WORKSHOP ON INTERNATIONALLY DESIGNATED PROTECTED AREAS

John Marsh, Workshop Chair

Introduction

The aim of this workshop was to identify actions that could be taken by CNPPA to support the creation, management and public understanding of internationally designated protected areas. Types of PAs for potential discussion included: World Heritage, Biosphere Reserve, Ramsar sites, transborder parks, twinned parks, as well as the Biodiversity Convention.

Twelve people participated in the workshop, namely: Bruce Amos, Robert Cahn, Harold Eidsvik, Arlin Hackman, John Marsh, Adrian Phillips, Jillian Roulet, Goetz Schuerholz, Jim Thorsell, Edgar Wayburn.

The chair summarised the objectives of the workshop, stressing the need for a limited number of feasible actions that CNPPA members would take responsibility for. A structure for considering roles for CNPPA in internationally designated PAs was offered, indicating the potential to look at PA designation or management, by country as internationally etc. This led to giving priority in discussion to World Heritage, Biosphere Reserves and the Biodiversity Convention. To initiate this discussion, short presentations were provided by: Jim Thorsell, Hal Eidsvik, Jillian Roulet and Bruce Amos. Some 20 possible actions were suggested, but only 10 are recommended, and several of these are immediate, simple, one person actions.

Actions

1. CNPPA will cooperate with governments in updating the indicative lists of potential world heritage sites, with special reference to the Arctic. (Arlin Hackman, 2 years)

2. Noting the World Heritage Committee wants advice on North American sites in 1996/97, CNPPA will help the World Heritage Centre develop monitoring methods, especially for World Heritage sites. (Harold Eidsvik, 2 years)

3. CNPPA will organise, with partners, a workshop to consider cultural landscapes and their relation to natural heritage. (John Marsh, 2 years)

4. CNPPA will urge the Bow Valley Task Force to solicit broad Canadian input and recognize global values. (Now)

5. The CNPPA Global Steering Committee will invited to consider a theme program on Biosphere Reserves, similar to that for World Heritage. (David Sheppard, now)
6. CNPPA will encourage North American participation in the World Conservation Congress workshop on Biosphere Reserves. (Bruce Amos, now)

7. The CNPPA Chair will urge the Director General of IUCN to encourage the parties to the Biodiversity Convention to take advantage of the World Conservation Congress to further implementation of the Convention. (Adrian Phillips, now)

8. The CNPPA will urge the use of one World Conservation Congress workshop for reviewing the report of the Task Force on PA System Planning, and its relevance to article 8 of the Biodiversity Convention. (Bruce Amos, now)

9. It is suggested that CNPPA participate in the forthcoming Ramsar conference, in Brisbane, and elaborate an agreement between CNPPA and Ramsar to facilitate communication and cooperation. (Adrian Phillips, now)

10. In support of training advocated in the CNPPA Strategic Plan, CNPPA North America will lead the global task force on training for PAs. (John Marsh, 3 years)
WORKSHOP ON PARKS [AND PROTECTED AREAS] FOR PEOPLE

Chair: Brent Mitchell
Rapporteur: Linda Hamilton
Members: Bruce Downie, Ken East, Bob Gamble, Don Gordon, Sergio Graf, Glen Hvenegaard, Ignacio March, Alan Moore

Protected Areas professionals and other conservationists are increasingly realizing the importance of building local support. Four of the seven characteristics of our changing world listed in the CNPPA Strategic Plan relate to challenges to address the needs of people and communities in and near protected areas.

Protected areas cannot continue to be viable without broad public support. Such support can be built by demonstrating real values and benefits for local communities and beyond.

While conflicts will inevitably arise, it is imperative that institutions concerned with protected areas management develop the capacity to facilitate meaningful public participation in protected areas conservation. Protected areas and human communities can learn to work together for mutual benefit, and the process can be promoted through assistance with information and skills training transferable from similar situations elsewhere.

Guidelines

A growing body of literature on public participation in resource management is not adequately available or interpreted for effective use by protected area managers and conservationists.

ACTION -- CNPPA-NA members will start a communications network of CNPPA members and others interested in protected areas and people. (The network will be informal at first, using electronic means where possible.) A core group will identify more focused areas of interest, including the process of reviewing and analyzing case study experiences in public participation in Protected Areas, which will contribute to the development of guidelines (or best practice principles) for PA managers and communities around the world.

Ken East, with Bruce Downie and Brent Mitchell
First communications in January, on-going

Additionally, Brent Mitchell will work with WCMC to develop a proposal to publish highlights/findings in a form of practical use to protected areas managers.

Local/Regional Economies

Regarding values of protected areas, managers need improved methods to evaluate, describe and promote positive economic (and cultural/social) benefits for local communities. Protected Areas managers should move towards a holistic approach to local communities interaction, including addressing, in appropriate areas, societal needs such as health, education, and small business development. They should fit this into a regional development context when possible. Innovative strategies to support rural development of extremely poor areas through Protected Areas may be needed. Managers must also be prepared to deal with deleterious economic activities such as excessive tourism.

ACTION -- CNPPA should establish and fund the proposed Tourism Task Force and include in its mandate to provide guidance on the special advantages and disadvantages of differing kinds of tourism activities in and near protected areas, and "best practices" for guidelines for protected areas managers. CNPPA-NA members will help identify potential Task Force members and develop a mandate for the group.

Glen Hvenegaard with Bruce Downie, by October 1996.
Training and Exchange

CNPPA should identify and promote training opportunities in the area of working relationships between protected areas and local communities. Training should be explored in sustainable resource use systems, emphasizing personal experience and problem-solving exchanges. Exchanges should include not only protected areas managers but local community partners as well.

Models/Frameworks

CNPPA should explore ways to protect and enhance cultural as well as natural diversity.

ACTION — North American members will establish contact with the CNPPA Task Force on System Planning to encourage the development of a systems planning model which recognizes the value of culture and promotes cultural diversity.

Ken East by December 1995

“Institutional Culture” Change

Since the internal philosophy of institutions concerned with Protected Areas management is a powerful force to stimulate and support—or discourage—productive interaction with local communities, CNPPA should call for and facilitate dialogue at the top levels in North American institutions, and get “success stories” to the decision makers who can use them.

Regarding the “institutional culture” of IUCN itself, members in the workshop expressed concern at the growing relationship of IUCN to multi-lateral development agencies such as the World Bank and recommend a thorough review of these relationships.

Further recommendations:

IUCN should develop a “skills bank” whereby members can easily identify members with expertise in public participation and other issues. A key word should be “community participation.” This could begin with a database of CNPPA members.

IUCN should foster better exchange among Commissions, many of which relate to issues of local communities. Ignacio March will work as a liaison with the Species Survival Commission. Don Gorden will contact the Communications Task Force to encourage development of communications pathways on this topic.
MISCELLANEOUS PAPERS PRESENTED IN TOPIC WORKSHOPS

27. Protected Areas on the High Seas and the Case for Marine Wilderness
28. Overview of Mountain Protected Areas and Mountain Initiatives Leading to and Furthering Agenda 21
29. The Yellowstone to Yukon Biodiversity Strategy
30. Highlights of Current Work and Opportunities in Atlantic Canada
31. Protected Areas and the Bioregional Management Challenge
32. Reporting on the State of the World's Heritage: A Response to Stress
PROTECTED AREAS ON THE HIGH SEAS
AND THE CASE FOR MARINE WILDERNESS

MAXINE MCCLOSKEY

As we consider marine environments as potential protected areas, on the high seas and within Exclusive Economic Zones (EEZs) of coastal nations, we must be mindful of the effects of harsh human hands on the land and take care in a timely fashion that those same wasteful and destruc

The Commission on National Parks and Protected Areas of the World Conservation Union (IUCN) adopted a revised Framework for the Classificat

According to the U.S. Wilderness Act of 1964 (P.L. 88-577), wilderness is defined as: "A wilderness, in contrast with those areas where man and his works dominate the landscape, is hereby recognized as an area where the Earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain."

Since enactment, the wilderness system has grown more than tenfold to 38,153,000 hectares in 553 units. Alaska has the most—22,964,000 hectares in 48 units. The largest is Alaska's Wrangell-St Elias National Park and Preserve of 5,631,470 hectares (USFS, 1993). Management regulations of these wilderness units prohibit roads, commerce, structures, and mechanical activities, with few exceptions. The Alaska national park units allow continuation of subsistence use.

After passage of the 1964 Wilderness Act, the first reference to applying the concept of wilderness to coastal and high seas areas was contained in the recommendations of a special U.S. Panel on Oceanography (President's Science Advisory Committee, 1966). The report says, in part:

Establishment of a system of marine wilderness preserves [would be] an extension to marine environments of the basic principles established in the Wilderness Act of 1964 that would provide ecological baselines, preservation of unmodified habitats for research and education, and marine wilderness recreation.


The Third World National Parks Congress, held in Bali, Indonesia, in 1982, and sponsored by the IUCN Commission on Parks and Protected Areas, devoted considerable time to exploring many aspects of coastal and marine environments, including legal, management, biological, economic, and recreational aspects (Salm, 1984).

A significant step towards the recognition of marine wilderness was taken at the 4th World Wilderness Congress, held in Colorado, United States, in 1987, and sponsored by the Interna-
tional Wilderness Leadership (WILD) Foundation. A special workshop on ocean conservation recommended that each nation develop a system of marine protected areas that should include wilderness. The term was defined as:

Marine areas where little or no evidence of human intrusion is present or permitted, so that natural processes will take place unaffected by human intervention.

Wilderness values can apply to both the high seas and to the spaces within national EEZs.

The oceans differ markedly from the lands, especially in that most of the living biomass is concentrated in the relatively narrow euphotic layer at the top and is drifting or swimming about in constant motion. On land, most of the biomass is at the bottom of the ocean of air and is relatively fixed to the substrate. There are fewer sharp boundaries at sea than on land. The water column is composed of layers at different depths that differ in temperature, salinity, oxygen content, nutrients, etc. These layers are in constant motion. On the high seas, all but the narrow photic layer are in total and perpetual darkness. Pollutants, as well as nutrients and other substances, can be carried over vast areas by the drifting and mixing mechanisms.

On land, wilderness areas help to maintain the geophysical equilibrium, water and air quality. They serve as nurseries and refuges for wildlife, maintain biological diversity, and have scientific, moral, historic, aesthetic, spiritual, recreational, educational, social, and personal values. While all of these values can apply to marine environments, those dealing directly with the physical and biological attributes are the most compelling: scientific research, refugia for species, gene banks for diversity, and as controls against which to measure what is happening in non-wilderness areas.

The moral arguments are just as compelling for ecosystems in the oceans. People don't have the right to manipulate every last hectare or resource on the planet for their own desires. Marine ecosystems have the same right to exist as do those on land. Furthermore, we don't know enough to assess what harm may be done by high levels of exploitation.

