

The Champlain-Adirondack Biosphere Reserve

William P. Gregg, Jr.

Abstract. The Champlain-Adirondack Biosphere Reserve provides a framework for cooperation in obtaining, sharing, and applying information to address resource issues in the Adirondack Mountains and the Lake Champlain Basin. The Biosphere Reserve is part of an international network of 311 sites in 81 countries being developed through the Man and the Biosphere Program of the United Nations Educational, Scientific, and Cultural Organization (UNESCO). Biosphere reserve status recognizes the region as a "landscape for learning," in which programs to improve understanding of the relationships between people and their ecosystems help the region find ways to meet human needs while maintaining natural ecosystem functions and the region's biological heritage. The international network offers opportunities to share experience with ecologically similar biosphere reserves in other countries that are working to demonstrate sustainable approaches in ecosystem management.

William P. Gregg, Jr.,
is Coordinator of the
Man and the Biosphere
Program for the
National Park Service
in Washington, D.C.

BIOSPHERE RESERVES: INTERNATIONAL RECOGNITION, LOCAL CHALLENGE
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The Adirondack Mountains and Lake Champlain Basin are interlinked biogeographical

regions of remarkable natural diversity, scenic beauty, and unique cultural history. Healthy ecosystems are vital to an economy in which forest products, recreation and tourism, hunting, and sport fishing are mainstays. The contemporary landscape mosaic of natural communities and human uses reflects the intimate, ever-changing relationships of people with the land and the Lake over the centuries. These relationships have influenced the character of human communities in which tradition, self-reliance, and regional pride are important values.

In the Adirondacks, the 2.5 million-hectare Adirondack Park is widely recognized as a model for integrating conservation and development of public and private lands through coordinated state and local planning and regulation. The Champlain Basin exemplifies bi-state cooperation in conserving the smallest of the Great Lakes through sustainable uses of the surrounding watershed and the lake itself under a bi-state Cooperative Agreement on the Management of Lake Champlain. The State of Vermont, which is responsible for the eastern half of the watershed, is recognized for its comprehensive statewide regulations on land use planning, environmental protection, and development of natural resources. Both regions have a long history of citizen participa-

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tion in decision making processes. Both face significant environmental, land use, and socioeconomic problems due to competing demands for land and water resources. Conservation of the region's rich biological heritage is increasingly problematic as a result of loss of natural habitats, especially from conversion to residential uses, the stresses of regional air pollution and acidic deposition, and the potential effects of climate change.

These regional characteristics and conditions make the Adirondacks and the Champlain Basin among the best places in the world to demonstrate ecosystem management. Ecosystem management is a process for using the ecosystems of a region to meet human needs for energy, materials, social interaction, and aesthetic environments in ways that sustain natural ecosystem functions and biological diversity in a changing environment. The process requires the best possible scientific information on interacting natural and human systems, and use of the latest information technologies to develop models of these systems at different spatial and temporal scales. It requires the participation and cooperation of all levels of government, non-governmental organizations, land managers, scientists, economic interests, and local citizens. In large

regions like the Adirondacks and the Greater Yellowstone Area, consensus among competing interests on goals and strategies for ecosystem management can be difficult to achieve. Biosphere reserves serve as "landscapes for learning" in which many stakeholders help build an improved understanding of the relationships between people and ecosystems. Biosphere reserves improve the basis for reaching consensus by expanding the constituency for the information upon which ecosystem management goals and strategies are based.

In designating the Champlain-Adirondack Biosphere Reserve (CABR), UNESCO recognized the accomplishments of the people and institutions of the Adirondack Mountains and the Lake Champlain watershed in biological conservation, integrating conservation and development, and developing the knowledge, skills, and public attitudes to make ecosystem management possible. In applying for the designation, the administrative authorities responsible for planning and management of the biosphere reserve acknowledge their responsibility to pursue the broad objectives of biosphere reserves, contained in UNESCO's Action Plan for Biosphere Reserves (UNESCO 1984). These objectives emphasize development, sharing and applica-

tion of information and management technology, and local participation, to help solve conservation and development problems. They encourage cooperative research, educational, and demonstration activities that support the process of regional ecosystem management. In accepting the designation, responsible authorities also acknowledge their responsibility to participate in the international biosphere reserve network. This participation may involve sharing of information and management experience with other biosphere reserves; and involvement in international research on major environmental issues, such as global climate change.

