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Dedicated to the Protection, Preservation and Management
of Cultural and Natural Parks and Reserves
Through Research and Education

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On the Cover:

We thank artist-printer *Michael Keranen* of Hubbell, Michigan, for the use of his rendition of *Procyon lotor*.

Annual GWS Election Results

The annual autumn election of GWS board members returned both Russell Dickenson and Jonathan Jarvis to the board for their second three-year terms. Both were unopposed, since a call for nominations earlier in the year yielded no takers. Board member and President Gary Davis completes his terms of office this year and is being replaced by a board-appointed position to which Neil Munro of Halifax, Nova Scotia has been appointed (short bio, below).

Neil W. P. Munro

Neil Munro has worked for Parks Canada for 27 years in a variety of capacities. At present he is the Science Adviser for the Atlantic Region where he provides a focus on strengthening the use of science and demonstrating the value of science in decision-making at the management level. He is also a strong advocate of increasing public awareness of the research and monitoring activities undertaken in the national parks. Previously he was the Provincial Director of Nova Scotia for the Department of Canadian Heritage, Director of Policy Planning and Research (Atlantic Region), Director of Operations (Atlantic Region), Policy Analyst (Ottawa), and Chief of Planning (Atlantic Region). He has worked in the U.K. and Sweden, for the Government of Ontario, and as a private consultant.

He holds a BSc in Forestry and a MA in Geography. He has authored, co-authored and edited 40 papers and publications on a number of protected area management topics such as environmental research and monitoring, an international society of protected area managers and professionals, criteria and categories for conservation areas, public involvement, landscape planning and demands for recreation and leisure in forests. He has taught as a sessional lecturer at Carleton University and the University of Ottawa, and is an adjunct professor at Dalhousie University, Nova Scotia. Mr. Munro served as co-chair for the International Conference on Science and the Management of Protected Areas, held in 1991 and 1994 in his home province of Nova Scotia. He is also co-chair for the next conference to be held in the spring of 1997 in Western Canada. He was a recent recipient of a Merit Award from the federal-provincial Parks Conference for his efforts in furthering the relationship between science and the management of protected areas.

Resources Stewardship Workshop

April 29–May 3, 1996

The National Park Service, Pacific West Field Area 1996 Resources Stewardship Workshop, "West by Northwest—Exploring Common Ground" will be held at Golden Gate National Recreation Area in San Francisco, California. The goal of this interdisciplinary workshop is to explore some of the complex issues managers face, and to identify priorities and actions that will guide the field area toward better resource stewardship. National Park Service partners are invited to attend. For more information, call Nancy Yoder at (702) 293-8949 or Judy Rocchio at (415) 744-3872.

ICOMOS Meetings on Authenticity, Mexico

US/ICOMOS will sponsor an Inter-American Symposium on Authenticity in the Conservation and Management of Cultural Heritage from 27–30 March 1996 in San Antonio, Texas. Co-sponsored by the Getty Conservation Institute and the San Antonio Conservation Society, this major Symposium will have the participation of all the ICOMOS National Committees of the Americas. Its main objective is to provide a forum for a broad exchange of ideas of the role and interpretation of authenticity in the multicultural environment of the Americas. The symposium will include ample periods for discussions that will be grouped according to three professional interest areas: Architecture/Urbanism, Archaeological Sites, and Cultural Landscapes/Corridors. Four speakers will stimulate and guide the discussion through presentations of different aspects of the main theme. The speakers will be Christina Cameron of Canada, Carlos Flores Marini of Mexico, Elias Mujica of Peru, and Silvio Mutal, formerly with U.N. Development Program, and now living in Amsterdam. Each of the four presentations will be followed by two case histories that will draw from the hemisphere's various experiences in dealing with the interpretation of authenticity. Early registration ends 27 February 1996. For more information, contact US/ICOMOS Executive Director Gustavo Araoz: Araoz@msn.com, or the US/ICOMOS office via fax at 1-202-842-1861 or phone 1-202-842-1866.

ICOMOS Mexico has announced that it will hold its Annual International Symposium in Veracruz, Mexico, from 27 May–1 June 1996. The Symposium will focus on the Cultural Corridor of the Spanish Conquest. The Mexican National Committee invites the participation of members of other National Committees, particularly those of the United States, Canada, and all Latin America and the Caribbean countries, to submit papers on the topic of Preserving and Managing Cultural Landscapes and Cultural Corridors. For more information, contact Carlos Flores Marini, ICOMOS Mexico, Mazatlan 190, Col Condesa, 06140 Mexico DF. Telephone 525-515-1471 or 525-277-3166.

CNPPA-NA Meeting Drafts Regional Action Plan

For the first time in more than a decade, North American members of IUCN's Commission on National Parks and Protected Areas have met to plot a course of action. The five-day meeting, held in mid-October at the palatial Chateau Lake Louise in Banff National Park, produced a draft Regional Action Plan which, when approved, will guide the volunteer network for the next few years. The meeting also energized what had been, by IUCN's own admission, a "sleeping giant." There were over 80 participants from the region (Mexico, the USA, and Canada) as well as some special guests.

A series of overviews of current protected area conditions in the three North American countries set the stage. The presenters, both government officials and NGO people, gave refreshingly frank assessments. It will come as no surprise that the parks of all three countries face troubling situations, though each one's problems are unique. Part of the meeting's remarkable synergy—and everyone I talked to remarked on it—derived from the willingness of the participants to carefully listen to their colleagues from other countries.

The meat of the conference came in workshops where items for the Action Plan were proposed, winnowed, and agreed to. The CNPPA-NA Vice Chair, Parks Canada's Bruce Amos, along with his colleague Murray McComb and the others on the organizing committee, continually reminded the participants to produce *specific* action items with *real* people committed to doing them according to a *feasible* timetable. Although it remains to be seen, there is every reason to believe that the result will prove to be a real working plan and not just another wish list.

The GWS was represented by Deputy Executive Director Dave Harmon, who led a workshop on "Science and Management of Protected Areas" and an implementation workshop on communication issues. Other GWS members who participated included Robert Cahn, Ron Hiebert, Patricia MacLaren, Dave Mihalic, Neil Munro, John Reynolds, Jillian Roulet, Scott Slocombe, and George Wallace.

Excerpts from the plan that are related to science and management can be found starting on page 60.

— Dave Harmon



Using Cost-Benefit Analysis to Our Advantage

October 9, 1995

Recently I saw a film, "In Pursuit of Honor," about the demise of the horse cavalry as the U.S. Army, following the example of Hitler's legions, shifted from that last relic of centaurs and chivalry to the clanking mechanics of armored warfare ... from men who love their mounts to those who tend noxious metal monsters with wrench and grease gun.

This is not a great film, but it is a good film—especially compared with the "Blown Away" fare that now dominates the screen. For it explores meanings that touch the heart, centered on an ancient alliance between man and beast.

The plot: To prepare for the Panzers we must dump the horses. In the Depression 1930s the destitute peace-time army can't afford to retire them with honor. So a bulldozed trench and machine guns await the faithful steeds. Finally, to stop the slaughter a handful of troopers mutiny and drive the horses to safety.

These men are throwbacks, obstructionists. But, as the film progresses, they do make their point of honor: Because we must shift from flesh to steel does not mean we must also lose our souls.

A few days later I read an article in the October 1995 *Atlantic Monthly*, "If the GDP is Up, Why is America Down?" And this morning, as these quite distinct stimuli marinated in my mind, the film suddenly became a metaphor for the American economy.

The authors of the article—Clifford Cobb, Ted Halstead, and Jonathan Rowe—head up a non-profit public policy outfit in San Francisco called Redefining Progress. They trace the history of economic measurement of the national economy to show that economic indicators, as coalesced in the Gross Domestic Product, are concerned with one thing only—the measurement of monetary transactions. If there is a transaction, whatever its purpose or result, it becomes an additive to the GDP. At any given moment, based on all of these indicators, the economy is either growing or slowing down. This mode of measurement is "objective." No value is placed on any transaction. Shooting horses, therefore, adds to the GDP because the money saved retools factories that build and sell tanks. The cost of brain surgery measures the same way as the cost for dumping hospital garbage off the New Jersey shore. A megabuck multinational merger that puts 10,000 white-collar computer specialists or blue-collar steel workers out of work—thus destroying families and communi-

ties and further concentrating wealth—is a plus for the GDP, a contribution to growth.

That is where the objectivity fallacy is exposed. For growth, as valued by economists, is always good—and slow-down, bad. The complexity of applying values to individual transactions is the excuse for valuing only the gross result. But the final gross figure is not really a result. It is an abstraction. The real results are dead horses or syringes and bloody bandages embedded in New Jersey beaches. Or entrepreneurial drug dealers in abandoned cities. Or regional rust belts. Or clear-cut forests. Ad infinitum. (From another source I note a particularly perverse example from California, where the prison industry—including all construction and support functions and multipliers—has emerged as the state's second-largest economic component, coincident with the crash of what was, only yesterday, the finest education system in the nation. But, according to the objective GDP, California is on the uptick.)

American politicians wonder why the country is anxious and upset. The economy is growing, jobs on the increase, stock market up. Things are looking good, they say. But, as the *Atlantic* authors note, this is not the America that Americans experience in real life. The modestly well-off lose ground and fear for their jobs; they worry about the future of their children; they worry about retirement—their pension funds sacked by financial manipulators, or abandoned outright by new owners of merging, disappearing corporations. The same concerns plague public-sector employees, who fear public bankruptcy.

So how to relieve this angst? More growth, of course. That will make the rich richer and provide jobs and economic opportunity for the masses. But what jobs? Prison guard, fast food, minimum wage, sweat shop . . . in a social fabric that rots as we watch? Where 90% of the population is falling—many through dissolving middle-class certainties, with increasing numbers of the unemployable and abandoned plummeting through the last shreds of a safety net now being sheared from its stanchions. And all the while, corporations export decent-pay white- and blue-collar jobs for cheap labor rates beyond the country's borders, or import half-pay computer experts from India and poverty-wage farm workers from Mexico.