Those values that are related to human considerations (e.g., aesthetic, spiritual, educational, and recreational) also apply to some marine habitats.

On considering the potential for marine wilderness, our first thoughts are of extensions from the land (i.e., sea level or the wave-filled surface). But how can there be wilderness values on the ocean surface when the view from sea level, coastal promontories, or the air shows a flat sameness that changes mostly from changes in weather conditions and light? Storms, however, add exceptional drama. Except for birds and surface-dwelling marine mammals, sea turtles, and fields of sargassum, the exhilarating variety of life forms is masked, for the wonders are below the surface of the sea.

Among other protection categories, there is potential for wilderness on the seabed—the continuation of land above sea level that becomes deeper as the distance from shore lengthens, finally dropping off the continental shelf. This extension of land underwater—or submerged land—becomes more manageable from the standpoint of setting metes and bounds and limiting or prohibiting certain human activities. The healthy seabed, particularly in shallower areas, contains a great mix of plant and animal life that thrives on the nutrient-rich soup of the sea. Of interest also is the three-dimensional nature of the marine environment: People, animals, and plants can move about within it. People are much more aware of their movements underwater in a complex of biological activity within changing environments than they are when moving within air overlaying land.

The water column also contains numerous species of plants and animals moving about in the currents. Some species are highly migratory, while others are dependent on the vital characteristics of more restricted areas such as food, temperature, salinity, and protection. Here are a
few examples of the kinds of marine features that merit protected status:

- **Open Seas and Coastal** - Places of vast plankton blooms or vast swarms of krill; rooted sargassum beds and drifting mats; calving and feeding grounds of great whales; routes of highly migratory species; seabed areas of unusual scientific interest, such as at current convergence, tectonic rifts, geothermal vents, and deep trenches (the reverse of mountain peaks and ranges on land); and sea mounts that support rich biological communities.

- **Coastal** - Nursery areas of great and small whales and other marine mammals; unusual seabed formations (e.g., mounts and canyons; areas where currents converge; areas of significant endemic populations; essential habitats of threatened or endangered species; nurseries for commercially valuable fish stocks; areas of exceptional biological diversity; areas of exceptional scenic values; representative areas; marine areas adjacent to protected areas on land; and submerged aquatic vegetation (seagrass) beds.

There are at least three approaches to managing marine wilderness. The first would be a system similar to that for managing existing designated terrestrial wilderness. That is, there would be maximum restrictions on human activity on, above, and under the seabed, in the water column, and on the surface and should apply to commercial exploitation of living resources as well as to exploration or mining for oil or minerals. There should be no dumping, incineration, cable laying, energy development, dredging, or any other conceivable human exploitative use.

Air over designated wilderness should be protected from pollution, just as attempts are made to prevent pollutants from drifting over designated terrestrial wilderness. There is a ready example in a number of areas of Australia's Great Barrier Reef Marine Park, where regulations extend to 300 meters below seabed and 900 meters above sea level.

Size, location, and sensitivity of the wilderness units would also dictate the degree of recreation permitted. Regulations consistent with terrestrial wilderness would prohibit the use of mechanized recreation equipment. Regulated sport fishing could be allowed. There should be restrictions on anchoring, especially in biologically rich coastal areas. Nature study and appreciation would continue and would be encouraged. High seas recreation would no doubt be limited to sailing.

A second management scheme would provide fewer restrictions on the use of the overhead water column. The closer to the surface, the lesser the restrictions (i.e., comparable to restrictions in the air over terrestrial wilderness). The problem here is that the transmission efficiency of water is 800 times that of air. Anything done at the top of the water column is likely to affect the bottom. This system could be applicable only to the high seas where biological resources are fewer compared to those of the continental shelves.

The third approach suggests that restriction of activities in a marine wilderness be tailored to the biological richness and diversity of the area, with the most stringent restrictions applied in those areas showing the greatest complexity (McConnaughey, 1989). For example, in identified rich photic areas, regulations should prohibit any human use except for benign research under permit and benign recreation. Less rich areas would allow some additional human uses. This type of management would be more suitable to photic zones of the continental shelves. However, there are other criteria besides richness and diversity. Some important communities that may not be rich biologically should still be reserved for wilderness, such as canyons and sea mounts. Representative areas of abyssal plains would also be valuable. These might be areas analogous to desert on land, which certainly have their own recognized biotic and scenic values. New re-
search indicates a “surprising congruity in global-scale patterns of diversity between surface and deep-sea biotas” (Rex, 1993).

Regardless of which management approach would be adopted, the present internationally accepted right of free passage of merchant and military vessels would probably continue in effect. By contrast, Australia worked with the International Maritime Organization (IMO) to stop both shipping and fishing in one area of 3,000 square kilometers of the Great Barrier Reef considered to be a particularly sensitive area. Ship passage in designated wilderness needs thorough analysis and consultation with the IMO.

Wilderness boundaries, as well as boundaries of other categories of protection, would be entered on all marine and air navigational charts. They could actually be marked on the seabed, although this may be impractical.

Coastal nations have sovereign authority over their territorial sea (usually up to 12 miles seaward), and they can regulate all economic uses in the area between the territorial sea and the outer boundary of the 200-nautical-mile EEZ, except that passage of ships cannot be prohibited. It is clear that coastal nations now can establish marine wilderness areas and enforce regulations within the EEZ.

A number of nations have already established programs for designation and management of marine protected areas within their territorial seas and the EEZ. These are called marine sanctuaries in the United States. However, a marine sanctuary is not wilderness as we know it. The largest marine area in the United States is Monterey Bay Marine Sanctuary along the central California coast. Established in 1992, it comprises 4,095 square nautical miles.

Australia has many wilderness areas (called marine national park zones) in the Great Barrier Reef Marine Park, which covers an area of 345,000 square kilometers (140,000 square miles). All extractive activities and structures (except buoys) are prohibited. Australia has also established several preservation zones within the four sections of the Great Barrier Reef Marine Park. This is a strict designation, not even allowing benign recreation, so it is not exactly wilderness, as the term is usually understood.

Adjacent coastal nations could agree to establish protected areas within their EEZs that contain shared special natural values. Examples would be extensive coral reefs, nurseries for valuable fish, nurseries and breeding grounds for marine mammals and birds, and routes of highly migratory species.

The open or high seas is the second element in understanding jurisdiction. The problem is that no nation can regulate the uses of the high seas by others; a single nation can only regulate the activities of its citizens, corporations, and flag vessels.

Two or more nations could, however, agree by treaty to regulate activities of their own nationals, corporations, and flag vessels on the high seas that they have agreed to designate for some protective status. The prohibitions on activities and enforcement would apply only to their people.

The United Nations (UN) could assume authority to study, plan, and recommend establishment of a global system of marine protected areas that should include wilderness. Such a program could be adopted by the member nations. However, this is easier said than done. The UN has already sponsored the Law of the Sea Treaty (LOS), which contains provisions that would allow the LOS International Seabed Authority to place parts of the high seas floor off-limits for minerals extraction if exploitation poses an environmental threat. After a dozen years, this convention is expected to go into effect in 1994 when the required 60 nations have ratified it. If the major powers do not ratify it, they will be unable to exert their influence on its administration. The close of the Cold War, and the realization that commercial exploitation of deep seabed minerals is many decades away, may influence them to ratify the convention. They should. Its presently limited provisions on protected areas could be amended to provide for a comprehensive program of marine protected areas.
Four previous actions by nations illustrate that combined efforts can protect the marine environment. The first is the International Convention for the Prevention of Pollution from Ships (MARPOL), concluded in 1973. It aims to eliminate all intentional discharges of pollutants by vessels and reduce the risk of accidental discharges.

The weakness of this or any treaty agreement is that it only applies to those nations that have ratified it and have taken steps to implement and enforce it. The agreement has no enforcement over nations that are not signatories. Companies that wish to avoid these restrictions can just change their ship registrations to non-signatory countries.

The second is the declaration of the Indian Ocean as a whale sanctuary by the International Whaling Commission and its new, endorsed concept, which would declare the circumpolar Southern Ocean south of 40 degrees S as a whale sanctuary for 50 years.

The third recent action was the adoption of four resolutions by the UN General Assembly (in 1989, 1990, 1991, and reaffirmed in 1992) that all nations agree to a moratorium on all large-scale pelagic drift net fishing on the high seas by 31 December 1992. While the drift net moratorium is now in effect, a number of pirate driftnetters are operating in the Pacific Ocean and in the Mediterranean Sea.

Fourth, in June, 1991, the eight Arctic nations agreed to adopt the Arctic Environmental Protection Strategy. It emphasizes the need to study and monitor the impact of pollution on fragile Arctic ecosystems. Initially, its declaration did not include protected areas, but now there is a commitment to planning.

Some additional existing international programs offer limited opportunities for establishing protected marine areas:

1. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) of 1979 applies to marine animals but does not require establishment of protected areas, although it refers to the necessity of protecting habitats. Many important coastal nations have yet to ratify this convention, including most of the countries of North and South America.

2. The Regional Seas Program is sponsored by UN Environmental Programme. A number of regional seas have been established, but all are limited to nations' EEZs. These conventions allow for protocols on environmental protection, as was adopted by the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region.

3. The UNESCO program on Biosphere Reserves applies primarily to land. A recently designated biosphere reserve is the first to combine ocean, island, coast, and land areas. It is the Central California Coast Biosphere Reserve of 340,000 hectares. Biosphere reserves are managed by each country using its domestic authorities.

4. The 1980 Convention on the Conservation of Antarctic Marine Living Resources (held in May, 1980) is a landmark in international conservation law, as it takes an ecosystem approach, linking species exploitation to ecosystem conservation. It includes a provision that the Commission might designate special areas for protection and scientific study, thus establishing reserves for protecting ecosystems, species or habitats, even on the high seas. A protocol to the Antarctic Treaty was signed on 4 October 1991 that bans mining activity in the Antarctic.
region for at least 50 years and designates Antarctica as a "natural reserve, devoted to peace and science." Only five of the 26 Consultative Parties have ratified the protocol.

3. The IMO, which regulates many aspects of shipping and dumping from vessels, also has a program of identifying special areas and particularly sensitive sea areas. It can designate areas to be avoided for safety and/or environmental protection (IMO, 1991).

It is time to press for an international program with authority to establish a system of protected areas on the high seas and on the continental shelves. At the same time that mapping, research, inventorying, and technological developments for exploitation of marine environments move forward, there should also be development of criteria and planning for designation and protective regulation of significant ecosystems and critical areas in the oceans. Such a scheme should include wilderness on and under the seabed, in the water column, on the surface, and in the overhead air.

