions, to reintroduce extirpated species, and to maintain the vigor of plant and animal species will have profound implications for NPS policies and management techniques, not to mention the impacts on our relationships with the public.

MAB is facilitating cooperation between the NPS and other institutions, both domestically and internationally, by using science to address problems of common interest. By providing access to vast interdisciplinary scientific resources, MAB can substantially augment NPS policy-making and problem-solving capability. Biosphere Reserve status will increasingly draw scientific attention to our finest park units, encourage their evolution into world centers for improving knowledge of natural ecosystems, and assure their sustained conservation for the overall advancement of human civilization.

Gregg is MAB Program Coordinator and this article is background to MAB Notes—a sometime feature of Park Science.