A BRIEF HISTORY

Biosphere reserves are an integral part of UNESCO's Man and the Biosphere Program (MAB). UNESCO launched MAB in 1971 to provide an intergovernmental framework for demonstrating harmonious relationships between human societies and Nature (UNESCO 1971). One of MAB's 14 original projects focused on the conservation of natural areas and the genetic resources they contain. An important component of the project called for the establishment of a network of biosphere reserves for conserving the characteristic ecosystems of each of

the world's biogeographic provinces, with the goal of establishing one or more biosphere reserves in each of the world's biogeographic provinces, as identified by Udvardy (1974). Each biosphere reserve includes one or more strictly protected core areas—such as the “forever wild” areas of the Adirondacks—for ecosystem conservation and as benchmarks against which to assess the ecological effects of human activities in the surrounding area. UNESCO recognized from the start that the integrity of the core areas depends upon the types, intensities, and patterns of human uses in the surrounding areas. Biosphere reserves provide for inclusion of areas where these uses can be managed to achieve ecosystem management goals.

UNESCO encourages national MAB organizations to pursue three roles in developing biosphere reserves (UNESCO 1984, 1987):

- To help strengthen the conservation of ecosystems, biological diversity, and genetic resources (the conservation role)
- To provide an operational base and facilities for monitoring and research, and to communicate information through the international network (the logistic role)
- To help integrate environmental concerns and the development of land and water resources (the development role)

Nations have complete flexibility to implement these roles in ways appropriate to their particular situations. In most countries, includ-

ing the United States, biosphere reserves have no independent legal status and rely on the authorities of their administrators and cooperating entities to plan and implement biosphere reserve programs. These voluntary programs emphasize collection, sharing, and application of information, and development and testing of appropriate technologies, to solve practical management problems. They do not infringe on the management prerogatives of the participants.

to this need.

Because few administrative areas are able by themselves to implement all biosphere reserve roles, many administrative areas often participate as cooperators in biosphere reserve programs. For example, the Central California Coast Biosphere Reserve in the greater San Francisco area includes 13 designated areas under Federal, state, local, or private administration, including four new areas added in 1992.

Expansion of an estab-

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From 1976, when the first biosphere reserves were designated, through the mid-1980s, UNESCO selected biosphere reserves primarily on the basis of their capability to implement the conservation and logistic roles. Many national parks and experimental research areas were designated as biosphere reserves during this period. In recent years, international concern over the sustainability of resource management and economic development practices has increased the need for areas that can serve as models for developing the theory, and demonstrating the practice, of ecosystem sustainability. Recent designations, like the Champlain-Adirondack Biosphere Reserve, therefore have placed greater emphasis on this role in response

lished biosphere reserve is easy to accomplish. Any administrative area can petition for international designation as a unit of an existing biosphere reserve to recognize its role in the biosphere reserve program. Such designations not only expand the geographic area of the biosphere reserve, they also help solidify support for biosphere reserve programs.

In 1980, the U.S. MAB Program began a systematic effort to fill the gaps in the U.S. biosphere reserve network. Expert panels were assembled to review the terrestrial biogeographical provinces represented in the United States in order to identify administrative areas that could serve as hubs for developing biosphere reserve programs. A separate ini-

tiative was begun for coastal and marine areas. In 1986, a U.S. - Canadian panel reviewed the Lake Forest Biogeographical Province (U.S. Canadian Panel on Biosphere Reserve Selection 1986). The province includes a vast region of mixed coniferous and hardwood forests along the international boundary from western Minnesota to the Maritime Provinces. Within the province, the panel identified six regions, including the Champlain Basin-St. Lawrence Valley; and, within each region, administrative areas for consideration in developing a biosphere reserve nomination. The Governors of New York and Vermont subsequently convened a bi-state task force to review the recommendations for the Champlain Basin. The task force recommended nomination of a 4 million hectare biosphere reserve including the Adirondack Park in New York, and, in Vermont, the summits of Mt. Mansfield and Camel's Hump and four wilderness areas in the Green Mountains. The remainder of the U.S. portion of the Champlain Basin and some lower watershed areas adjoining the west side of the Adirondack Park were included in a large zone of cooperation.