There is a strong argument for giving priority to the continental shelves. They are much richer biologically and more severely impacted by human actions (GESAMP, 1990). In addition, it is easier for individual and adjacent nations to exert the authority they already have.

It is only a matter of time before the high seas receive the burden of human activities like the continental shelves already do. Concerned people must start learning more about the problems of the high seas and searching for legal mechanisms for addressing the problems on an international basis. The Ocean Governance Study Group recently said, "... it is time for a new vision of ocean governance—a vision that looks at our ocean as a whole and not solely at its discrete parts" (Cicin-Sain, 1992).

People of the world cannot allow the same diminution of the viability of the world's oceans, already underway, which continues to occur on land. We must rally international energies to convince nations and international agencies that the mysteries of the seas are worthy of protective programs.

REFERENCES


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The oceans and reefs of the world have the charismatic Jacques Cousteau to capture the imagination and the support of the public, and thus eventually the political process that works toward their conservation. Wild animal life had Walt Disney to popularize it and/or over-popularize it; then on a more professional level, --Aldo Leopold and Gerald Durell. Lowland tropical rainforests have their well-known champions influencing popular opinion in persons such as Norman Myers, John Seed or perhaps David Attenborough. But who is the spokesperson for mountains who can move hearts and minds to action for their conservation and sustainable development? Mountains, though having grandeur, mystery, prominence and even sacredness have not captured public nor political attention as a focus for concern and action. Without an illustrious, persuasive spokesperson, mountains have languished as a discrete topic of major public concern.

The constraints to sustainable use of these dynamic, "fragile", three-dimensional earth features have not been recognized. Most mountain development, some of it quite ecologically, culturally and economically catastrophic, has been planned and initiated by "flatlanders" in government offices, corporate boardrooms and donor offices in major cities of the plains and sea coasts.

Within the last four or five years however, there are some indications that the public and the politicians are beginning to be concerned. Their attention has not been commanded by any one "mountain leader," nor by the voices of the many gods and ancestors that dwell in the holy mountains around the world. Rather it has been a gradual dawning of comprehension brought about by the combined efforts of a lot of hard-working scientists and managers. Mountain men and women scholars have almost by tradition and temperament been "loners", but through professional interchange at meetins such as this one, a community of scholars and interested persons has developed, and I strongly believe we are on the verge of a breakthrough. Or at least, as Sherlock Homes would utter: Watson, the game's afoot."

Perhaps it had its beginning with Carl Troll, and a small but growing band of researchers who began to focus on the mountain as a physical unit for study. The history of the fledgling field of mountain science has been traced by Ives and Messerli (1990) and the collaborative attempts to meld science and application described by Ives (1989). Throughout the period since 1973 , the UNESCO MAB program, and later the UN University, were significant players. In the Himalayas-Hindu Kush, a major leap forward
occurred in 1984 when the International Centre for Integrated Mountain Development began operations in Kathmandu, Nepal to work with eight countries of the region. This grew out of the UNESCO activity in mountains. A highlight occurred at Lake Mohonk Mountain, New York in 1986 in an amalgam of science, management and policy focused on the "Himalaya-Ganges Problem," to be followed by the landmark book "The Himalayan Dilemma" by Ives and Messerli (1989). A major breakthrough has come however, in June 1992, at the UN Conference on Environment and Development in Rio de Janeiro, with the adoption of Chapter 13 of Agenda 21, under the title "Managing Fragile Ecosystems: Sustainable Mountain Development." Some of the important events and actions leading to this landmark action and follow-up are briefly described in what follows. The role played by those dealing with mountain protected areas is highlighted.

Let me treat these activities using some visual material showing recent publication on various aspects of mountain environments that seem to be moving the global community of NGOs, managers, general public, and politicians toward a significant leap in mountain awareness.

Colored overhead transparencies:

1. Mountain people have elicited much fascination on the part of mountain visitors and even lowlanders who have never experienced mountains. It is true that over many years there have been many books on particular ethnic groups designed for popular or semi-popular audiences, for example, on the Sherpa of Nepal or the mountain farmers of European Alps. But not long ago a book edited by Michael Tobias (1986) titled "Mountain People" brought together beautiful pictures and well-written text in a global context. Groups discussed in the book range from the "hillbillies" of the US Appalachian Mountains through the Kalash Kafirs of the Hundu Kush to the Ik (or Kwarikik) of Uganda. Strangely, Europe is not covered in this book. This book is helping to engender a realization that mountains worldwide have many "people problems" in common, requiring international efforts at solutions.

2. In 1990 a splendid book dealing with the sacred and metaphysical aspects of mountains appeared. Edwin Bernbaum's superbly illustrated volume on "Sacred Mountains of the World" (1990) takes readers to the most revered peaks on earth. It brings into the public arena along with scientific information on mountain use and degradation, a much needed element if we are to include cultural values along with economic and biophysical values. It is an important contribution in the struggle to influence the way seemingly heedless people treat the mountain environment. In the establishment of national parks or other protected areas, the taboo or reverence has often been the raison d'être, or at a minimum, has assisted greatly in securing official protection. P.H.C. "Bing" Lucas, Vice Chair of CNPPA/IUCN, has pointed out that the national park concept was first crystallized
in New Zealand with the gift from the Maori people of the sacred Tongariro Mountain (Lucas 1993).

3. Also in 1990, the first publication of a new Protected Area Program Series from IUCN appeared, dealing with the topic of transfrontier protected areas (Thorsell 1990). It was entitled "Parks on the Borderline". Border parks are not the exclusive domain of mountains, since rivers also form many national boundaries, but mountains are often national boundaries of some "tension" because of their more remote, less controlled frontier. They often therefore lend themselves to transboundary peace parks. The publication lists 70 tranfrontier parks involving 65 countries, and a subsequent inventory of mountain border parks by Thorsell and Harrison (1993) gave 24 pairs of parks, with a minimum relative relief of 1,500m and a minimum size of 10,000 ha. (If these constrains were relaxed, there would be many more which people generally consider mountain transfrontier reserves.) Interest in this topic seems high, and places as far apart as Nepal/China and the mountains of the Czech and Slovak Republics are featured in "local" publications. Here is shown a recent one entitled "Frontier Parks in Czechoslovakia" by Čeřovský, Povolný and Urban (1991). A mountain transboundary protected area workshop will be held in the Australian Alps in November 1995, bringing together 28 pairs of park managers from 21 countries, co-sponsored by the Mountain Theme of CNPPA and the Australian Alps Liaison Committee.

4. In October of 1991, 41 protected area managers, administrators and scientists with experience in over 30 countries around the world came together in Hawai'i Volcanoes National Park under the aegis of the East-West Center to share their expertise and to develop a set of Guidelines for Mountain Protected Areas. These were developed by a set of 10 working groups, and synthesized into a publication which is No. 2 in the IUCN Protected Area Programme Series (Poore 1992). The 161 terse guidelines have been well received, and the publication has been translated into Russian by Yuri Badenkov and Olga Galtseva. Translation into Spanish occurred in 1994 (Fundación Peruana para la Conservación de la Naturaleza), and it has just last month been published in Japanese (Nature Conservation Society of Japan). Jim Thorsell of IUCN has produced a slide program illustrating many of the guidelines, and has presented this, as I have also, to many audiences around the world. Most recently, this was shown last month at a conference in Japan to discuss how to arrest the deterioration of Mount Fuji, the symbol of that country.

5. Another product from this East-West Center meeting was the publication Parks, Peaks and People (Hamilton, Bauer, and Takeuchi 1993). This work contains 22 papers that were presented or tabled at the consultation including the landmark paper reporting on the present status of the world's mountain protected areas: some 442 areas embracing 243,159,476 ha (Thorsell and Harrison 1993).

6. Meanwhile a small, international team within the International Mountain Society
was working to establish a global network of mountain researchers and managers. IMS publishes Mountain Research and Development, a fine journal, and occasionally a World Mountain Network Newsletter as funds permit.

A sub-group, calling itself "Mountain Agenda" became determined to put mountains on the political agenda of the UN Conference on Environment and Development in Rio de Janeiro. The individuals were from the following organizations: University of Berne, University of California at Davis, International Centre for Integrated Mountain Development in Kathmandu, Russian Academy of Sciences, Swiss Development Cooperation, East-West Center, and one individual in a private capacity who had previously worked with the 1972 Stockholm Conference on the Environment. This group planned and published in time for the Conference a short, popularly-written and well-illustrated booklet entitled "An Appeal for the Mountains" (Mountain Agenda 1992) that was put into the hands of every delegate to UNCED. Concurrently, the group planned, commissioned reports, and produced a book on "The State of the World's Mountains" (Stone 1992). Although done hastily in the short time available to produce a book before the Rio meeting, it has a wealth of information, even if incomplete. It came off the press only two weeks before UNCED, and was made available to each of the delegations. Thanks to these documents and to the diligent and time-consuming efforts of three people in particular, Jack Ives, Bruno Messerli, and Jayanta Bandyopodhyay (who shepherded draft texts through several UNCED preparatory meetings, and then went to the Rio meeting with the books), an item on mountains was adopted without dissent in Agenda 21, and appears as Chapter 13.

It now behooves the mountain community to pick up the Earth Summit challenge. It does little good waiting around for the politicians and donors to come up with the US$330 million per year ($50 million from international sources) mentioned in the document. Those of us who love or work in mountains must seek every opportunity to improve our knowledge base, to establish networks or collaborative working relationships with other mountain men and women, and to place before the public at every opportunity the appeal for a more science-based, ecologically gentler, and culturally sensitive approach to using, developing, and protecting mountain environments.

7. Several recent developments to this end are significant. The African Mountain Association which was founded in 1986 in Addis Ababa, has shown increasing vigor, and in March 1993 organized a meeting with UNU/IMS/IUCN/Swiss Development Cooperation. Coming out of this is a commitment to a six-year "Mount Kenya Ecology Project" and a resolution putting forward this mountain as a World Heritage Site. In May 1994 an East Asia-Pacific Mountain Association was launched with a secretariat at Lincoln University in New Zealand. The University also established simultaneously a new Regional Center for Research, Education and Training for Mountains and Steeplands. An Andean Mountain Association was launched in April 1995 at a meeting held at Lake Titicaca in Bolivia.
8. The European scene is also animated, and only a few of the many activities will be mentioned. There is, of course, the Alps Convention, which attempts a more holistic international approach to a mountain range. An AlpAction program has been put in motion by Prince Sadruddin Aga Khan's Bellerive Foundation. ICALPE, the International Centre for Alpine Environments was initiated six years ago, and together with the Centre of Alpine Ecology (Italy) has formed a European Economic Interest Grouping under the European Union. In September 1992, a conference on Biodiversity Conservation in Mountain Ecosystems of the Balkans was held at Ticino park, Milan, organized by the International National Park Documentation Center (CEDIP) and the IUCN East European Program. An Association of Carpathian National Parks and Protected Areas has been formed as a regional NGO with its secretariat in the administration of the Tatra National Park (Slovakia). Two years ago I helped to sponsor a meeting in the Czech Krokonoš National Park on National Park and Biosphere Reserve Monitoring and Management where a proposal for an International Center for Research and Information on the Hercynian Mountains was developed.