Just as dismal is the GDP result in cultural, infrastructural, environmental, and public health matters. Because, in the main, these foundations of civil society and decent life are uncounted in the GDP and are on the outs in today's ideologically driven political climate, we witness an America regressing to ugliness and decay. Education and aesthetics, and public access to them, wither in this climate. Water and air blend with sewage and garbage. Public utilities overload and break in their obsolescence. Greenbelts and parks and recreation are chopped or intruded or privatized because of growth pressures and lack of public monies. All of these things—along with cuts in public health facilities,

school lunches, vaccination programs—contribute to mental and physical abuse of real people in their daily lives. A case in point: Child health in America ranks lowest of all industrialized countries. These things simply do not register on the GDP.

The global economy is similarly measured. A recent article in the *Christian Science Monitor* begins: "Investors in most of the world's stock markets . . . feel financially chipper these days. Share prices are reaching new highs, propelled by steady global economic growth, low interest rates, privatization of state-run enterprises . . . and wide-spread political stability." One growth-fund director comments on the condition of international markets: "I just don't see any major problems around the world right now." Yet that same issue, and every other issue of this international newspaper, is filled with stories about the real world that belie such blindered assessments.

So what is the remedy to the perverse view projected by the GDP—a view that converts social loss and environmental tragedy to economic gain, growth, progress? It is, of course, to change the indicators so that monetary transactions that subtract from the social and environmental health of a nation and the world are listed as the debits they really are. Thus, a cost-benefit analysis system that does not hide depletion and pollution under "the accounting thing called 'growth.'" For too long economists have claimed objectivity when in fact they have made "the enormous value judgment that such things as family breakdown and crime, the destruction of farmland and entire species, underemployment and the loss of free time count for nothing in the economic balance." These things are not a big zero, as currently and arbitrarily measured. They are tangible costs measured in our lives every day.

So, as we in the national-park-and-equivalent-preserve business are called upon to convert the values these places represent into cost-benefit terms, let us be creative and introduce honesty into this formula. Cobb, Halstead, and Rowe call for a Genuine Progress Indicator (GPI) that does assign value to family and community life, to oceans and open spaces. To do this we must insist on measuring modes that go beyond dollars, and we must use formats unbound by market prices and presumptions. Rather, we must demonstrate values that provide genuine benefit and progress to individuals and societies. If it, whatever private and public action it may be, makes people and places better off than they are now, that's progress. If a "growth" proposal does the opposite, it is not progress: it is depletion and pollution that uses up the world's social and natural resource capital.

If you can get it, read that article in the October *Atlantic*. It will help you turn cost-benefit analysis into a sword.



Report from Zakopane:

The First World Ranger Congress

At 6:30 on the evening of Sunday, May 21, 1995, Gordon Miller, chairman of the International Ranger Federation (IRF), officially opened the First World Ranger Congress with the raising of IRF's flag—the green, blue, and white ying-yang symbol, representing the balance of the world's waters, lands and mountains—outside the Kasprowy Hotel in Zakopane, Poland, to the thunderous applause of 135 delegates from ranger organizations from 35 nations around the world.

That triumphant moment symbolized both an end and a beginning—the end of the three intense years of planning and organizing that followed the signing of the original IRF charter in July 1992; and the beginning of a true world community of park and protected area rangers. It was a watershed moment in the history of the ranger profession—and in the movement to bring together the people who are on the ground in protected areas worldwide, directly involved on a day-to-day basis with putting research and theory into practice to conserve and maintain the last fragments of the world's incalculably precious natural and cultural heritage.

The impetus for both the federation and the congress came from a meeting on the shores of Loch Lomond in the spring of 1991, when representatives from England's Association of Countryside Rangers

(ACR), the Scottish Countryside Ranger Association (SCRA), and the U.S. National Park Service's Association of National Park Rangers (ANPR) met in the corner of a hotel pub and agreed to work toward the creation of an international organization and a world ranger congress to formally inaugurate it. That meeting itself followed years of discussion and the laying of groundwork for such an organization by rangers in the United Kingdom.

After a year's work on a charter for IRF, the presidents of the three associations met in Peak District National Park in England in July 1992 and signed the document, formally establishing the International Ranger Federation.

The charter stipulated that member organizations (IRF is a federation of associations rather than an association of individual members) had united in order to:

- Further the professional standards of rangers throughout the world;
- Advance the aims of IUCN's World Conservation Strategy in all its efforts;
- Share knowledge and resources;
- Establish global communications among ranger organizations;
- Foster professional exchanges among rangers;
- Provide advice and guidance on travel contacts in parks in their respective nations;
- Arrange and conduct regular international meetings; and
- Undertake joint activities to directly support fellow member's operations where necessary and feasible.

The charter stipulated that membership as an affiliate association in IRF was open to all national associations of rangers or wardens "who perform the services associated with ranger work, including protection and preservation of wild lands and their resident flora and fauna, protection and preservation of historical and cultural heritages, provision of recreational opportunities in natural settings, interpretation of natural, historical and cultural themes, and administration of public lands."

Once the charter was signed, work began in earnest on two tasks—bringing in national associations and organizing the first world congress. Both have been successes.

Since the signing of the charter just over three years ago, IRF has grown from three to almost 20 members, with more pending. As of this writing, the federation has member associations from England and Wales, the United States (ANPR and the California State Park Ranger Association), Scotland, Northern Ireland, South Africa, Ireland, Italy, Denmark, Paraguay, Honduras, Costa

Rica, the Dominican Republic, Western Australia, Romania, Portugal, Iceland, and Nepal. National associations are currently being formed in Canada, France, Kenya, Finland, Sweden, Australia (including all territories), Malta, Germany, and elsewhere; these will come into IRF in the near future.

If anything, the first world congress in Poland—chosen because of its status as an emerging Eastern-bloc nation and for its outstanding parks (Tatra National Park, near Zakopane, is an international biosphere reserve)—was even more of a success. The delegates all came on their own time; most came at their own cost, though a number received partial support through the contributions of three major donors—Scottish National Heritage, R&R Uniforms, and National Parks and Conservation Association. Because of this, the delegates displayed an exceptionally high level of interest in their work, commitment to improving the lot of rangers and wardens worldwide, and devotion to the cause of natural and cultural resource protection.

The congress had themes for each day that reflected principal concerns of the delegates. On Monday, it was the federation and its purposes, then some of the issues and problems in protected areas; on Tuesday, resource management; on Wednesday, human resources; on Thursday, the means for balancing conflicts, particularly through interpretation and education; on Friday, IRF's future.

The approach to each theme was similar—a presentation or two on the subject, followed by workshops and discussions. The topics addressed in these sessions illustrated the diversity of issues that rangers must address; among them, providing environmental education, dealing with native or aboriginal peoples resident within parks, managing parks on the urban fringe, controlling poaching and other resource depredations, establishing ranger training programs, and integrating research into resource management.

Delegates were continually intrigued to find so many commonalities in issues faced by rangers wherever they lived and worked. Discussions revealed solutions found in one country that might resolve problems in another, and served to foster the already high degree of interchange among delegates. The text of the presentations and of the recommendations which emerged from many of the subsequent discussions will appear in full in the congress proceedings, which are to be published late in 1995.

But congress activities weren't limited to papers and position statements, nor to auditoriums and meeting rooms. Except for Monday, there were field trips each day of the week—a bit of good luck, as it rained on Monday but was mild, clear, and beautiful through the balance of the week. The trips on Tuesday and Wednesday were to different sections of Tatra National Park—a limestone gorge, a cave high on the side of a ridge, an alpine meadow. On Thursday, the group got to visit the park's new visitor center, then adjourned to a nearby meadow for vodka toasts, a roaring bonfire, and rounds of national songs sung by rangers from different countries. The final excursion of the week was a half-day raft trip down magnificent Dunajec Gorge in Pieniny National Park on the border of Poland and Slovakia.

There were also evening speakers and slide shows that provided some of the week's most memorable moments. Robert Swan, who has *walked* to both poles and is about to mount another expedition to the South Pole, gave an extraordinary slide show on his journeys in the Arctic and Antarctic, and concluded by urging that IRF develop a worldwide ranger network to educate the earth's people on their dramatically diminishing resources. He also proposed that Antarctica be declared an international park/protected area and that it be managed by a company of rangers from many nations sponsored by IRF.

On subsequent evenings, delegates gave slide and video presentations on their parks which again revealed both the remarkable diversity of their resources and the striking similarity of their management issues. Although there were inevitable differences in cultures and in the type and severity of local problems, the fundamentals were again the same—increasing visitation, accelerating impacts to natural resources, encroachments, insufficiency of funds and staff, political meddling, and so forth. But delegates also got to see the breath-taking beauty of the world's natural areas, from Kenya to Nepal, Tasmania to Alaska, Brazil to Finland. The effect was to give delegates a sense of *one* worldwide system of parks and protected areas and a realization that rangers preserve the very last fragments of this planet's wondrous natural diversity.

The week ended all too soon. On Friday, delegates got together to review decisions made at a Thursday night board meeting, to talk about IRF's future, and to ratify a declaration that was subsequently presented to reporters at a late-afternoon press conference. The congress concluded with a banquet, farewells, firm promises to write and visit each other, and a strong commitment to further IRF and the mission of rangers worldwide.

IRF is now in the process of following up on decisions made at the congress and in planning future activities, including:

- Preparation and dissemination of quarterly newsletters to member associations.
- Examination of two possible sites for the next congress in 1998—Costa Rica and South Africa.
- Preparation and dissemination of congress proceedings.
- Development of an international code of ethics for rangers.
- Establishment of a working group to prepare a list of issues to be addressed by IRF and strategies for advocating them to citizens and governments.