Following UNESCO's approval of the Champlain-Adirondack Biosphere Reserve in 1988, an interim steering committee of government agencies, academic institutions, and non-governmental organizations from the two states and the Canadian Province of Quebec began planning the biosphere reserve program. A feasibility study, commissioned by the steering committee and com-

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formed the Southern
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(SAMAB)
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objectives.”

pleted in 1991, identified various options for organizing a regional program (Northrup and Muyskens 1991). The Committee subsequently recommended establishing a separate coordinating organization for the Adirondacks and the Champlain Basin. Each organization would facilitate the participation of agencies, organizations, universities, citizens groups, and other stakeholders in the program. The proposed organization for the Adirondacks is under state government review. The State of Vermont coordinated a regional workshop in mid-1993 to recommend program goals and organization for the Champlain Basin program.

<p>EXPERIENCE FROM SOUTHERN APPALACHIA</p>
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As the administrative organization of CABR takes shape, experience gained by a contemporary biosphere reserve offers insights into some of the possibilities. In 1988, seven Federal agencies formed the Southern Appalachian Man and the Biosphere (SAMAB) Cooperative, the first organized cooperative program in the United States to implement biosphere reserve objectives. The SAMAB program focuses on providing a framework for addressing resource problems in a region that includes five biosphere reserve units—a national park, two experimental research areas, a state park, and a private nature reserve—and a zone of cooperation that includes parts of seven states. During its first five years, one state agency and two additional Federal

agencies have joined the Cooperative; a non-profit Foundation has been established to facilitate private sector funding and support; and informal ties have been established with citizen groups, academic institutions, and industries. The Cooperative has established interdisciplinary committees for research, resource management, environmental conservation and education, cultural resources, public information, and sustainable development. A formal relationship with a regional network of universities is being developed, and community chapters of SAMAB are being planned to facilitate citizen participation. The SAMAB stakeholders have cooperatively planned and arranged funding for numerous projects that support ecosystem management and constructive action on regional issues. Examples include:

Community Development. One of SAMAB's first projects was development of a model plan, widely distributed in the region, to assist small communities in their efforts to encourage sustainable, ecologically based tourism.

Biodiversity. A SAMAB research partnership is assessing the effects of forest fragmentation as a factor in declining populations of neotropical migratory birds that breed in the region.

Air Quality. SAMAB has convened regional forums on air quality management of Class I areas; symposia for local government leaders to foster local support for cooperative approaches for air

pollution control; and coordination of a strategic plan for air quality monitoring and research.

Forest Ecosystems. SAMAB is coordinating a multi-agency forest health monitoring and landscape ecology program to monitor ecological change in Southern Appalachia in cooperation with the Forest Service and EPA's Environmental Monitoring and Assessment Program. SAMAB has held forums, prepared educational materials (video, poster, teachers' guide, and brochure) to help the region respond to dogwood anthracnose, a fungal blight that threatens the flowering dogwood, a species of both symbolic and economic importance to the region.

Special Interest Species. SAMAB sponsored an Emmy award-winning documentary on the restoration of the endangered red wolf to the Southern Appalachians, a viewer's guide for teachers that was widely distributed before the production was aired on regional television, and a poster that was sent to all local schools and public libraries. SAMAB also sponsored a review of the status of the brook trout, the region's only native salmonid, with a focus on factors in an estimated 75 percent reduction in the species' original range. The review identified many considerations in species restoration and recommended needed research.

Annual Conference. Since 1990, SAMAB has sponsored an annual science conference to focus on current research, management,

educational and demonstration activities relating to regional environmental problems.

Education. SAMAB prepared and distributed a regional directory of educational and training opportunities in environmental education, and developed a water education program curriculum targeted on elementary schools.

Awards and Promotion. SAMAB sponsors annual "Friends of the Biosphere" awards to recognize the individual and the organization whose activities best exemplify SAMAB ideals. SAMAB was nominated for the President's Conservation and Challenge Award, which recognizes accomplishments in integrating conservation and economic development. The program was cited in the Council on Environmental Quality's 21st annual report to Congress as an example of regional cooperation to support ecosystem management. SAMAB has prepared a variety of materials to communicate its mission, programs, and accomplishments to a wide range of audiences (quarterly newsletter, promotional brochure, slide program, video [in preparation]). Program representatives have gone on the road at home and abroad to present the SAMAB model in other regions interested in exploring opportunities for organizing programs to support ecosystem management.