9. Again, on a global level in 1994, along with two colleagues from the University of Hawai'i and the International Institute of Tropical Forestry, I produced a state-of-knowledge assessment about tropical montane cloud forests. This contains a synthesis, location maps, research needs, management responses to threats, and 24 technical papers on these important mountain ecosystems with their fog water capture function and high biotic endemism. This was published in January 1995 by Springer-Verlag (Hamilton, Juvik and Scatena, 1995). It calls for a major international campaign to protect the remaining cloud forest fragments throughout the world, in parks and reserves. And IUCN has just published a booklet in the Focus Series calling for assistance in mountain cloud forest conservation (Hamilton, 1995). The World Conservation Monitoring Centre has just received support from IUCN Netherlands to initiate in November 1995 a status study and cloud forest atlas. The Mountain Theme will cooperate.

10. And finally there is the formal follow-up to Agenda 21, called Mountain Agenda. An Interagency UN Task Force was established with FAO as lead agency and FAO's Tage Michaelsen as Focal Point. IUCN is represented on this by Jim Thorsell and myself. This Task Force has stimulated 1) an International Mountain NGO meeting (Lima, Perú, February 1995) to bring this needed non-government input; and 2) a series of regional intergovernmental meetings to develop regional strategies and promote national sustainable development plans for mountains. Two of these have been held so far, one for Asia in Kathmandu and one in Lima for South America. An African meeting is planned for April 1996 in Ethiopia and two meetings are on the docket for Europe in 1996, one in May in Scotland and one in September in Italy. North America has not yet begun to stir, and attempts to find a sponsor/organizer so far have not borne fruit. Are there suggestions? The NGO meeting resulted in the establishment of an International NGO Mountain Forum, and
the planning meeting for this organization has just occurred the last week of September at The Mountain Institute in West Virginia, USA.

It is essential therefore, more than ever, to knit together through communication, all of the individual pieces of action that are taking place, so that we can draw encouragement by seeing a larger picture, --one that is not unsubstantial. Hence this long paper inflicted on you. I personally am encouraged by what I see being undertaken by men and women, singly or in collaboration, to advance the understanding of mountain environments, and the need to treat mountains in a more holistic manner than we have in the past. Protected areas in the uplands are a key element in this, and it is the role of the Mountain Theme of CNPPA to assure that this element is kept in the circuit, on the planning table. Mountain Protected Area Network members are encouraged to get involved. Write articles, initiate workshops, seminars and conferences, influence the political process, and in general help to make mountain environmental needs more visible and tangible to lay persons, to other professionals and to decision makers. We need spokespersons for the mountains.

References


Presented at the Meeting of North American Members, Commission on National Parks and Protected Areas, IUCN (World Conservation Union); Banff National Park, Canada, October 14-19, 1995.
The Yellowstone to Yukon Biodiversity Strategy
By Harvey Locke
October, 1995

The Yellowstone to Yukon Biodiversity Strategy is a vision for the future of the wild heart of North America. It is rooted in conservation biology and love of wild beauty. When realized, there will be a series core protected areas, connected by movement corridors for wildlife, surrounded by buffer zones from the south end of the Greater Yellowstone Ecosystem in Wyoming to the north end of the Richardson Mountains in Yukon Territory. Recent research on animal movements and conservation biology theory indicate we must think on this scale if we are to sustain viable populations of large carnivores.

The core protected areas will provide large, secure refuges for all native species and accommodate non-industrial human use consistent with the refuge goal. The corridors will ensure the landscape is permeable so there are no barriers to genetic exchange among sub-populations of any species. The buffer zones will allow for human use of increasing intensity as one moves away from the core areas. Near core areas, buffer zones will allow a variety of low intensity uses such as restricted access, low density oil and gas wells, livestock grazing, selective timber extraction, roadless mining, hunting and fishing. Outer buffer zones will allow more high intensity human uses like internal combustion recreation, large scale mining, oil and gas processing facilities, intensely managed agriculture, and, on their outer edge, cultivation-based agriculture.

1 Locke, H. “Preserving the Wild Heart of North America”, Borealis, Spring, 1994
Noss, R.F. Maintaining Ecological Integrity in Representative Reserve Networks, World Wildlife Fund Canada, January, 1995
The area encompassed by the Yellowstone to Yukon vision includes the mountains and valleys of western Wyoming, Idaho, western Montana, the east and west Kootenay, the Robson Valley and the Northern Rockies of British Columbia, the Eastern Slopes of Alberta, and the southeastern Yukon to the north end of the Richardson Mountains.

These mountains and valleys are synonymous with wildlife and wilderness throughout the world and contain some of the most beautiful scenery on earth. The wild places of Yellowstone to Yukon have provided spiritual and emotional inspiration to native people, members of North America’s industrial society and others from every continent through the opportunity to experience unspoiled nature. The national park idea was first realized in Yellowstone. World Heritage Sites have been declared in Yellowstone and in Banff, Jasper, Kootenay and Yoho National Parks in the Canadian Rockies.

The Yellowstone to Yukon biodiversity strategy will build on existing strengths of the region. A series of core protected areas (some with serious management problems like Banff National Park) already exist in the Greater Yellowstone, Crown of the Continent, Greater Purcells Columbia Mountains, Cariboos and Central Rockies and Greater Jasper ecosystems. Further large core areas are needed in the Muskwa-Kechika area of the Northern Rockies of British Columbia and the Wind, the Snake and the Bonnett Plume drainages of the Yukon. Other small but no less significant core areas are also needed in Alberta’s montane ecoregion and in riparian and interior old growth forests in the east and west Kootenays and in the Robson Valley of British Columbia.

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2 This area is expanded from the area discussed by Locke (note 1, supra) as a result of a workshop of biologists and conservationists at Kananaskis, Alberta in December, 1994
3 To identify these ecosystems see C. White, D. Gilbride, M. Scott-Brown, and C. Stewart, Atlas of the Central Rockies Ecosystem, Komex Consultants, 1995
4 See “The Northern Rockies: Muskwa-Kechika Wilderness: The Big “E””, Borealis, Fall 1994
Our objective is immediate implementation of the Yellowstone to Yukon vision over the short term. Pressing needs include addressing and solving management problems in existing core areas and securing an undisturbed land base for the needed additional core areas. Also, there is a pressing need to find and implement a means to reduce wildlife mortalities and to eliminate the barriers to wildlife movement caused by the eight permanent highways and rail lines which run east-west across the Yellowstone to Yukon area.

The Yellowstone to Yukon biodiversity strategy is among the largest scale conservation initiatives ever undertaken in settled North America. However, if we are to ensure the long-term viability of large carnivore populations and the persistence of wilderness, it must be realized. If we cannot save wildlife and wilderness in the Yellowstone to Yukon region of Canada and the United States, there is little hope for them in the world.
My presentation this morning will provide a cursory overview of a few initiatives that are being pursued in Atlantic Canada. Some of these may have broader application at the North American level.

At the outset, I should note that research and monitoring in our region has developed in an opportunistic manner. In this regard, we have been particularly well served in that a number of university staff and researchers from other federal government agencies have sought to pursue research in large part due to the long term protected status of the parks. There is certainly a dependence on other agencies to undertake significant benchmark monitoring relating to atmospheric and aquatic monitoring. The first impacts of reductions in federal budgets are now being felt with the initial withdrawal of selected hydrologic monitoring stations. Discussions are ongoing on how best to provide a continuance of these essential services.

One of the significant developments over the past two years is the development of a Science Strategy for the region. The purpose of this strategy is to deliver improved and more credible science to aid managerial decision making. Specific elements of this strategy are as follows:

1. **Establishment of a Regional Science Advisory Board** - This will serve to monitor the ecosystem science program including review of research proposals. The board will be comprised of line managers, Park Ecologists, a Chief Park Warden, a Superintendent and two external representatives from universities or ecological research agencies.

2. **Establish an Ecosystem Science Fund** - We are presently seeking a floor level of funding for the fund based on previous expenditures over the last three years to provide short term continuity in project funding. This fund will be managed by the Science Advisory Board.

3. **Improve Monitoring and Data Management** - Integrated data management systems for ecosystem based management is recognized in Parks Canada policy and by park management as a priority requirement for the delivery of credible science. The intent is to develop, adopt or modify information management protocols for inventory, research and monitoring data. This will provide essential data required for State of the Parks reporting.
4. **Enhance Skill Levels of Ecosystem Scientists** - The demands to undertake ecosystem research has increased dramatically over the past decade. As a result, there is a need that staff acquire familiarity with this new knowledge and the experience gained by others. Skill enhancement is particularly required in the design and monitoring of research projects, analysis and publication. A greater in-depth knowledge of the fields of conservation biology and restoration ecology is similarly required. Credibility is to be improved through meeting specific academic requirements, (i.e. a minimum M.Sc.), a research and publication record and documentation that shows research results are used by management.

5. **Establish a Referred Publication Program** - As well as encouraging staff to publish in professional journals, an in-house referred ecosystem science report service has been established.

6. **Evaluation of Research and Monitoring Program** - Evaluation is considered a key element in pursuing an active approach and improving credibility of both in-house and contracted research. Evaluation will be undertaken by an evaluation team comprised of both internal and external researchers.

7. **Broaden links with Universities and Other Science Based Organizations** - Universities are recognized as key partners in undertaking and advancing research in the parks. At present, we have 8 Memorandum of Agreements with universities that encourage researchers to utilize the parks for research and educational purposes that are in keeping with the goals, objectives and principles of Parks Canada. Staff are also encouraged to provide lectures, sit on graduate student committees and accept adjunct professorships to maintain close ties with the university community. Similarly, contacts with agencies such as Environment Canada, Fisheries and Oceans, Natural Resources, and provincial governments in pursuing information exchange and program development on issues of mutual interest are encouraged.

8) **Strengthen Park Ecosystem Conservation Plans** - Park Ecosystem Conservation Plans are key documents for establishing Park level priorities for research and monitoring. These plans also reflect national and regional priorities and projects listed in the plans will be given priority for consideration for Ecosystem Science Fund resourcing. A research needs assessment for each park will be undertaken with parks, universities and other interested agencies to develop a more strategic regional program.

9) **Enhance Public Awareness of Research and Monitoring Programs** - The role of parks as benchmarks is not well appreciated by the public, nor is the significance of much of the research that is at a national or international scale. Greater emphasis will be given to working with interpretive staff,
NGO's and the media to communicate the value, results and application of research and monitoring in the management of protected areas and other lands.