As noted above, IRF is an organization for associations whose members protect, preserve, and interpret parks and protected areas worldwide, work to support and advance professional standards, and strive to help each other in our common efforts to preserve and sustain the world's heritage. It is different from other international conservation organizations in that it is composed of people who do the work in the field, who fight in the trenches every day. We have come together to support each other and work together, and we are doing it on our own, without the direct support of any government or agency.

While drafting this article, I noted that the objectives of the George Wright Society are remarkably—almost uncannily—similar, to the objectives of IRF: “[P]romoting the application of knowledge, understanding and wisdom to policy making, planning, management, and interpretation of the resources of pro-

tected areas and public lands around the world.” We strongly encourage the board and membership of GWS to consider membership in the federation in order to further our common aims. [Ed. note: Following the preparation of this article, the GWS Board of Directors considered, and declined, IRF’s invitation to join. However, the GWS Board expressed its collective support of the IRF’s mission and activities, and we will continue to offer the pages of *The George Wright Forum* to the IRF for

reports on activities of common interest.]

Over the next decades, the last of the world’s unprotected areas will disappear due to the onslaughts of growing populations and resource demands. Those areas that have been designated as protected will also fall under unprecedented pressures for resource extraction, increased access, and deauthorization. It is time for us to work together to defend what little remains.

The following declaration, prepared by Juan Gambarotta of Uruguay (with the assistance of Rick Smith and Bill Halainen from the United States), was unanimously endorsed by delegates and issued by the congress at the end of the week:

Zakopane Declaration

We, the delegates here assembled in Zakopane, Poland, at the first International Ranger Federation Congress, representing rangers from 35 nations on six continents, do hereby declare our commitment to the following principles:

- That, as principal guardians of the world’s premier natural and cultural protected areas, we are uniquely positioned and qualified to monitor their health, assess their problems, and extrapolate current trends into probable futures;
- That, unless circumstances change, these natural and cultural areas under our charge will in many cases continue to slowly but inexorably decline;
- That the rangers charged with protecting these areas play a distinctive and essential role in identifying problems associated with this decline and proposing practical solutions to them;
- That these rangers also have a fundamental role in explaining the importance of natural and cultural resources to the public, thereby awakening in them the essential desire and interest in conserving them for future generations;
- That these rangers are involved in complex and highly important tasks in preservation of natural and cultural resources, but lack recognition of the importance of these tasks from the governments that employ them;

- That the majority of these rangers live in very difficult conditions, lack adequate institutional support and resources, receive meager salaries, and take significant personal and professional risks to protect these invaluable sites, which constitute core elements of the world's natural and cultural heritage;
- That they all too often sacrifice their lives in their commitment to protection of this heritage;
- And that, for all these reasons, we are firmly committed to seeking greater recognition and attention to their work, to their well-being, and to the critical status of the heritage that they protect and defend, and will exert ourselves in a concerted effort to resolve these problems, enlisting in this effort the support of the people and governments of this earth.



Bill Halainen

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Managing Long-Term Ecological Monitoring Programs in the U.S. National Park Service

Beyond the Science

Natural resource monitoring, in a variety of forms, has been conducted in the U.S. national parks for decades. However, long-term ecological monitoring (LTEM) programs specifically designed to define the status and trends of park ecosystems or ecological communities have only recently been incorporated into a very few park science programs.

The benefits of both research and LTEM programs has been discussed at length in a variety of publications, culminating in the 1994 National Park Service Strategic Plan. There, listed as the first of the ten most important things the agency can do, is: "...develop a scientific basis for resource management decisions." Knowing the status and trends of park resources and the health of park and regional ecosystems should be the core of this scientific basis. In spite of this recent recognition, very little progress is being made. Although there are some inherent dangers in generalization, there is substantial evidence suggesting that there are three primary reasons for this lack of progress.

First, the science of developing LTEM programs is still evolving. It was only within the last decade that the scientific aspects of designing and operating these programs have been defined and tested in the field. However, several programs exist that are

successful enough to be used as models.

Second, the experimental nature of monitoring and associated high costs have caused a reluctance on the part of some science managers to attempt the development of comprehensive programs. As the scientific capability within the USNPS continues to improve, the resulting cost efficiency should increase, making cost less of an issue.

The last reason is the presence of agency barriers. Currently, these barriers are the most difficult of the three to remedy. What still needs to be done to make LTEM programs an integral part of park operations is to identify and successfully address USNPS institutional barriers to program implementation.

Identifying Agency and Institutional Barriers

If the need for understanding the status and trends of park resources has been known for decades by the

scientific community, why aren't effective LTEM programs found in most parks? Effective implementation strategies require the identification of goals and potential barriers to attaining those goals. The 1990 Inventory and Monitoring (I&M) Initiative was designed as a USNPS-wide implementation strategy. One of the reasons why this program is still struggling for support may be that the strategy lacked an analysis of existing barriers such as those created by agency culture.

Institutional Barriers

Institutional barriers are often the result of organizational culture. The USNPS agency culture is very strong, conservative, and firmly based in a history of exceptional public service.

Agency image. The need for USNPS to view itself primarily as a protected area stewardship agency rather than a public service agency has been stressed by its critics, but has not been fully embraced by the agency's leadership. Nor is it very often evident in how priorities are established at the park level (Haskell 1994). The identification of resource stewardship as the primary mission of the USNPS in the 1994 NPS Strategic Plan is a large step in the right direction.

Staffing Shortages. While the goals of the recent agency re-structuring include improving field staffing levels and making central office functions leaner and more effective, little progress has yet been seen in improved scientific capability. Central-office science organizations, such as

the Air, Water, Mining and Minerals, and Biological Resources divisions, are being severely cut back in staff or are targeted to be eliminated, and System Support Office staffers engaged in natural and cultural resources will likely be fewer than smaller parks require to assist them with science issues. It remains to be seen if the positions eliminated from central offices will indeed be reassigned to the parks, or whether they will transfer to other agencies or be lost to early retirements.

The Natural Resources Assessment Program (RMAP) has identified relative science needs, but the agency has not yet developed a strategy to meet these needs. USNPS staffing levels over the past decade have grown substantially, but not in a way that addressed the highest-priority needs. A good recent example is the conversion in 1995 of over two thousand seasonal positions to term appointments, with future plans to convert most of these to permanent positions. Although the original intent of providing insurance and health benefits for temporary employees was sound, the actual implementation was largely uncontrolled. The long-term result may not be consistent with the greatest agency need for staffing increases at this time.

In contrast, only twelve science positions were added this year via the Resource Professionalization Initiative. The RMAP, completed in 1994, defined the shortages in all park natural science staffs. On the average, most parks are currently operating

with only 25% of the needed staff to effectively carry out essential natural resource programs.

Science represents perhaps the most quickly growing segment of unmet park staff needs. The quest for information gained through research and monitoring and the capability to effectively use this information increases as the complexity of park resource issues continues to intensify. Although park programs should be changed to meet changing stewardship needs, new science staff have been added to parks largely through special science staffing initiatives. In some cases, however, even these positions have not been filled by the park or have been diverted to other needs as directed by the park superintendent. Science-based resource management has still not been identified as a high priority in many parks. Where this need has been identified, the method by which budget priorities are established appears to be another very real barrier to developing science-based LTEM programs.

Budget priorities. Science program needs are being poorly met partly because of general budget shortfalls and how annual park operating budgets are derived. In spite of repeated efforts each year to obtain funding, only four out of the original ten pilot-park LTEM programs have been funded, with a total investment of less than \$2 million. Compared with the cost of recent professionalization initiatives based on visitor services, this has been a small investment. Science needs have not re-

ceived a high priority in agency budget packages, nor has the need for good science been articulated effectively to Department of the Interior officials and the staff of congressional committees. The advent and uncertain future of the National Biological Service have made things more difficult by suggesting that the needs of the USNPS will be met by this new agency (or its successor).

Budget-related resistance at the park level is manifested in several ways. The majority of park managers use past park budget percentages to arrive at how the next year's budget will be divided between the functional areas of operation such as interpretation, maintenance, etc. During the last decade of lean budget years, new program needs have not fared very well. Even the best managers find it very difficult to cut existing programs to accommodate new needs primarily since a large portion of park budgets are tied up in permanent staffing. Making significant staffing changes to meet new program needs is a slow and occasionally difficult process that few managers are willing to tackle. Budget priorities tell the whole story. Few, if any, park science and resource management programs receive more than 6% of the budget, while the public-service functions included in maintenance, ranger activities and interpretation usually total over 50%. There is an extreme reluctance by managers to improve science programs by reducing visitor services.

Management tradition. Many values held by park managers have remained unchanged for decades and form a part of the core of agency tradition. Few senior managers have extensive experience working with good science programs. Science has just not become an integral part of NPS tradition. There is an increasing number of excellent superintendents who would place more emphasis on science if their actions would be supported at higher levels. Since the US-NPS restructuring process began, there is more talk about supporting "feisty superintendents" who are willing to make tough decisions in defense of park resources. Many watchers eagerly await positive proof that this will become a reality.

Right now things are the way they are. The vast majority of park superintendents came up through the park ranger ranks. For the most part the people selected to become new superintendents continue to be chosen by the senior superintendents. This selection system has changed very little since 1916. People have a strong tendency to hire in their own image, to assure that their traditions and priorities will be continued unchanged. In many cases, superintendents specifically ask to be able to select their successor. There is a natural tendency for people to favor activities that they understand and relate to. Most superintendents, having come from the ranger ranks, understand the needs of visitor service programs very well, but frequently lack understanding of the needs and complexities of

good science-based resource management programs.