INTERNATIONAL LINKAGES

A major benefit of biosphere reserve designation is the

opportunity to share knowledge and experience with ecologically similar areas in other parts of the world. The temperate forest ecosystems that characterize the Champlain-Adirondack Biosphere Reserve are particularly well represented in the international biosphere reserve network. EuroMAB, an association of MAB organizations from Europe and temperate North America, recently launched the Biosphere Reserves Integrated Monitoring Program (BRIM) to strengthen cooperation among the biosphere reserves in Canada, the United States, and 30 European countries. BRIM's first project is a directory of EuroMAB biosphere reserves, scheduled for publication in mid-1993. The directory provides a contact for each national biosphere reserve program and for each biosphere reserve. It also identifies research priorities and summarizes the results of a survey of scientific activities, infrastructure and facilities for each biosphere reserve. Of the 176 EuroMAB biosphere reserves, 119 or 68 percent are located in three biomes: the temperate broad-leaf forest (64), temperate needle-leaf forest (8), and mixed mountain systems with complex zonation (47). Many of these biosphere reserves have robust scientific capabilities. In view of its complex topography and its location at the ecological interface between the North American broad-leaf and needle-leaf forests, the Champlain-Adirondack Biosphere Reserve has a potential stake in cooperation with many of these biosphere reserves. Linkages with biosphere reserves in eastern Europe and

Russia could be especially useful in comparative studies of the effects of atmospheric pollutants, acidic deposition, and global climatic change, as well as comparative research to support integrated management of forest and lake ecosystems. Other ongoing EuroMAB projects of potential value to the Champlain-Adirondack Biosphere Reserve include the testing of database structures for biological inventories based on adaptations of protocols now in use in the National Park System (Gregg, Serabian, and Ruggiero 1993), and development of a metadatabase on permanent vegetation plots.

THE FUTURE

The challenge of organizing and implementing a biosphere reserve program is formidable and long-term. Yet the potential benefits are enormous. Biosphere reserves offer the opportunity to participate in a unique intergovernmental network that facilitates cooperation at appropriate scales for addressing the interrelated issues of biological diversity, ecosystem sustainability, and global change. These are the issues likely to pose the greatest management challenges in the next century. They are priorities in contemporary ecosystem science (Lubchenco et al. 1992), the major themes of MAB (UNESCO, MAB International Coordinating Council 1993) and primary challenges of integrated ecosystem management (Risser and Lubchenco 1992). Effective action to address these issues requires cooperation at the

regional landscape scale—i.e., in biogeographic regions delineated on the basis of their suitability for understanding interacting biological, physical, and human systems, and for involving local people, agencies, and institutions, and many different management units, as partners in ecosystem management. The same issues require unprecedented international cooperation in sharing scientific data and practical management experience. Because many of the world's outstanding centers for ecological research are already designated as biosphere reserves, biosphere reserves are logical areas for international scientific cooperation on regional and global issues. Such cooperation will eventually link individual biosphere reserves to form international terrestrial and coastal-marine networks for detecting, understanding, predicting, and ultimately determining how to manage for ecosystem change.

Worldwide interest in biosphere reserves is increasing. Biosphere reserves figure prominently in international discussions on developing a global terrestrial observation system for obtaining ecological data on regional and global change. A biome-based network of circumpolar biosphere reserves is being established (UNESCO MAB Northern Sciences Network 1992). Several countries, including Australia, Canada, and the United Kingdom have prepared national biosphere reserve plans. U.S. MAB is also developing an action plan for the U.S. biosphere reserves. Cooperative biosphere reserve programs are helping their participants ad-

dress local and regional issues in many countries, including the United States. Individual biosphere reserves, designated years ago, are exploring ways to implement biosphere reserve concepts in cooperation with neighbors.

The Champlain-Adirondack Biosphere Reserve is the largest biosphere reserve in the United States, and the sixth largest in the world. The scale is assuredly adequate to implement biosphere reserve roles and address major regional and global issues. The CABR program now being organized has the potential to expand coordination of scientific and educational activities to address these issues, and improve the access of participants to scientific information. The program is coming on line at a time when the need for the CABR, the opportunities for cooperation, and the practical benefits of cooperation for the people of the region have never been greater.

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Upper
Au Sable
Lake

Gary
Randorf