In considering the CNPPA role, it would appear appropriate to develop a strategy including the overall mission of CNPPA in North America, and specific goals that should be realized.

I would like to very briefly cover some approaches that we are using in the Atlantic Region to pursue research and monitoring in order to respond to our ecological integrity mandate.

**The Greater Fundy Ecosystem Project (GFE)**

Over the past few years, we have pursued ecosystem management beyond the parks in developing relationships with neighbouring landowners using the "Greater National Park Ecosystem" approach. This approach is to design a sustainable landscape that permits the maintenance of ecological integrity while sustaining the economic vitality of the area. The National Park serves as the core of these greater ecosystem proposals. The Greater Fundy Ecosystem project is the best example of this in Atlantic Canada. The objectives are to identify strategies to maintain viable populations, perceived to be of risk and to:

- quantify species - habitat relationships
- examine stressors and their impact on natural resources
- develop monitoring protocols that are ecological and cost effective

The project is a multi-partner research program that is coordinated by the Faculty of Forestry and Environmental Management at the University of New Brunswick. The GIS database is 1,042 sq. km. The prime ecosystem stressors are natural forest habitat fragmentation and loss and atmospheric pollutants. Observations and results of research are shared with participants, and management guidance is provided to land managers.

**The Fundy Model Forest (FMF)**

This program developed shortly after the Greater Fundy Ecosystem Project was launched is administered by the Canadian Forest Service part of the federal department of Natural Resources. There is some overlap in geographic area while research in both programs contribute to a more comprehensive understanding of the ecosystem. The GFE project is presently incorporated as part of the Fundy Model Forest. The goals of the program are: to ensure environmental sustainability, to derive the full social and economic potential from the forest, and to enhance and share knowledge of the forest ecosystem and techniques for managing it. Integrated management on a landscape basis is a prerequisite to accomplish these goals. There are four related objectives of particular relevance:
• **The Planning System** - To develop a system for integrated forest landscape management which addresses ecosystem dynamics, multiple ownership and public interest.

• **The Plan** - To design and implement a plan for sustainable forest landscape management by the end of the first five year period.

• **Forestry Practices (Actions)** - To design, implement and assess forest management practices that will result in better ecosystem management.

• **Research** - To develop and implement a research strategy to support sound ecosystem management.

**Ecological Monitoring and Assessment Network (EMAN)**

Another model of particular relevance is a program administered by the Department of the Environment. This program is to bring together independent research activities to facilitate cooperation and a holistic approach to ecological enquiry and understanding at the ecozone level. The EMAN objective of particular relevance to parks is to foster integrated research and monitoring at Ecological Science Cooperatives by:

- defining the effects of environmental stresses (e.g. UVB)
- developing baselines (species, communities and natural processes)
- developing standard protocols for monitoring

...to:

- provide early warning of anthropogenic stressors
- provide a framework for integrated sustainable resource
- communicate between researcher, land managers, and the public
- provide scientific rationale for policy and legislation

Kejimkujik National Park was selected as Canada's First Ecological Science Cooperative in March 1993. Fundy National Park and the Huntsman Marine Laboratory at St. Andrews are also cooperators within the Atlantic Maritime Ecozone. Kejimkujik has over 50 research and monitoring projects underway on atmospheric and climate, aquatic, fish and wildlife, vegetation, and education.

**Smithsonian Institute/MAB Forest Bio-diversity Plots**

Another initiative we are pursuing is the establishment of Forest Bio-diversity plots to provide a means of undertaking in-depth integrated ecological monitoring and research at specific geographical locations. The plots are relatively large being one hectare in size. These have been set up at Kejimkujik National Park with objectives to:

- develop and apply protocols for the conduct of ecological research while protecting plot integrity
• develop and refine the information management system to optimize accessibility and utility
• increase cooperation and understanding among potential users.

A number of studies have been initiated this year including: forest and ground, terrestrial, myriapod fungi, microclimate (soil, surface and canopy) and comparison with working forest environments with local forest managers (Bowaters Mersey Pulp and Douglas Lumber).

Results that are expected are an enhanced understanding of ecosystem processes that should lead to an optimization of forest protection on adjacent lands, ecological sustainability and the development of educational material for use of students and the general public.

A pilot training program is presently being developed to teach the methodology of setting up and undertaking integrated biodiversity monitoring within forest study plots. This three week program is to be given in Sept./October 1996 at Kejimkujik National Park.

**Atlantic Region Conservation Data Centre**

Concurrent with these activities is the development of an Atlantic Province Conservation Data Centre. This centre will compliment other centres already located in B.C., Saskatchewan, Manitoba, Ontario and Quebec and in the U.S. The Atlantic Conservation Data Centre will function as a long term depository for biodiversity inventory information. Information collected will focus on natural communities and species, their biology, habitats, locations, health, degree of threat, conservation status and management needs. The centre will provide a broader context for parks and will provide economies of scale for data storage and access. The centre is scheduled to begin operation in 1996/97.

In considering these approaches, there are some common requirements: a partnership, standard protocols for data collection and compatible information management systems.

In considering the application of some of these examples for application by CNPPA at the continental level, I would suggest that CNPPA establish a research and monitoring strategy for North America. This could have as its base a compatible ecozone map, as illustrated by Ed Witken. This could be further enhanced with the overlaying of existing national parks and protected areas. Those areas that are undertaking long term monitoring programs could be specifically identified and a comparison of the common monitoring indicators undertaken. From this one could derive a basic standard set of indicators for protected areas for North America. This could serve as the basis for a North American protected areas monitoring program. Discussion and adoption of a continental wide information management system indicating data requirements, storage and access needs would also be required.
This should provide the necessary data for analysis and for comparison. This could then serve as the database for a State of the Protected Areas Report for North America. Public awareness of research and monitoring program could be enhanced by the communication of this data and the subsequent analysis, along with a State of the Protected Areas Report for media and interested sectors of the public.

This would provide CNPPA with a strategy, a set of priorities, a shared commitment to provide input and share results that could be presented and interpreted on a continent wide basis.
PROTECTED AREAS AND THE 
BIOREGIONAL MANAGEMENT CHALLENGE

Presented by

Nels Johnson
Biological Resources and Institutions Program
World Resources Institute, Washington, DC

at the

CNPPA North America Regional Meeting
Banff, Alberta
October 14-19, 1995

1 This paper is excerpted from a WRI publication to be released in November 1995:

This should provide the necessary data for analysis and decision-making. This would then serve as the database for a State of the Protected Areas Report by South America. Public awareness of research and monitoring programs would be enhanced by the communication of this data and the subsequent analysis, along with a copy of the Protected Areas Report for public and interested sectors of the society.

This would provide a strategy for protected areas management to provide input and guidance that has been developed and interpreted evenly across the region.

BIOREGIONAL MANAGEMENT CHALLENGE

Presentation of

Welcome Remarks and Introduction

Participants fill out information packets.

Workshop leaders provide an overview of Western Hemisphere work.

Instruction: Introduction to the workshop.

Participants fill out self-assessment.

Welcome remarks from the workshop leaders.

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AN OVERVIEW OF "BALANCING THE SCALES"

Storm battered islands of biological diversity in a sea of human settlement: that may well be the fate of the world's parks and natural areas as wildlands give way to farm, pasture and settlements. Lands set aside for conservation have been at the center of the world's efforts to protect biological diversity, and that strategy is under siege. What can be done to shore up these vital areas, and as important, maintain key habitats, species and genetic materials wherever they are found across human modified landscapes while fostering their careful use?

The answer must address the way people manage and interact with nature outside of protected areas, where they live and work, and in forestry, agriculture, fishing, wildlife management and other major uses of land and water resources. In Balancing the Scales, Kenton Miller argues that we must first expand the geographic scales of conservation and development programs -- shifting their traditional scope to embrace whole ecosystems. We then must change the process of conservation and development programs to involve the broad array of people and institutions who have a stake in the management of that region. Only by adopting this larger "bioregional" approach can we nurture our natural resources while giving local communities the chance to derive sustainable livelihoods from those resources. Balancing the Scales is a practical and accessible book that explores the lessons that can be drawn from current experiments with bioregional approaches, and proposes sensible guidelines for policy-makers, and especially for practitioners, on making bioregional management work.

The rubric of "bioregional management" draws upon world-wide achievements with protected areas and is enriched by a number of different approaches, including bioregionalism, biosphere reserves, integrated conservation and development projects, and ecosystem management (see Box 1). Each builds upon a strong ethic of "place" and stewardship. Each promotes the use of best available science and information to help protect, restore and carefully manage biodiversity and natural resources. But how well do bioregional methods work in practice?

To learn how policy-makers, managers and communities go about uniting conservation and development on larger scales, Balancing the Scales looks at La Amistad Biosphere Reserve in Costa Rica; the Greater Yellowstone Ecosystem in the United States; the Wadden Sea, extending from the Netherlands to Germany and Denmark; the Greater Serengeti Ecosystem on the Kenya/Tanzania border; Australia's Great Barrier Reef Marine Park; the Mediterranean regional sea; Zimbabwe's CAMPFIRE program; the United Kingdom's North York Moors National Park; and the Hill Resource Management Program in India. These programs were established with a variety of goals, not always giving highest priority to biodiversity conservation. Yet, experience demonstrates that region-wide programs offer important opportunities for embedding biodiversity objectives into other resource management purposes.

These long-running programs have had varying degrees of success in meeting their ambitious objectives, but all provide useful insights in meeting the three major challenges facing those bent on applying bioregional approaches.
BOX 1. KEY CHARACTERISTICS OF BIOREGIONAL MANAGEMENT

Drawing from the elements and experience of Bioregionalism, Man and the Biosphere Program, International Conservation and Development Projects, Protected Area Management, and Ecosystem Management, 14 defining characteristics of bioregional management work can be identified:

1. **Large Regions to Encompass Biological Interactions and Ecological Processes** -- Bioregional management programs embrace regions large enough to include the habitats and ecosystem functions and processes needed to make biotic communities and populations ecologically viable over the long-term. These regions must be able to accommodate migratory patterns, anticipate nature's time cycles, and absorb the impacts of global change.

2. **Leadership and Management** -- The leadership to establish bioregional programs may come from public agencies or from the community of residents and resource users. The tasks of convening stakeholders, preparing and negotiating vision statements, planning and implementing agreed-upon activities can be shared cooperatively between public and private entities, or fully community-based.

3. **Cores, Corridors and Matrices** -- These programs include core wildland sites that feature representative samples of the region's characteristic biodiversity. Ideally, such sites, which may already be designated as protected areas, are linked by corridors of natural or restored wild cover to permit migration and adaptation to global change. Both the core sites and corridors are nested within a matrix of mixed land uses and ownership patterns.