We are all a product of our past experiences. Some park managers have attempted to use science to improve management decisions, but have less-than-ideal experiences dealing with science programs. Unsatisfactory experiences often lead to ill feelings and a lowering of the value placed on the role of the other party. Some superintendents have been disappointed by park scientists who did not produce the needed information; conversely, some scientists have been exasperated by the poor understanding that many superintendents have regarding the benefits and needs of good science-based resource programs.

As an agency, the USNPS has done little to facilitate building a bond between science and management, to educate managers about the value of science, or to train managers in how to build and manage science programs.

Designing Strategies to Overcome Institutional Barriers

Recognizing barriers for what they are is the first step in overcoming them. The USNPS barriers to developing park-based LTEM programs should not be underestimated. They are very real and present difficult challenges for science program managers.

In response to agency culture, there are several steps that are critical to the implementation of LTEM and other science programs. These are:

management education, a phased approach to program design, building program value, creating public-private science partnerships, and celebrating achievements.

Education. As park management becomes increasingly more demanding, the need for good information will become correspondingly compelling. However, this may not, in itself, result in a change of agency priorities relating to science programs. The agency must continue to focus management development programs on creating a vision of the USNPS of the future. In this vision, the USNPS is the guardian of what little remains of the natural and cultural heritage of this country. This nationally significant responsibility will by necessity place greater value and demands on effective science-based resource stewardship programs. As this process continues, top managers will more frequently be selected for their understanding of resource management programs and their ability to work with the scientific process. And so the traditions and culture of the USNPS will also change through time.

In addition to general education regarding the value of good science, a well-planned education program is needed to bring about a mutual understanding between managers and scientists as to the values, program requirements, expectations, and costs of LTEM programs. From the broad perspective, this training should occur in a formal program of management development.

LTEM program design. Excellent progress had been made in the past five years in the area of developing conceptual models of LTEM programs (Davis 1989, 1992). The best of these models guide program designers to incorporate the most important ecological elements into the program. What some of these models don't address is the importance of phasing the implementation of program elements so that the LTEM program can start building management value as early as possible. LTEM program implementation strategies must address a priority of management needs in addition to building meaningful scientific data relationships. If done correctly, this strategy will not only result in the production of the *right scientific information* but the information will more likely be available *when it is needed*.

Building program value. Building LTEM program value is the cornerstone of success. People will fight for what they value. In the USNPS, programs that are valued receive funding and staffing support; those that aren't get cut when finances get scarce. The requirement for LTEM programs to operate for the "long-term" is obviously critical, yet most difficult to assure. Capable science program managers may be able to generate enough energy to design and get a program started, but what assurance is there that it will be continued into the future? What can be done to make LTEM programs as secure as park interpretive and visitor-protection

programs? The answer, again, is value. Program managers must take every opportunity to make the information gained from LTEM programs available and useful for management as well as for scientific purposes. We cannot take it for granted that park managers will support science for its potential value to some future successor. Value, like beauty, is in the eyes of the beholder. Until the USNPS develops a much more sophisticated agency understanding of the need for sound science programs, it will be up to individual park science program managers to foster an appreciation for science at the local level.

As critical park management issues unfold, park scientists should immediately start looking for ways LTEM and research data can be used to develop and support the battle plan to protect the park resource being threatened. Each time that science "wins the day" for the manager, positive reinforcement occurs and value is generated. This science program philosophy cannot be left to chance. It must be a part of a well-designed, value-building strategy. Failure to do this can lead to the demise of even the most scientifically credible LTEM programs.

Creating science partnerships. The recent USNPS restructuring process generated a lot of discussion about the values of developing partnerships. Most references have been in regard to management partnerships with other agencies and the conservation community. Science managers should not overlook

opportunities to generate science partnerships. One of the greatest values of science partnerships is the diversification of both financial and staffing support. There is a strong desire to want to completely fund and staff an entire LTEM program with agency-funded personnel. This might be an ideal situation but it does not fit with the reality of today. LTEM programs are usually very labor-intensive and costly. Diversification of funding and staffing support makes these programs less likely to be affected by agency budget shortfalls during lean years.

Many LTEM programs have components that can be supported by partner funding or staff assistance. Examples of potential partners include other federal and state resource agencies, Native American tribes, undergraduate university programs, well-organized conservation groups, the Student Conservation Association, and private-sector cooperators such as "Friends of the Parks" groups, trusts, and park auxiliary co-operating associations. If carefully supervised, some types of data collection can be accomplished by the use of non-USNPS staff. Funds raised by cooperating associations and trusts can also be applied to supporting LTEM programs.

This type of diversification is not only beneficial for protecting programs from park-based funding shortfalls, but serves as an incredible educational tool and a way to involve more people in park science programs. Building highly supportive

constituents that have a true understanding of the natural and cultural values of parks is essential to the survival of the National Park System. A wide range of involvement in LTEM programs may turn out to be one of the best ways to build truly effective partnerships and caring constituents.

Celebrating achievements. This factor is closely related to building value. Science managers take the time to publicize events when science is used to improve resource stewardship or visitor experiences. This celebration should be carried out both internally and externally with park and agency partners. The media should be used fully to facilitate celebration and should be recognized as an integral part of the partnership-building agenda. Celebrating LTEM

program successes will help in building a widespread understanding of the relationship of science to park stewardship.

There is no substitute for good science in the design of park LTEM programs. Conversely, there is no substitute for developing a sound LTEM program implementation and maintenance strategy. To keep the "long-term" in the LTEM acronym, science managers must understand the importance of both. Managing successful science-based resource programs in national parks is not an easy task. The most difficult of all components may prove to be keeping an LTEM program alive and well within the constraints of government service and an agency struggling to re-define its mission.

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Perhaps, after all, America never has
been discovered. I myself would say
that it had merely been detected.

—*Oscar Wilde*

Education . . . has produced a vast
population able to read but unable to
distinguish what is worth reading.

—*G. M. Trevalyan*

Today's public figures can no longer
write their own speeches or books,
and there is some evidence that they
can't read them either.

—*Gore Vidal*

National Parks in the United States

An Overview of Current Conditions

Based on remarks presented at the IUCN Commission on National Parks and Protected Areas North American Regional Meeting, Lake Louise, Banff National Park, Alberta, October 1995.

Franklin K. Lane, secretary of the Interior in 1916, directed Stephen T. Mather, the first director of the U.S. National Park Service, to “stay abreast of what other park services are doing elsewhere in the world.” It was a good idea then—and it’s even a better idea today.

In the more than 7,500 parks and protected areas in over 145 nations, we have remarkably similar goals, shared objectives, and many issues in common. Among the most challenging issues are: reduced or static budgets in economically unstable and inflationary times, unsustainable and often incompatible surrounding land-use practices, increasing social pressures for demonstrable public benefits and short-term gains, the growing necessity for greater cost efficiencies and wrenching institutional streamlining, the contradictory and perpetual desire for more personnel and increased management capabilities, and the erosion of public trust reflected in a growing cynicism toward governments.

It is just common sense that our common issues can be addressed more effectively with a common effort. The world park community and the resources for which we are responsible will be better served with a

pooling and sharing of renewed commitment, information, techniques, concepts, and innovations—among ourselves and with our public beyond the walls of the Chateau Lake Louise.

In the 21st century, no one organization, agency, or institution responsible for parks or protected areas can reasonably expect to survive intact, much less effectively resolve these challenging public-trust issues, without significantly strengthened partnerships and unprecedented cooperation in meeting common goals. When you are up to your belt in alligators, it is difficult to protect the swamp.

In the United States, parks at all levels of government and protected areas across the country grew in numbers and popularity between 1985 and 1995. In the United States, national park rangers emerged as the most-liked of all federal employees in nationwide polls. An active Congress

added 31 new national park areas in the last decade. We now manage a total of 369 units covering more than 80 million acres (about 3% of the U.S.). Combined with other wildlands such as public forests, wildlife refuges, sanctuaries, wilderness and the state park systems, the U.S. is approaching 12% of its territory under conservation management. In national park areas, we had a 26% increase in visitation to about 270 million visits per year during this same period. More than 700 million additional visits were made to state parks this year.

As you well know, however, the popularity of parks is a double-edged sword. Budgets did not match this affectionate embrace. After decades of modest funding increases for the USNPS to a level of \$1.4 billion in fiscal year 1995, we now anticipate declines as measured against both appropriations and inflation. Our total USNPS appropriation for 1996 is a huge 6.6% drop from 1995—and 11.5% less than we asked for. Internal adjustments to respond to the legislated requirements of a more complex and expanded system, however, has resulted in a growing backlog in maintenance from an estimated cost of \$1.9 billion in 1988 to \$4 billion today. Our entire infrastructure—roads, emergency and patrol vehicles, bridges, buildings, water treatment plants, trails, fire-fighting equipment—is in a growing state of disrepair.

Despite increases in visitation, services in parks are being curtailed.

Public facilities, visitor centers, even entrance stations where fees are collected are open fewer hours a day, during shorter seasons. Interpretive programs, long believed to be the key ingredient to an aware, interested, and involved public, have been reduced in diversity, duration, and dimension. Frequent and intensive employee development programs, required to prepare a capable, skilled, and cohesive field management staff, will lapse almost entirely this year—training fund requests were entirely lost in the appropriations process in Congress.

According to a recent Government Accounting Office report to Congress (published in August 1995), national parks are at a crossroads. We are advised in this report that we must do one or more of the following: (1) increase our financial resources; (2) limit or reduce the number of units in the National Park System; (3) reduce the level of visitor services. Further, we must, along with all other U.S. federal agencies, stretch the available fiscal resources with more efficient management and performance measurement systems. Remember the alligators!

Interpretive programs at Shenandoah National Park have been cut 80%; last year life guards were no longer on duty to protect swimmers at Padre Island National Seashore. And at the same time, the U.S. House of Representatives is proposing to reduce the size of the currently authorized boundary at Shenandoah. The result would be development in areas

critical to the environment of this lovely park on the doorstep of the urban Eastern United States.

Research and resource management budgets have suffered as well in an effort to address broad ecosystem issues and avoid "ecological train wrecks." A consolidation of scientists and financial resources from several agencies was accomplished with the creation of the National Biological Service (NBS). Greatly reduced funding support for NBS, however, has left us with a net loss of capability, rather than gain. And we are still not able to monitor the condition of many vulnerable resource systems in areas we manage. The train clearly is off the track. The loss of funding that was originally part of the National Park Service's science program and the erosion of the ability of the dedicated scientists who were paid with this money to do critical park-related science could well turn out to be the "Love Canal" of the national parks—the most serious assault on our ability to protect the parks in the history of the National Park System.

Fiscal conditions in other park and protected area agencies in the United States are no better, and in most cases worse. There is an inescapable irony in that, as we gradually have refined our economic modeling techniques and now have the basis for concluding that 11 of the national parks each generate close to \$1 billion per year in regional economic revenues, we're going broke. An additional 25 national park areas each generate an estimated annual regional revenue of

close to \$100 million in services, sales, employment, and taxes. And we are still going broke!

The ongoing work of one of IUCN's CNPPA members, Lee Thomas of Australia, and his USNPS counterpart, Ken Hornback, have gone a long way to help management refine presentations on socioeconomic benefits. But it is going to take further persuasive refinements of broader regionally based assessments to bring asset- and investment-protection arguments home to legislators and their constituencies. And even more work for them to understand that national parks are not just theme parks, and that the reasons for their popularity lie in their inherent natural and cultural resources, their ability to remain our real heritage as we move through an ever-changing future, more devoid of our cultural past and our natural base in every passing year.

In the United States, the response to park revenue enhancement and cost recovery has been most successful at the state level. While the state budgets have exhibited relative declines and have unquestionably been affected by federal grant reductions (now eliminated in the 1996 appropriation), at least several state park systems have managed to meet, or almost meet, full annual operating expenses; a 65-85% coverage is more common. USNPS doesn't come close to these levels—nor are we likely to. Revenue generation often comes at high cost. According to the *State Government News* (January 1995), in an article titled "Nature Under Siege,"

state parks "have become more expensive to visit and less natural as park managers increasingly focus on generating enough revenue to stay in business." Most chillingly, I don't believe the visiting public knows what they have lost. David Weizenicker, Wisconsin's state park director and president of the National Association of State Park Directors, called the constant struggle for funding the biggest change he has seen in 32 years of park management. It is not a positive comment.

In today's climate of tight fiscal constraint, it is unlikely that needed additional funds will be provided through normal appropriated means. Of the possible alternative sources that remain, increased entrance and other user fees, higher returns from in-park concessioners, and funds from non-federal agreements appear to have the highest potential for supplementing budgets. Currently, less than 8% of the national park annual operating budget is generated through such means. For benefits to be realized, such funds would have to stay in the parks. Until recently, all national park revenues went into the general receipts of the U.S. treasury.

For each park visit, an average of \$0.33 is received—it costs USNPS an estimated \$4.12 for each such visit. In some areas, a fee of over \$25.00 per visitor would be required to cover a unit's annual operating costs, assuming visitation levels would remain the same and we had the staff to collect the fees. With entrance fees fixed in law on a park-by-park basis, there is

little chance of significant off-setting growth of return in this area, unless both the price of entrance fees were dramatically increased across the board and this amount could be retained for park use.

However, increases beyond some level would no doubt affect levels of visitation, and perhaps exclude segments of the society from access to their heritage. Fee increase proposals must be carefully thought through. The 1996 appropriations bill establishes a fee demonstration program for all land-managing agencies. It is a start. USNPS has a fee bill in the Congress, which we are currently working to improve even more.

Additionally, repeated efforts have been made to increase revenues from concession operations—changes in contracts including shortening leases and renegotiating the percentages to government have improved the rates of return. This wouldn't take much. Concession leases of the past averaged only 1-2.5% of gross sales. Just several years ago, combined concession revenues returned totaled only \$13 million per year, equal to approximately 1% of the USNPS budget. Currently most such funds also go into our treasury as well, not back to the parks, although this is changing in some instances. USNPS has a bill in Congress to improve competitiveness and return higher percentages to the parks. Both the fee and the concessions bills are critical.

Most national park unit budgets average as much as 70-95% in employee salaries and benefits. Some, if

they were to operate in 1996 as they did in 1995, would need 110% of what they will receive for all park operations just to pay people currently on board. To reduce central overhead costs and increase efficiency, we are in the midst of a major restructuring of regional and headquarters offices. Our intent was to reduce central offices by 40%, decentralize essential functions, and redistribute suitable personnel and their salaries directly to the parks. This process is well under way. However, because of eviscerating budget restrictions and lower appropriation expectations, the primary benefit gained will be reduced central-budget-office overhead costs with few actual gains to park budgets or personnel ceilings.

Are there other more creative alternatives? Last month one of our distinguished colleagues asked if greater economic benefits could be achieved by turning the management of Grand Canyon over to a large corporation like Disney, Inc.—perhaps a Club Med-like resort, or Safari Land? A legitimate question. Many, but not all, such corporate theme parks have proved highly profitable. What are the consequences of a poor return on investment? Who has the proprietary interest in our national (and international) resource base? What is the real value of an approach that does not afford all citizens access to their parks at reasonable costs? And one that is built first on entertainment principles, not natural or cultural resource protection principles? Such schemes are not appropriate to park

systems dedicated to retaining our national and cultural heritage for the benefit of future generations. I do not believe such an idea is worth the risk. Nor do the American people, if we can judge by what happened when Disney proposed to build a Civil War theme park in Virginia—and got run out.

Elsewhere in the world in recent years, alternative private non-profit management considerations have indeed become accepted and implemented. While only time will tell if such actions are in fact in the long-term public good, early World Bank reviewers were hard-pressed to identify successful case studies of such expediencies. Unfortunately, most have proven to be short-lived phenomena with externally funded, high front-end costs and built-in obsolescence. Managing heritage in perpetuity is a long time, and even the great conservative economist Adam Smith wrote that this function should be reserved “to the Crown.”

To further fix and reduce costs, it has also been suggested that the National Park System be limited to no further expansion, or perhaps even should cut the number of its units. Congressional initiatives to establish a commission to review, identify, and remove areas from the System are still alive. There is no certainty that such efforts will not be successful. To achieve substantive cost savings, the equivalent to closing some of the larger national parks would be required. To save 10% of the USNPS operating budget would require

eliminating the equivalent of the 200 least-expensive parks.

What is important is for Congress to establish strong criteria to use when considering new additions to the National Park System, and rejecting the less-worthy suggestions. If there are existing units that would not meet such criteria, Congress already has the authority to deauthorize them. It has happened in the past, and just last year Congress moved the Kennedy Center for the Performing Arts out of the National Park System. If Congress wants to change what they have put into the System they already have the authority to do so. Do we really need a new law that will open up the potential to take a run at federal heritage protection, at a tradition that spawned park systems worldwide?

All federal land-management agencies in the United States (as elsewhere) are faced with rapidly mounting private-sector pressures for commercial resource development. When our successors look back from the bicentennial of the park idea and the first century of ecosystem management, will we be judged as having demonstrated that we adequately understood the "limits of acceptable change"? "Risk analysis"? And be proud of our legacy of "sustainability"? Our pledge to future generations requires at the very least that we be cautious. There are very few quick fixes in our business. Concerted efforts are currently being made to open the Arctic National Wildlife Refuge (ANWR) to gas and

oil exploration. This area, as our Canadian friends have long been aware, is essential for the transboundary health of the Porcupine caribou herd. Continued oil and gas exploration, hard rock mining, habitat fragmentation, exotic species introduction, clearcutting, and continued development in the Yellowstone ecosystem potentially threaten the very resources determined to be of World Heritage status in the world's first national park. As was pointed out during a public forum there in September 1995, a body of gold ore may have the potential extracted value of millions of dollars over 40 years, but Yellowstone generates close to \$1 billion every year in its current state—and always will, if protected.

Congressional initiatives for reinstating timber harvest in currently protected wildlands of the Tongass National Forest in Alaska could potentially threaten the integrity of the transboundary Canadian and U.S. World Heritage site from Kluane National Park through the Tatshinini-Alsek drainage to Glacier Bay National Park and Preserve, the largest managed wilderness in North America.

I would like to share with you a few of my own thoughts about the World Heritage designation—this increasingly visible management tool. For two decades after ratification of the World Heritage Convention, the U.S. quietly went about implementing our legal treaty responsibilities in identifying and nominating proper-

ties which it believed to be of outstanding universal significance. Over the last five years, the Convention has become operational as an instrument for domestic conservation and international cooperation.

The listing of Everglades National Park in Florida as a "World Heritage Site in Danger" by the 21-nation intergovernmental World Heritage Committee supported critical negotiations and litigation resulting in the cost sharing of an \$800 million wetlands restoration program. A proposal for the realignment of highway Route 101 through Redwoods National Park, a World Heritage Site in northern California, was modified from an original plan of removing 750 old-growth redwood trees to the now-acceptable level of no more than five (and probably only two) after the intervention of the World Heritage Committee.

In the U.S., Canada, Mexico, and the 140 other countries that have ratified this convention, we as individuals and collectively have perhaps our most effective emerging tool for broadening our global base of support, strengthening public resolve, and reinforcing national pride, while more effectively conserving biological diversity. Such long-term international cooperative goals must not be precluded by the context of our admittedly stretched situation or current political exigencies.