4. **Economic sustainability** -- The livelihoods of people living and working within the bioregion, including those in industry, and especially in the matrix, are encouraged. Appropriate incentives to make optimal use of local resources, and apply sustainable technologies, are combined with a system for sharing the costs and benefits of conservation and managed use fairly.

5. **Full Involvement of Stakeholders** -- All parties who can affect or benefit from the resources and the region develop skills, information, and opportunities to be fully involved in planning and managing the bioregional program. Key here is building the local capacity to participate, negotiate, and perform the various tasks involved (such as those listed in Box 1.9)

6. **Social Acceptance** -- Any proposals for changes in the way of life and livelihoods of the residents and local peoples, including indigenous communities, need to be acceptable to them. All stakeholders warrant the opportunity to participate in program management and implementation.

7. **Solid and Comprehensive Information** -- All stakeholders have at their disposal the critical information prepared to facilitate biodiversity management. Geographic Information System
technology is used to help stakeholders envision their region and its distinctive features clearly. GIS also helps them model options and scenarios for the future.

8. **Research and Monitoring** -- Research and inquiries focus on people/environment interactions, the development of innovative methods for the managing natural resources, and the long-term monitoring of environmental factors and the impact of management practices.

9. **Use of Knowledge** -- Scientific, local, and traditional knowledge are employed in planning and management activities. Biology, anthropology, economics, engineering and other related fields are all tapped. Such knowledge helps stakeholders and program managers anticipate nature's long and short cycles and to track global change.

10. **Adaptive Management** -- Bioregional programs are operated on an experimental basis, upon which to draw lessons from real-world experience, and respond appropriately.

11. **Restoration** -- Where the viability of some habitats or ecological functions have been impaired through excessive or inappropriate use, then these areas are to be restored.

12. **Cooperative Skills Development** -- Communities and public and private organizations together locate and mobilize the skills, knowledge, and information needed to be able to manage the area.

13. **Institutional Integration** -- alliances with other institutions and with local organizations are forged to close gaps, minimize overlap, and make management and investment in the region more efficient.

14. **International Cooperation** -- Because some ecosystems cross international boundaries and, in some cases, extend globally along animal-migration routes, international cooperation is often a vital component of bioregional management.

The first great challenge is building capacity. At larger geographic scales, managers must be able to plan and implement activities that may call for skills and experience not found in their own organizations. The needed tools, methods and talents may be found, however, in other levels of government, or in the private sector or indigenous or civil society groups. Bioregional programs should plug the gaps in organizations' and individuals' capacities -- building upon existing capacity wherever possible, while being able to respond to changes in attitudes, the economy and the environment as necessary.

Another challenge for bioregional management is engaging local residents and other stakeholders, that is, those who depend upon, utilize, live within, or otherwise care about the place and its biological resources. Stakeholders who do not become full partners in planning and implementing programs can end up hindering the program's chances of success. So leaders,
planners, policy-makers should get to know the stakeholders, their concerns, interests and perspectives, and should seek ways to involve them in the planning and implementation process. One key is to help them select issues of common interest for action and investment. These individuals and groups may need help gaining access and skills to participate fully in the decision-making process, and all stakeholders need access to key information as well as a fair distribution of benefits. Government agencies, for their part, must honor their commitments to local communities, work quickly to implement programs, and be prepared to share authority and responsibility in new creative ways with regional and local public and private partners.

The final challenge facing bioregional managers is *promoting cooperation between organizations and institutions already working in the area*. This means developing management options that balance local interests with society's larger interests. Adjusting the design and delivery of technology may be necessary to give communities and institutions the space and time to adapt. Similarly, drawing on external funding sources may be vital to securing short-term support -- so long as that funding gives way eventually to a sustainable flow of resources.

These challenges notwithstanding, bioregional management has the potential to reap huge gains for biodiversity -- in part by attracting a larger, more complex pool of skills and tools. Dr. Miller argues that this approach also helps local communities grasp the connections between biodiversity and their own livelihoods and encourages them to begin voluntarily restoring the habitats, sites, and ecological functions that determine the health of larger ecosystems. In the end, all interested parties recognize the importance of social and institutional concerns and scientific knowledge in charting a better future.

**CONFRONTING THE CHALLENGES TO BIOREGIONAL MANAGEMENT**

Increasing biodiversity's chances through bioregional management means finding answers to three fundamental questions:

- how to create the capacity to manage more complex and integrated programs,
- how to meaningfully involve all stakeholders, and
- how to build up and link established institutions, or, if needed, create new ones.

Confronting these challenges will require policies and approaches that foster new balances among often-conflicting factors, such as the redistribution of responsibility and authority among central and local entities. Guidelines derived from examples in Chapter II should help.

**What is the Right Scale?**

In bioregional management, there is no one single right scale at which to work. A bioregion of hundreds of thousands of hectares is appropriate for some ecosystems that comprise mountain slopes and whole watersheds. A few thousand hectares may be enough to manage or restore some habitats or to protect, say, specific strains of wild rice. At each scale, different tools
and capabilities will be needed to help meet management objectives. Stakeholders and institutional jurisdictions may vary as well.

To be practical, communities, residents, resource managers, and government agencies will want to define the bioregion in terms that most residents and resource-dependent people think of as home. This space will be subdivided into areas that correspond to specific watersheds, habitat types, the home ranges of certain species, timber-supply sheds, development zones, and the like.

Setting the scale of the project is essential to reaching shared individual and institutional goals. Dialogue, scientific trial and error, and adaptation over time are the best way to determine a bioregion's boundaries. Any institution, organization, or individual with a skill or capability needed to help assess, plan, or implement a bioregional program should be made a partner in the effort. So should neighbors in the matrix who control over or have an interest in old-growth or forest regeneration, upstream catchments, critical wildlife habitat, dispersal areas for large mammals, cultural or historical shrines, or resources and sites key to the regional economy, settlements, and infrastructure. Anyone in a position to halt or harm the program by, say, misusing resources, diverting water or wildlife movements, over-harvesting timber or wild fauna, setting inappropriate fires, etc., should also be invited into the program. By the same token, any abused parcel of land that affects other critical habitats negatively — through erosion, for example — belongs in the program.

Thus, the right scale is determined by dialogue and informed by science, technology, information, and social considerations. There will be one scale that is most ecologically viable, economically practical, and socially convenient for the overall program. Nested within will be other scales suitable for work on specific objectives, such as the restoration of stream flow in a river catchment, retaining old-growth stands that are habitats, genetically improving varieties of grains to enhance local economic and food security while reducing pressure on wildlands from the region's poor, etc. Similarly, there will be other scales in the program of work suitable for dealing with migratory species, air and water quality, trade in endangered species, and timber certification that require negotiations with other institutions, often overseas.

GUIDELINES FOR DEVELOPING BIOREGIONAL MANAGEMENT PROGRAMS

A. Develop the Capacity to Manage More Complex and Integrated Bioregional Programs

Grappling with whole ecosystems, bioregional managers face a daunting challenge. They must develop the capacity to plan, encourage, coordinate, and implement the many tasks and functions associated with the protection and use of biodiversity, forests, soils, seas, and other biological resources. Typically, this means protecting wildlands; systematically collecting and cataloging flora, fauna, and microbial life; establishing and maintaining ex situ facilities for storing key genetic resources; restoring impoverished sites and critical habitats; fostering biodiversity education in local schools and universities; promoting research on using biological resources
sustainably; establishing policy incentives and financial mechanisms to support and foster optimal land use practices; and encouraging and testing technological improvements for conservation and development work in the region.

In most of the case studies presented in Balancing the Scales, institutions already in the region had most of these tools and capacities. What they lacked were policies for integrating existing programs and the skills to catalyze a multi-shareholder planning process. In a few cases, however, new institutions had to be established to provide missing skills and knowledge.

1. **Develop leadership for the bioregional program.** Who convenes interested parties in a bioregion? Who gets to know the residents and resource managers and users? And who formulates a vision and plan for a bioregional program? Ideally, a well-respected local individual or organization already has leadership capacity and knows the community and its resources.

Several policy options for cultivating such local leadership emerge from the profiles contained in Balancing the Scales:

First, where various jurisdictions and levels of government converge in the bioregion, a new institution can be established to integrate capacities and skills and to implement a regional cooperative program for protecting and controlling the use of natural resources. A prime example of this option is the Great Barrier Reef Marine Park Authority (GBRMPA). GBRMPA realized that no single new agency could effectively exercise authority over 334,000 square kilometers of open sea, along with the reefs, atolls, islands, and coastlines. Even with aircraft surveillance, local contact would be required to inspect and assess human activity, so the Commonwealth central authority (GBRMPA) formed a legal partnership between GBRMPA and the Queensland State government to handle day-to-day management of the coastal and marine territory already under state jurisdiction. This Emerald Agreement, as it is called, avoided duplication in establishing and financing a new Commonwealth protection service for the reef, and the Queensland Park Service’s capacity to protect resources expanded as a result. GBRMPA established similar partnerships with local universities and research centers to cover aspects of the Authority’s research and educational agenda.

Second, as in the multi-country cases of the Wadden Sea and the Mediterranean, new institutional mechanisms were established to convene the constituents, foster dialogue and debate, and help formulate common goal statements and get agreement on programs.

Third, in the national programs of CAMPFIRE in Zimbabwe and North York Moors National Park in the United Kingdom, public resource management organizations reached out to area residents to form new co-management arrangements for wildlife management (in the first case) and habitat restoration (in the second).

Policy-makers should not underestimate the importance of leadership style and legitimacy. For example, where a few powerful governmental agencies dominate the landscape, it might be all too easy to simply enlist them to take over the effort. However, their leadership can overwhelm
other stakeholders, blocking cooperation in building a bioregional program. In the Greater Yellowstone Ecosystem (GYE), the bioregion's two dominant stakeholders -- the U. S. Forest Service and the U. S. National Park Service -- prepared a "vision statement" that prescribed goals and activities for the entire bioregion. Whatever the proposal's merits or deficiencies, employing a top-down, closed-door approach -- albeit with public hearings after the fact -- alienated other regional stakeholders and national interest groups whose contributions are essential to the bioregion's successful management. The approach effectively short-circuited the debate, failed to integrate capabilities, roles, and functions, and generated more divisive and lingering controversy. Broader-based stakeholder processes -- essentially bottom-up and non-governmental -- are now under way, including that of the Greater Yellowstone Coalition, though the relative success of working from the opposite extreme end has yet to be evaluated.