For the last one and a half years, the USNPS has been brilliantly and critically represented in the Middle East peace negotiations between Is-

rael and Jordan by Rob Milne. This summer, I personally traveled with Sharon Cleary (who, like Milne, is with USNPS's International Affairs Office) to Tiberias to participate in these ongoing deliberations. At this time, all parties have agreed that disputed boundaries in the Jordan Rift Valley between Aqaba and the Golan Heights can be addressed in part with the creation of an international transboundary peace park. A joint international marine park has been designated in the Gulf of Aqaba and plans are under way for similar action in the area of the Dead Sea. When such opportunities and the need for international cooperation are presented they simply cannot be ignored.

Closer to home, after decades of productive interchange, the USNPS and Parks Canada have negotiated and will sign at the earliest appropriate opportunity a memorandum of agreement which will further strengthen heritage cooperation between our two countries. As with Canada, we share ecosystems and many areas of common heritage with Mexico. The USNPS, in fact, has jurisdiction over the northern side of 28% of the Mexico-USA border. With the recent designation by Mexico of several border and near-border biosphere reserves, significant strategic steps have been taken to strengthen joint conservation efforts in the Chihuahuan and Sonoran transboundary ecosystems. By definition, such systems can only be managed with the collaborative involvement of many individuals and

organizations from both nations.

These are significant and hopeful steps forward, and should be applauded. But as we do that, let us look soberly in summary at the state of protected areas in the United States.

The 1996 budget cuts are terrible for the National Park Service. They are worse for the rest of the agencies. Even more alarming is the pattern of combining the budget process, under the legitimate concern for deficit reduction, with other legislative approaches to mount a massive assault on the environmental protection side of the equation for a sustainable future. Combine the current political climate with the pressures of an increasing population and their need for jobs, a better life for their children, and a secure future, in concert with an urbanizing citizenry with little understanding of their direct ties to the natural world. The result is the greatest pressure against continued, let alone increased, opportunity for protected area conservation that we have seen since World War II.

At the moment, the environmental organizations in the United States are less influential than they have been in decades. A complete reversal of this trend is needed. It can only occur through grassroots citizen education, understanding, and involvement, in which we must all participate. It is my hope that the diversity and professional capacity represented in the membership of the CNPPA continues to expand, and be increasingly activated in North America to meet these park and protected area challenges and opportunities of the next century.

This is clearly a time for developing coherent strategies; a time for convergent, not divergent, efforts; a time for cooperation. As Jay D. Hair said in his remarks to you here, this is a time to climb mountains. I climbed the Grand Teton this summer—hard work for me. What lies before is harder work, but the reward is a brighter future for this planet. We won't hear our great-great-grandchildren say, "Thank you." But they will.



Editor's note: Copies of the Government Accounting Office report mentioned by the author are available from the National Park Service's Office of International Affairs, P.O. Box 37127, Washington, D.C. 20013-7127.

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Natural Protected Areas in Mexico

Mexico's wealth in terms of biodiversity is widely recognized worldwide. However, this richness is suffering a rapid deterioration whose rate has increased in recent years. Our country is undergoing an economic crisis never before experienced. Unfortunately, the development paradigm Mexico is following dictates costs in terms of improper use of natural resources, and hence will deliver a by-product we all know: ecosystem impoverishment or degradation.

In light of these facts, it seems appropriate to confer a greater priority on measures and actions promoting the sustainable development and use of natural resources. Regardless of priorities, however, the development of strategies and concrete actions for the management and operation of the protected areas of Mexico is still incipient, and in many respects shows serious deficiencies.

In 1988 the General Environmental Law was approved by the Congress. It constitutes the legal frame-

work of the National System of Protected Areas (known as SINAP) and of all natural protected areas in the country in general. Its second heading reads "Natural Protected Areas" and contains in two chapters a total of 35 articles with specific regulations on protected areas.

Article 76 reads: "The natural protected areas that are considered of Federal interest constitute as a whole the National System of Protected Areas." Article 46 of the same law lists the categories:

Table 1. A brief description of each category.

I	Biosphere Reserves
II	Special Biosphere Reserves
III	National Parks
IV	Natural Monuments
V	Marine National Parks
VI	Areas of Protection for Natural Resources
VII	Areas of Protection for Flora and Fauna (terrestrial and aquatic wildlife)
VIII	Urban Parks
IX	Zones Subject to Ecological Conservation

Hence, SINAP comprises nine major management categories, as well as five "undercategories" included within Category VI. The cor-

respondence of these categories with those internationally accepted and more widely used (e.g., the IUCN categories) is not clear at this point. In

fact, the "National Park" category as internationally defined confers a great deal of protection on natural resources, whereas in Mexico the same designation is used to refer to areas that serve a primarily recreational purpose.

We tend to talk about the Mexican "System" of protected areas as if such a thing really exists. Legally, as per the aforementioned law, it does exist, but in reality there is no system. What we have is a collection of discrete units established at different times and for various purposes which are not related in any way and which, even collectively, have failed in achieving the goal of protecting Mexico's natural resources.

There are differences in opinion with regard to the number and extent of the existing protected areas in Mexico. In IUCN's list of National Parks and Protected Areas, Mexico is mentioned as having a total of 61 areas, covering 9,419,669 ha.¹ According to our calculations, based on the information provided by each of the legal documents used to declare the areas, the actual extent covered by SINAP is slightly over 10 million ha (i.e., about 5% of the nation's territory). But this figure considers only federal territory, and includes the areas traditionally recognized under SINAP while leaving out other areas,

also formally established at the federal level, such as forest reserves and protected watersheds, and other names and categories that the law includes as undercategories within SINAP. If all of them are included, approximately 34% of the land area of Mexico is subject to a certain degree of legal protection, at the federal level, due to its natural features (Table 2).

If all the protected areas established at the state level were also taken into consideration, the total number of protected areas in Mexico would rise to more than 674, amounting to roughly 40% of the territory of the country. For example, in the state of Morelos only four areas are recognized at the federal level (shared with other states in fact), but, after reviewing the state's Government Official Acts, or Periódico Oficial "Tierra y Libertad" publications from the past 75 years (1919-1994), we found that there are 108 additional decrees imposing some degree of protection on areas of various sizes within the state.

The figures, therefore, only reveal the extent of the paperwork that has gone into establishing protected areas under more than 150 categories and names throughout the country. It is not an indicator of what is truly being strictly protected. Mexico is not immune to the "paper parks syndrome" that, as an epidemic disease, has hit several countries in the world.

The authorities were proud of creating the system under the General Environmental Law of 1988, but they made a very serious legal mistake

¹ Editor's note: A check of the 1993 *United Nations List of National Parks and Protected Areas* (which is the most recent edition of the IUCN list) shows slightly different figures: 65 areas, covering 9,728,732 ha.

Table 2. Summary of federal-level Mexican protected areas

Management Category	Number of Areas	Extent (ha)
Main Categories of SINAP		
Biosphere Reserves	17	6,759,264
Special Biosphere Reserves	18	738,725
National Parks	60	824,653
Natural Monuments	3	13,023
Marine National Parks	2	386,006
Areas of Protection for Natural Resources (terrestrial and aquatic wildlife)	5	1,391,355
Other protected areas (beaches)	18	33,305
Research Stations	2	749
Subtotal, main categories of SINAP	125	10,147,082
		(5.07% of national territory)
Undercategories of SINAP		
Forest Protection Zones	77	11,190,410
Hydrological Watershed Protection Zones	12	45,000,000
Nat. Irrigation Districts Protection Zones	116	15,000,000
National Forest Reserves	19	1,158,861
Subtotal, undercategories of SINAP	224	72,349,271
		(29.23% of national territory)
Less overlap between main categories and undercategories		-13,886,200
Grand Total	349	68,610,792
		(34.3% of national territory)

Sources: Flores-Villela and Ordoñez 1995, PG 7 Consultores Data Bank (unpublished data).

Note: If state-level areas were included, the total number of protected areas would rise to more than 674, covering roughly 40% of the national territory.

which is never mentioned and which nobody realized until it was too late to do anything. They forgot to acknowledge, within the clauses of the 1988 law, the former existence of protected areas. Therefore, from a strict legal standpoint, only 22 protected areas comprise the current Mexican System, because only 1 Na-

tional Park, 2 Marine National Parks, 5 Natural Resources Protection Areas (including Flora and Fauna), 3 Natural Monuments, and 11 Biosphere Reserves were established after 1988 (Table 3). They represent only 17.6% of the number (though roughly 74% of the extent) of the federal areas traditionally considered to

Table 3. Mexican protected areas legally in the SINAP (i.e., established after the General Environmental Law of 1988)

Name (State)	Extent (ha)
Biosphere Reserves	
Desierto de Vizcaíno (Baja California Sur)	2,546,790
Calakmul (Campeche)	723,185
Lacantún (Chiapas)	61,873
Pantanos de Centla (Tabasco)	302,706
Yum Balam (Quintana Roo)	154,052
Sierra de la Laguna (Baja California Sur)	112,437
El Pinacate y Gran Desierto de Altar (Sonora)	714,556
Alto Golfo de California y Delta del Río Colorado (Sonora & Baja California Sur)	934,756
El Triunfo (Chiapas)	119,177
Chamela-Cuixmala (Jalisco)	13,142
Sierra del Abra-Tanchipa (San Luis Potosi)	21,464
Flora and Fauna Protection Areas	
Laguna de Términos (Campeche)	705,016
Chan-Kin (Chiapas)	12,185
Corredor Biológico Derrame del Chichinautzin (Morelos)	37,302
Marine National Parks	
Sistema Arrecifal Veracruzano (Veracruz)	52,239
Arrecife Alacranes (Yucatan)	333,768
National Park	
El Tecuán (Durango)	1,000
Natural Monuments	
Yaxchilán (Chiapas)	2,621
Cerro de la Silla (Neuvo Leon)	6,045
Bonampak (Chiapas)	4,357
Natural Resources Protection Areas	
Archipielago Revillagigedo (Federal)	636,685
Las Huertas (Colima)	167

have been part of SINAP. They cover much less than 3.7% of Mexico's territory (given that some are marine and national waters and continental shelf are not accounted for in deriving this percentage).