2. **View management as a social and governance issue.** All too frequently, planners and managers presume that defining and implementing bioregional programs are technical and professional matters. If, this logic goes, the scientific facts are clear, the best technologies are selected, and control and leadership are given to a professional agency of government, a bioregional management program will take off in the right direction. But the approaches to bioregional management reviewed in *Balancing the Scales* show the importance of both according high priority to science, data, information, and appropriate technology, and focussing on social and governance issues.

The cultural and organizational characteristics and values of the Maasai of Serengeti, fishers of the Barrier Reef, farmers in the North York Moors, ranchers in Yellowstone, and rural communities in Zimbabwe and India all had to be taken into account as a management program was defined, planned, and implemented. Most significantly, how authority and responsibility are distributed among levels of government and between public and private interests is a central issue in promoting cooperation and mobilizing skills and capacity.

3. **Use authority to foster cooperation.** It is idealistic to expect constituents to work together as a tight band of well-meaning stakeholders. Indeed, experience suggests that a measure of authority to provide "backbone" to the effort is both needed and appreciated. Some regulation and regulatory authority is required to ensure that certain minimum goals, standards, and criteria are met. The exact balance of authority and the relative use of intervention will depend on local circumstances.

   In La Amistad in Costa Rica, regional constituents asked government to established a Commission to ensure follow-up on activities agreed to by all parties. Without this "big stick," hours of dialogue, debate, and negotiation could have become hollow exercises in paper democracy. Similarly, the Great Barrier Reef Authority's power to intervene and protect resources has enabled it to foster cooperative arrangements with resource user communities, even though it has never had to exercise that power.
4. As needed, redistribute power over land and resources to develop authority and responsibility in the bioregion. The Zimbabwe CAMPFIRE Program illustrates an issue fundamental to all the examples presented: how can central governments share or redistribute authority and responsibility over biodiversity and biological resources to (a) remove the "open access" problem, (b) establish incentives for local residents to take on responsibility for biodiversity protection and management, (c) foster a fair sharing of benefits from the use of those resources, and (d) place the authority to protect, control and use, closer to the ground?

In many parts of the world, central governments wrestling with budget cuts and personnel quotas appear to be having ever greater difficulty exercising this power adequately. In Zimbabwe, power over wildlife resources is being shared with local governments and community groups. As a result, evidence suggests, the already-strong public commitment to conservation in that country is now spreading to rural communities directly involved in management and benefit sharing.

5. Identify and assess the capacities of organizations and individuals in the bioregion and fill in the gaps. Wadden Sea countries (e.g., Denmark, Germany, Netherlands) possess the capabilities needed to manage their own in-country programs. But they couldn't integrate the tri-country bioregion until they formed an international commission and an international conference to convene multi-country dialogues on issues, identify options, and forge consensual work programs with corresponding targets and responsibilities.

In the Serengeti, the Tanzanian Government established the Ngorongoro Conservation Area Authority to forge a bioregional program among the several public agencies, communal groups, and private interests in the region. But though this Authority has identified the elements of a cooperative stakeholders' agreement, it has yet to mobilize the local skills and capabilities needed to provide the veterinarian services, road maintenance, and health facilities it has promised in the region.

In La Amistad, the early analysis of local skills and capabilities identified a lack of capacity to inventory the Talamanca region, which is huge and both biologically and topographically complex. In response, the La Amistad Biosphere Reserve initiative joined forces with other voices calling for the establishment of what is now INBIO, the National Biodiversity Institute of Costa Rica. Now INBIO works with local stakeholders to systematically inventory the Talamanca bioregion.

In India's Hill Resource Management Program, two important steps were taken to establish capacity -- one technical and one social. First, the program cooperated with the state to build the small water-storage dams throughout the bioregion. Second, and almost too late, the community established the Hill Resource Management Societies to help local communities take better advantage of the water now available and to protect catchment structures being trampled by cattle.

6. Use and build upon existing capacity wherever possible. Rather than building a large regional supra-structure of institutions, the Mediterranean program reinforced local and national
scientific technical capacity. Some countries helped others in the bioregion train personnel, construct facilities, secure funding, and establish databases, computer services, and other infrastructure. Similarly, the Barrier Reef program strengthened universities, state agencies, and research centers in the region.

Less emphasis was given to capacity development in other bioregions. Yet, some was done in the Wadden Sea in response to calls by the Commission and Conference for analysis and the implementation of studies, techniques for tourism management were developed in the Barrier Reef, new approaches were taken to wildlife restoration and harvesting in Zimbabwe and to water-storage facilities in India.

7. **Build the capacity to handle change.** Changing attitudes among constituents, shifts in the greater economy, and environmental change mean that the context of any bioregional program is in flux. The capacity to anticipate such changes and to respond appropriately is thus critical to bioregional management's success.

The Indian water-conservation program illustrates how economic growth enabled people to find jobs elsewhere and to abandon upstream catchments to vegetative regeneration -- a plus for habitat diversity. Still, these shifts took time, and engineers had to re-program their efforts, effectively slowing down the development of water-catchment dams while communities prepared local agreements on livestock management and the use of the new water resource.

The Costa Rican case illustrates the need to weave preparedness for natural disasters into the bioregional management program and budget -- in this case, hurricanes and earthquakes. However inevitable, such setbacks are unpredictable and can devastate biodiversity programs otherwise.

B. **Foster stakeholders as co-managers who can help address biodiversity goals in the core areas, the corridors, and the landscape’s matrix.**

By reaching out beyond core areas, policy-makers, managers and community leaders are faced with the challenge of involving private land-owners, farmers, foresters, tour operators, indigenous communities, municipalities, state agencies, corporations, and other interests in bioregional management. Already, protected areas such as those in IUCN’s categories V and VI, including the Great Barrier Reef Marine Park, have developed considerable expertise in this form of outreach, as discussed in Chapter II. In general, many more restricted wildland core sites managed as IUCN’s categories I - IV are working with adjacent communities and regional development programs.

Also, some stakeholders live at some distance from the site, and future generations -- whose welfare, livelihoods, and environment will depend partly on decisions made today -- also need representation. In this context, governments may have a stakeholder role to play
representing the public interest in the bioregion, even if little or no public land is involved. This is especially true where ecological processes and functions or species and genetic traits need protection.

As noted, unless stakeholders become full partners in planning and implementing bioregional management programs, one group or another is likely to find its self-interest obstructed and to pursue other goals that may not be in the common interest. In a worse-case scenario, competing stakeholder groups can become totally dis-empowered and leave the greater community, taking with them knowledge and other contributions.

8. Leaders, planners, and policy-makers should get to know the stakeholders, their concerns, interests, and perspectives. The evaluation of the Yellowstone example points to the failure of an early attempt at ecosystem management, mainly because too little effort was made to know and understand the region’s peoples. In contrast, the Great Barrier Reef program dedicated considerable time to meeting with key stakeholder groups, articulating their views, and defining the issues to be examined together. The launch of the Mediterranean program almost failed for want of cooperation until the issues as seen through the eyes of each country were seriously explored.

9. Initially, focus tasks on a few issues of interest to the widest possible set of stakeholders in the region. Although the aim of bioregional programs is to comprehensively secure biodiversity and the region’s ecosystems, experience suggests the need to begin simply, limiting the program to one or a few issues of common concern. Gradually, programs can grow to embrace a more comprehensive list of the region’s issues and opportunities and the stakeholders’ vision for the future.

The Barrier Reef began by addressing such specific issues as tourism’s impact upon the reefs, sport fishing’s effect on fisheries, mangrove protection, and control of the crown-of-thorn threat. Through a step-wise process of dialogue and collaboration with user groups, the Authority’s technical and managerial competence won recognition, and its role as partner was accepted by stakeholders throughout the region.

CAMPFIRE focused on mechanisms to engage communities and individuals directly in decisions on how income from wildlife can be distributed. North York Moors began with the restoration of hedgerows. In contrast, in the Yellowstone, the public agencies jumped prematurely into comprehensive planning and the formulation of an overall vision for the region, raising many issues at once and making it difficult to get a diverse community to agree upon a discrete set of actions.

10. Link conservation and restoration activities with socio-economic development goals in the bioregion. Goals to conserve biodiversity can hardly be separated from the needs and perspectives of local constituents. Considerable literature documents how the inequities inherent in top-down programs for resource protection lay the ground for conflict, resource
impoverishment, and the loss of livelihoods. The challenge is thus to integrate development with conservation goals and measures. The Amboseli and Kajaido examples demonstrate how, through sensitive and open dialogue -- in this case, with local Maasai residents and ranchers -- it is possible to start a well-focused regional program with activities that first address stakeholders' perceived needs. Building fences to help protect gardens and rangelands from migratory wildlife preservation inspired confidence in the program.

In several other cases, a lack of early focus on the needs of stakeholders has hampered progress. For example, the Yellowstone program initially gave short shrift to the problems of local ranchers and loggers -- social and economic analysis would have helped. In the Serengeti, more attention should probably have been given to the concerns of pastoralists, including cattle-disease control, transportation, and personal health. In these and other cases, a preoccupation with wildlife appears to have predominated the regional programs.

11. Give local residents and communities access to decision-making processes and the skills needed to participate fully in the development and implementation of democratically managed bioregional programs. In the Serengeti Regional Ecosystem, a dominant stakeholder group -- the Maasai pastoralists -- whose practices have been associated with the development and maintenance of the ecosystem for centuries, have been left out of program planning, implementation, and management. Even past agreements to, for instance, provide human health facilities, and road maintenance have not been honored, putting pastoralism's very future at risk. Government policies that encourage plowed agriculture around the periphery of the Greater Serengeti Ecosystem and provide incentives to settle lands and convert communal reserve lands and group ranches to private holdings also make it hard to conserve wildlands and biodiversity.

The experience of the indigenous peoples living in the La Amistad Biosphere Reserve demonstrates how barriers to involvement in biodiversity planning and implementation can be overcome. When government agencies failed to provide access to planning activities, the La Amistad indigenous peoples joined forces with church groups to form their own NGO, which now offers them training in the skills needed to participate and negotiate in planning exercises.

While stakeholders along the northern shore of the Mediterranean Sea were dealing with a developed-country agenda (environmental degradation, habitat and species loss, etc.), countries along the southern shore were addressing developing-country issues (employment, nutrition, housing, institution building, etc.). Even though conventional wisdom dictates that a bioregion should be defined to embrace stakeholders with homogenous expectations, managing the Mediterranean bioregion meant working with a particularly large and heterogenous set of communities. The Mediterranean Action Plan provided a means by which the countries could select one topic of common concern -- oil pollution, as it turned out -- and helped the North African countries, through information exchange and skills development, to participate fully in work on this initial issue.
Few examples show more discouraging and encouraging results than the Amboseli. After the government policies to stop hunting came into force, internal funding for compensation incentives dried up. But the Wildlife Extension Program (WEX) opened up opportunities for Maasai ranchers to take part fully in planning discussions and to set an action agenda that reflected their perspectives.