This legal clarification, which might seem like a futile mental exercise, is on the contrary a very serious matter. The flaw in the 1988 legislation implies that unless the remaining federal units are established again through a new presidential decree, they have no legal protection. As anyone can understand, this action requires a top priority that, it is to be hoped, the newly created National Council for Protected Areas will recognize and recommend.

Another legal aspect worth mentioning is that, as part of the modernization crusade for rural areas that the former federal administration undertook, Constitutional Article 27 was reformed (decree of January 6, 1992). It establishes new forms of production and of association for production. The objective, as the decree states, is to promote and favor investment in rural areas in the hope that this will translate into a source of wealth and well-being for the peasants and *campesinos*.

These reforms enable the actual alienation of property of the formerly

untouchable community land-tenure regime called *ejido*. Now, new arrangements between *ejidos* can be explored, they can incorporate or make new associations, allow the use of their land to a third party, or even continue their current situation. This means that part of the land of the *ejidos* can be bought or rented, making national and foreign investments feasible on *ejido* land. Even commercial enterprises can own rural land now. Naturally, this reform will have implications for protected areas which have not been fully felt yet.

In December 1994 the Ministry of the Environment, Natural Resources, and Fisheries (SEMARNAP, the Secretaría de Medio Ambiente, Recursos Naturales y Pesca) was created. This is a clear reflection of the present federal government's interest in incorporating ecological criteria into development schemes along with the economic, social, and political criteria commonly used. SEMARNAP has established as its major task the promotion of the "transition towards sustainable development." SEMARNAP's responsibilities include wildlife (flora and fauna), forests, fisheries, and the administration of all federal protected areas.

The ministry's priorities with respect to protected areas are to:

- Re-classify them, perhaps following IUCN's categories;
- Define priorities (both areas and actions);
- Decentralize administration, following local and regional interests;
- Terminate certain areas;

- Promote co-management and co-responsibility by encouraging the involvement of the private, social, and academic sectors;
- Foster mechanisms for management to achieve self-maintaining status; and
- Perhaps create an independent administrative body over the long run.

SEMARNAP has also begun establishing the National Council on Protected Areas by inviting a select group to join it. The Council's profile is primarily of a technical nature and the hope is that it will generate policies, recommendations, and even a national strategy that government entities may then follow. In addition, protected areas recently have been recognized as the backbone of the governmental biodiversity conservation strategy. These two events—the creation of the Council and the recognition of role protected areas can play—are perhaps the most encouraging recent developments. They bring some hope for an emergence of a new era for protected areas in Mexico.

The efficiency of a system is limited if there is a defined centralism and very little or no local decision-making and implementation capacity. In this sense, the federal government has historically allowed only very little participation from local governments, communities, or organized citizens. This condition probably will change in the near future given the new open attitude that is steadily penetrating governmental structures at different levels. If a change in this direction does not take place, we will face more serious limitations in the proper operation of the Mexican System.

There is a glaring lack of planning in the field of protected areas in Mexico. No specific and appropriate criteria for selection or ranking priorities are applied that would guarantee them to be truly representative. Many of the areas remain as parks on paper, far from being properly managed. Rather, in many cases they are constantly plundered and irreversibly deteriorated. The oblivion in which many areas are left is evident also in the lack of resources—human, material, and financial—that they are allotted, and in the multiple problems of operation and management.

Although in Mexico there are no specific research or training programs designed for natural protected areas, a few efforts have taken place, primarily in the biosphere reserves (old, new, and proposed). For the El Triunfo Biosphere Reserve in Chiapas, for example, social and economic surveys were conducted along with basic studies on vegetation, the distribution and abundance of endangered and non-endangered species, inventories of wild flora and fauna and of domestic animals and cultivars, land tenure studies, and so forth. They were the basis for the proposal submitted to the authorities for El Triunfo's formal establishment, and also served as the framework for all the planning, operation, and management of the area. There are a few other examples as well.

The increase in nominally protected land area and in the number of conservation units has simply happened; it is not the result of a well-thought-out, coherent national strategy. The growth was merely driven by opportunities, political convenience, some degree of imitation, and a certain inertia or momentum. Institutional and even individual preferences have also shaped the system, as has (exceptionally) the pressure exerted by both radical environmental groups and mainstream conservation organizations, including research centers and universities. As a result of this diverse origin and evolution of the areas, the so-called System is inadequate and therefore must undergo major surgery, with bad tumors removed and new organs and units transplanted.

As another result of this confusing evolution, the owners of land lying within the boundaries of most of the protected areas have not been compensated and still continue development activities that destroy the natural ecosystems (e.g., legal and illegal use of resources, hunting and poaching, deforestation, extraction of materials). On the other hand, oftentimes tracts of land have been incorrectly allotted to *ejidos* or communities regardless of being part of previously established protected areas. This situation brings about a number of additional problems, such as the increase in irregular and dispersed human settlements, immigration, clearings, provision of goods and services (electricity, drinking water,

food, roads), rubbish dumps, and a list of others you can imagine. It can even be a cause of social unrest, as the recent uprising in Chiapas by the EZLN made evident.

The federal government has openly announced its interest in fostering a shift in its approach towards protected areas. The new approach stems from the sincere realization of its lack of capacity to manage the System and calls for the participation of all sectors of society. In particular, the private sector has been invited to invest as concessionaires and take an active role in protected areas. I should point out, however, that the hook—improperly baited, in my opinion—has not been bitten yet by any sector.

Major decisions and crucial definitions as to the degree, extent, and nature of such participation must be made. Moreover, radical legal changes have to take place before the private and social sectors can participate. Undoubtedly, collaboration between various sectors is badly needed and should be explored. Although there are a few exceptions, in general neither the private nor the NGO sector has the capacity to engage in such a venture. A major question remains unanswered, however: Will the government actually allow full responsibility for an area to be given to, say, a private consortium? History has shown the opposite to now. Many other controversies, debates, and questions come to mind just with the thought of how this collaboration might take place.

International collaboration and cooperation in the establishment and management of some natural areas in Mexico has been very useful, given that it has enabled continuity of projects in many of them. Such as been the case in El Triunfo and El Ocote in Chiapas, Calakmul in Campeche, Sian Ka'an in Quintana Roo, and Manantlán in Jalisco, to mention just a few examples. Support has been provided in various ways and has also helped awaken the interest and flow of support from local authorities and people.

Now that the NAFTA is in effect and the Commission on Environmental Cooperation established, the need to foster greater cooperation among Mexico, the USA, and Canada has been recognized. We believe we should take advantage of the opportunities this new institution will open, to gain from the experiences we can share.

The traditional concepts of protected areas as followed in Mexico have grown old and impractical. The areas failed to protect resources and, even worse, failed to be properly valued by locals or considered a worthy national investment. By searching for innovative approaches and through gained knowledge and experience, new theories and schools of thought have emerged throughout the world, and their impact on Mexican protected areas is to be expected, in terms of economics, legislation and regulations, management, innovative institutional arrangements, operation, establishment, priority ranking,

planning, and design.

The National Council on Protected Areas will be given the responsibility for overseeing and providing significant input on the long-expected but still non-existent National Plan for Protected Areas. Drawing from the most updated information both nationally and internationally, the plan must clarify the expected mission, goals, rationale, and priorities for the System, in terms of budget allocation, representativeness and ecological significance, critical areas, and other major issues and topics. In the process of producing such a document, the Council will make its recommendations with respect to the need to identify new areas that should be incorporated into the System, as well as those that must be taken out.

The government, through the Council, should acknowledge and take advantage of the leading efforts in producing a comprehensive study of the current state of all protected areas in the country. This study must constitute the framework of a new System and must also be regarded as the starting point of the Council and as a tool to foster international and regional cooperation and understanding.

Perhaps one of the greatest needs is that all the tasks inherent to identifying, selecting, recategorizing, formally establishing, ranking, evaluating, monitoring, operating, and managing the natural protected areas of Mexico must be professionally conducted. As long as the necessity for

this professional activity is not recognized with the seriousness and respect it deserves, improvisation will continue and mistakes will be made, some of which will be hard to amend and which oftentimes will have severe repercussions and irreversible effects. The era of empiricism and improvisation in relation to protected areas must be left behind. It cannot be justified in the case of Mexico nor in any other place.

The imbalance between the

magnitude of the challenge, and the meager efforts devoted to cope with it, prevails. The accomplishments are still very little compared with the task ahead. The National Council on Protected Areas, along with the growing interest of private, academic, and social entities to participate, give us some hope. Things might change for protected areas in the near future. Nevertheless, it is fair to say that the future of the protected areas in Mexico is uncertain.



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Hunting as a Tool for Wildlife Management

When properly practiced, hunting can be an important component of good land and wildlife management. It has the potential to be useful in two ways: first, in helping to maintain the integrity of natural conditions, and second, by helping to build and strengthen public support for land preservation.

Hunting is one of the most ancient of human activities. Throughout human history it has affected the quality of life of individuals and the broader cultural realms of art and literature. Hunting and its traditions have great cultural value for human societies, and should be maintained for the benefit of future generations. Unfortunately, the number of people who hunt is declining, and there is a danger that some day it will disappear entirely.

Equally unfortunate is the diminishing voice of nongovernmental citizen activists who have traditionally demanded adequate budgets for parks and refuges. To some extent these phenomena are related: hunters have traditionally been strong advocates for increased funding for parks and wildlife. They were a major force behind the founding of the modern environmental movement in the United States, and President Theodore Roosevelt and other activist hunters of his era were strong allies of land preservation. However, in recent years other voices have become more prevalent in the arena of environmental preservation and land

management.

But hunters and the public lands need each other. As government budgets grow tighter and tighter, public lands managers and their supporters have found themselves in a fierce competition for funding. They need the strong voices of hunters to join them once again. We believe that it would be beneficial for both hunting and environmentalism if hunters were once again recognized as environmentalists.