12. To keep negotiations fair, give all stakeholders information of equivalent value. In most of the examples, one or more potential partners lacked key information about the resources, land use, economy, ecology, and other dimensions of their region. Some information was technologically inaccessible, requiring training in advanced computer use, Geographic Information Systems (GIS), etc.

Perhaps uniquely, the Great Barrier Reef worked from a scientifically established information base right from its beginning, regularly issuing maps, data, and carefully prepared information for the public. As a result, the program’s constituency is relatively well informed, public debate on oil and mineral exploration (which was turned down by the public) has been vigorous, and the reef’s many visitors receive an education.

13. Give stakeholders incentives to get involved in and committed to bioregional programs. Even where interest in conservation is great and volunteerism ensured, few stakeholders can afford to do more than attend a few public meetings or respond to questionnaires. To get them to alter farming, fishing, or logging, or tourism practices, for example, or to restore habitats on private lands, may require compensating them for time, expenses, or alternative uses of resources — at least until markets more accurately reflect true costs and prices and thus elicit rational cooperative behavior and activity.

In the North York Moors, neighboring farmers in the bioregion’s matrix were offered contracts to restore and maintain hedgerows on their lands and to restore certain habitats. Remuneration was high enough to sustain cooperation in the program. Presumably, these payments were efficient since they re-established appropriate habitat for less than it would cost to buy new land and hire workers. Here too, a pay-for-services approach can jump-start cooperation on other issues.

In the other bioregional programs discussed in Chapter II, different types of incentives were established to encourage stakeholder involvement. In La Amistad, stakeholders got the chance to plan and secure livelihoods over a longer time span than before. In CAMPFIRE, gaining a share of the income and seeing improvements in community services turned the tide of participation. The Great Barrier Reef program eliminated hassles for tour operators by developing strong voluntary codes of conduct to protect and maintain the reefs and coastal areas. In the Mediterranean, shared science, technology, and information helped all parties in the clean-up of everyone’s backyard.
14. To foster involvement and commitment, ensure that individual and group stakeholders receive a fair share of the benefits. The Zimbabwe experience with CAMPFIRE illustrates what happens when coins of income are literally placed on the communal table and those present are allowed to decide what constitutes a "fair" share. Similarly, the North York farmers received a fair price for their labor and expenses, giving the program a sure footing.

On the other hand, the Maasai are still waiting for their due. In both the Tanzanian and Kenyan sectors of the Greater Serengeti Ecosystem program, many people who have basically delivered on their side of the deal are still waiting for the benefits promised.

15. In areas of multiple jurisdictions, try to develop coordination mechanisms that do not immediately challenge nations' existing mandates or sovereignty. In all the examples, various jurisdictions were already in force. Some twenty-eight distinct public and private entities had jurisdictional responsibilities in the Talamancan mountains when Costa Rica established its portion of the one-million hectare bi-national La Amistad Biosphere Reserve it co-sponsors with Panama. In the Mediterranean, 21 nations have sovereignty over portions of the terrestrial, coastal, and marine components of that ecosystem.

Clearly, mechanisms can be designed to convene a bioregion's constituents, explore issues and potential answers, and promote appropriate action without challenging their sovereignty. The Biosphere Reserve approach leaves in tact the authority of public agencies and private property rights in the Talamancan. The Med Plan fosters project activities to address oil pollution within each country and establishes cooperative research and monitoring activities at new centers around the region.

16. Honor all commitments that result from negotiations. Evidence from the Serengeti, Amboseli, La Amistad, and Yellowstone suggest that various commitments made by government agencies ring hollow several months and years later. Potential partners in the region stood ready to negotiate and implement agreed-upon activities; but government was unable to deliver. Why? In La Amistad, government policies changed, cutting off personnel and budgets. In Amboseli, pumps at the watering facilities were not maintained, forcing pastoralists to return into the National Park with their herds. In such cases, cynicism sets in -- a further obstacle to progress in future.

17. Promptly implement projects that respond to community needs. Government agencies and regional organizations must quickly implement projects agreed upon by the communities whose livelihoods and security are affected by a bioregional management program. This need opens up an important niche for cooperation by non-governmental organizations, which often can move funds and carry out activities faster than public agencies required to rely on public works, abide by national budgets, and follow detailed procurement procedures can.
In the Amboseli example, the Wildlife Extension (WEX) project helped procure and install the fencing needed to protect gardens and fields from marauding wildlife in short order after the ranchers had waited two years for government action.

C. Establish Cooperative Arrangements Among Institutions

Initially, every bioregional management program described here found that the ecosystems of interest were already occupied by an array of public and private organizations and institutions. Perhaps the most complex was Costa Rica's La Amistad Biosphere Reserve, but the political landscapes of the Wadden Sea and Mediterranean programs were also dotted with national and international structures.

Along with formal organizations, communal institutions already operating have an important role to play in bioregional management. The indigenous peoples of La Amistad, the Maasai, and other peoples of the Serengeti, Amboseli, and Kajaido, the ranchers of Yellowstone - all have strong notions about social behavior, land use, and the role of government that must be reckoned with if regional management initiatives are to succeed.

18. Don't hesitate to rely on short-term financial support from external sources for bioregional programs initially, so long as it is replaced in a timely manner by a sustainable flow of resources. Non-governmental support, debt-for-nature swaps, and other forms of financial support can be particularly helpful where governments require several years to get a new budget line funded. That said, however, the cases of La Amistad and Amboseli and Kajaido illustrate the pitfalls of relying for too long on short-term external support. In both, programs were halted and local incentives proscribed while alternative sources of funding were sought.

Many countries are now setting up "environmental funds" in which grants and contributions from international, national, and private sources are held in trust and capitalized. Such approaches hold out the possibility of long-term planning and program security. Commitments made to stakeholders can be honored and incentives continued indefinitely.

19. Establish cooperative management options with and among stakeholders. A cardinal rule of ecosystem management is that people with interests in a bioregion are not simply to be placated with marginal give-aways or menial jobs, but are understood to be partners. Nor are they simply occupants of so-called "buffer zones" to be accommodated just to minimize negative impacts on core zones. Indeed, their patches of forest, farm, and coastal area are vital cogs of the greater ecosystem, and many of the resources they control are as important as the core areas themselves to the ecosystem's overall function and health.

Cooperation between public agencies and private parties hinges on how well government's authority to protect the interests of society at large are balanced with the need to join forces with
local interests. The sport fishing boats operating in the Great Barrier Reef now police their own community members to protect nursery grounds of the fishery. CAMPFIRE communities with government to prevent poaching of an animal worth more alive than dead to the group coffers. North York farmers manage their own patches of the whole Moors ecosystem but follow guidelines developed communally.

20. **Adjust the design and delivery of technology to allow for the space and time necessary for communities and institutions to adapt.** The Indian Hill Resource Management program illustrates why technology and innovation have to be introduced carefully and adjusted to local social and institutional circumstance. Once the engineers building the small reservoirs joined forces with community leaders to pace the program so that the community could more easily adapt these welcomed facilities, participants began keeping their livestock off the new reservoir walls and agreed on ways to use and share. As a result, both the productivity and the sustainability of the investments increased.

**BALANCING THE SCALES**

This analysis suggests eight issues that policy-makers and managers need to weigh in the balance if their goal is to promote bioregional management:

1. **Scale.** Seek a balance between larger scales that permit analysis and the implementation of policies to protect and utilize whole ecosystems and the smaller scales at which managers must deal with the problems and issues of communities, resource users and managers, and residents whose livelihoods are at stake. Thus, a bioregional program will feature work at various scales simultaneously. Each level may well require different types of skills and capabilities, different partners, and different kinds of collaboration.

2. **Power and Authority.** Balance authority and responsibility between central, regional, and local levels of government and private entities. In most instances, however, some level of central authority will be required to represent society as a whole and future generations and oversee compliance with appropriate standards and norms. Neither extreme of totally central or entirely community management appears to be ideal or practical.

3. **Focus.** While analyzing global and regional ecological, economic and social issues to define the bioregion and its program of work, keep the focus on issues of common concern to all interested local parties.

4. **Conservation/Development.** Balancing conservation and development goals keeps bioregional programs relevant to local residents and resource dependent people and industry. A preoccupation with conservation alone can alienate potential partners and isolate the area from the regional economy.
5. **Funding.** Welcome international funds to support the launch of bioregional programs, but shift the balance of funding as soon as possible to a mix with internal sustainable funding sources.

6. **Sovereignty.** Establish cooperative arrangements among central, regional, and local government entities, and private interests that respect national and institutional sovereignty and existing mandates. Centralized command-and-control approaches to natural resources management and ownership will have to gradually give way to co-management and co-finance arrangements.

7. **Time and Adaptability.** The time needed to develop new ideas and techniques needs to be balanced with that required by managers, communities and other interested parties to adapt their respective social norms and resource use techniques. Some of the cycles of nature, like migration patterns, are predictable, so managers can easily prepare for them. But others -- such as natural disasters -- strike unannounced, while still others occur over intervals too long to fit into even long-sighted plans. Bioregional programs need to anticipate and prepare for natural disasters and humanitarian assistance demands while dealing with normal daily projects and activities.

8. **Old versus New Institutions.** If the roles of existing organizations and institutions are balanced against those of new ones, the need for continuity doesn't swamp that for innovation. But, avoiding duplication, the overlap of functions, and new expenditures, sometimes new organizations are needed to promote bold and creative approaches where conflict reigns.

**DOES BIOREGIONAL MANAGEMENT INCREASE THE ODDS FOR BIODIVERSITY?**

Most of the examples examined in this study have yet to incorporate steps to monitor and evaluate results, and work on indicators to be used to gauge progress has been initiated only recently. But, short of passing a final verdict, we can draw first-order conclusions about the positive impact of bioregional management where such programs are under way.

1. A larger and more complex pool of skills and tools are being brought to bear on the region's problems.

2. Greater numbers of individuals and groups with interest in the region have become involved in charting its future and making connections between its biodiversity and their own livelihoods. In some cases, this involvement has led to voluntary contributions and acceptance of responsibilities by particular interest groups.

3. Stakeholders have taken steps to protect and restore habitats, sites, and ecological functions key to maintaining the overall ecosystem, usually in the enlarged context of overall regional management.
4. Established public and private institutions in the area have become partners in the process while new entities have been established to fill gaps, innovate, and share leadership.

5. The importance of social and institutional factors -- including policy, legislation, and administrative procedures that often depend upon involvement of local communities and upon traditional and local knowledge -- has become prominently fixed in the minds of all participants. Increasingly, strictly technical and expert fixes are held suspect.

6. Paradoxically, the role and value of science in program planning and development and the value of useful information to empower all interested parties to participate is increasingly appreciated.
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