One of the goals of the Aldo Leopold Society, with which we are associated, is for hunters to come to see themselves not only as a part of nature, carrying on ethical and ancient practices involving hunter-gatherer traditions, but equally as environmentalists. To this end we support the permanent preservation of landscape and species diversity, understanding that the majority of the species in a natural community are unrelated to hunting. We would like to distance ourselves from those groups such as the National Rifle Association who detract from the tradition of hunting in their advocacy of a "shooting is the issue" attitude, and to

establish a middle ground between the extreme positions that currently hold sway.

It is not our intent to suggest that hunting necessarily be allowed in all parks or preserved landscapes; in fact, it would be far better to achieve a balance with predator-prey relationships in place. It should be noted, however, that humanity has historically served as a predator, strongly impacting animal populations. To deny our role as a predator is to elevate ourselves above the natural world in which we live. Humans' attempts to declare themselves independent of nature are at the root of many of the environmental and social problems we see today.

Hunting as a Tool to Maintain the Integrity of Natural Areas

Imbalances often occur when people manage landscapes. Invasive, non-native plants are an example, and the removal or management of them is common practice. Likewise, imbalances in bird and mammal species have the potential to affect the integrity of a preserve. The understanding of that potential has only emerged in this century, and continues to be better understood as time passes.

One of the early observations of this phenomenon is described by Aldo Leopold in an article entitled "Wisconsin's Deer Problem" (*Wisconsin Conservation Bulletin*, August 1943). In this article Leopold discussed the George Reserve study by the University of Michigan. The George

Reserve was a 1,200-acre enclosed parcel without deer. In 1928 it was stocked with four does and two bucks, and by 1933 vegetation damage was clearly occurring. A census of the deer population showed that their numbers had increased to 160 in five years. The deer were immediately hunted down to a population of 50 and maintained at that level thereafter. Overgrazing and plant damage disappeared. This is a clear example of the usefulness of hunting as a management tool.

The Leopold Preserve, site of the shack in Leopold's book *A Sand County Almanac*, is itself an example of a managed preserve. About one-third of the white-tailed deer there are harvested each year in an attempt to maintain a balance with the vegetation of the preserve. Neighbors and other citizens who voice support for the preserve's excellence in the community do the hunting.

In *A Sand County Almanac*, Leopold described watching the "green fire" fade from a dying wolf's eyes. This incident marked the turning point in Leopold's transition from one who saw predators only as negative factors in game management—animals to be killed in order to increase game numbers—to someone who understood the importance of their role in maintaining balance. An example of the reason for this change in attitude was the debacle that took place on the Kaibab Plateau just north of the Grand Canyon after the turn of the century. In an effort to increase deer numbers for the enjoy-

ment of the deer-hunting public, predators, including mountain lions, were poisoned, trapped, and hunted to extirpation.

The deer population initially skyrocketed from its long-stabilized level of approximately 4,000 individuals in 1910 to about 100,000 animals in 1924. The range showed signs of drastic overgrazing, and despite warnings of impending disaster, nothing was done. Then, after two catastrophic famines, diseases and starvation reduced the herd by 60% in two winters. By 1939 it had dropped to a tenth of its peak size. The real disaster was that the range had lost much of the carrying capacity it had enjoyed prior to the population explosion. The pre-1910 numbers were no longer sustainable, and it was estimated that the population declined 25% from that level, to 3,000 animals.

Recent Examples of the Use of Hunting to Preserve Habitat

There are also numerous recent examples of the use of hunting as a positive tool in land management. In the 1960s, The Nature Conservancy (TNC) purchased the majority of Santa Cruz Island, one of the Channel Islands off of Southern California. The island has a long history of occupation and exploitation of natural resources, beginning with the stocking of feral pigs by Spanish sailors. When TNC took over, there were some 40,000 feral sheep on its part of the island. The organization decided to eliminate this non-native grazer,

which it considered one of the major detriments to the island's ecology.

Volunteer hunters were enlisted, and with a massive output of human capital it took less than one year to clear the TNC-occupied portion of the island of sheep. This case was an appropriate melding of needs and desires. TNC had a specifically determined biological goal, the elimination of a feral ungulate. It chose to utilize people, who considered it a privilege to be allowed to donate their time to undertake an immense physical task. The volunteer hunters were able to carry out the program successfully, in a socially beneficial manner. Another valuable level of cooperation came from the California Department of Fish and Game, which suspended its prohibition on wanton waste, allowing TNC to utilize its manpower to eliminate the feral animals rather than waste its time extracting massive amounts of biologically rich material from the system.

In a number of other instances, the U.S. National Park Service has also struggled—effectively, it would appear—to use hunting as a management tool. In a geographically and biologically related situation, the USNPS bought Santa Rosa Island, another of the Channel Islands. It decided to begin its exotic animal removal by eliminating feral pigs, an exotic species whose feeding habits have a negative impact on other vertebrates as well as on vegetation. This was done with contract hunters—sport hunters “deputized” by the USNPS for the project. Minimally

skilled employees removed the majority of the pigs. Helicopters were then brought in to further reduce the population. As the last few pigs were extremely wary and difficult to catch, trained hunting dogs were brought in for the final phase. The skill of these dogs and their handlers, developed through sport hunting, is of supreme importance in a pig eradication program. The USNPS was able to enlist these skills to help solve a difficult management problem.

The California Academy of Sciences' Pepperwood Preserve provides yet another example. Situated in Sonoma County, it is on the rural-urban interface, with all the problems and possibilities that entails. Border issues dominate management strategies. Pepperwood has 19 contiguous neighbors, and many more who consider themselves close enough to have an interest in its land-use practices. Part of the preserve is bordered by large ranches, part by five- to ten-acre ranchettes.

As on Santa Rosa Island, feral pigs are one of Pepperwood's land management challenges. Management of the pigs in Pepperwood's case was impeded by three things. First, the preserve has 25 miles of border, and pig-proofing it is beyond the financial ability of the Academy into the foreseeable future. Second, although many of the preserve's neighbors agree with the Academy's assessment of the pigs as harmful to the native habitat, a vocal minority consider them an essential element of the ecosystem and do not want them re-

moved or their numbers reduced. Third, the state of California's hunting laws are designed to ensure a sustained yield of pigs, rather than favor the control and elimination of pigs to protect native elements in the biotic community.

The Academy of Sciences has attempted to find its way through the maze of these disparate elements by using well-informed sport hunters as volunteers in an ongoing feral pig population reduction program. These hunters are selected and signed on as volunteers. Although it knows that it cannot eliminate pigs under the present circumstances, it is able to lessen the damage they cause by reducing their numbers. The Academy has tried two approaches. The first was to use volunteer sport hunters with dogs to catch pigs. However, because this occasionally resulted in the unintentional entering of neighbors' properties, hunting with dogs has been phased out. The Academy does continue to remove pigs using volunteer sport hunters with rifles. This is an inefficient method, as hunters average 13 hours to catch a pig, but the Academy can't afford to pay professional hunters to implement this program. The bottom line is that the use of volunteer sport hunters makes the program fiscally possible.

The Political and Social Implications of Public Support for Wildland Preservation

Land managers today face a multitude of social and political, as well as ecological, problems. We are learn-

ing to effectively manage wildlife and maintain the integrity of wildlands; now we must learn to manage the public support that can provide long-term funding for that management. We must learn how to relate natural systems to social systems.

The problems described above regarding management of the Pepperwood Preserve, or The Nature Conservancy's attempts to clear an island of feral sheep, are not atypical of the political and sociological aspects of managing preserved landscapes in a rapidly urbanizing America. It should be noted that TNC has continued to come under criticism from anti-hunting elements, in the form of both pickets and negative articles and letters, because of that sheep removal. These elements characterize TNC's efforts as improper management activities by an environmental group.

Another critical problem for land managers is funding. Given the current budget priorities of both private and governmental institutions, it seems clear that funding for wildland management, including national and other park management, will continue to decline. And as governments across the United States continue to feel the pinch of fiscal cutbacks, there is increasing concern that preserves, often owned by nonprofit agencies such as land trusts, will be denied tax exemption. Without tax exemption, the majority of wildlife preserves and other small land trust-held properties would not be sustainable over the long term.

Perhaps the biggest problem cur-

rently faced by the managers of wildlands, however, is the "Wise Use" movement, funded by contributions from the exploiters of public land, which would "privatize" public parks. The angry response by hunters who use the public lands has so far been instrumental in defeating these attempts.

All these problems need to be prepared for and dealt with professionally by those engaged in land preservation. A part of that effort will involve guiding public opinion to be an advocate for preservation.

Politics—the interplay of interest groups in the formation of policy—is an integral part of modern land-use management. In order to be effective, land managers need to understand that issues of resource allocation involve conflict and have important political implications. Unfortunately, the United States traditionally does not train resource managers in sociology or political science, preferring to focus on "pure" science. There is no evidence that this policy is changing; if it does not, we may be condemning our resource managers to irrelevance.

As was demonstrated by the threats made by the 1995 Congress and local governments, the political implications of resource management can be effectively dealt with by a non-governmental constituency. What is needed is a permanent base of support in the community for the values of wildland preservation, voices who say: Yes, that is a justifiable use of tax exemptions, or Yes, parks and pre-

serves need to be funded. Hunters once were one of the most active constituencies seeking support for wildlife, parks, and environmental funding within the government budget process. They need to be heard as environmentalists again. For the moment, however, they are perceived largely as supporters of the NRA, and little else.

Hunters have served as a strong base of support within the community. As their numbers have declined, however, so has their activism. The careful use of hunting as a management tool on preserves would encourage hunters of a thoughtful, professional caliber to become directly involved in wildlife management is-

sues. Through this involvement they would become allies.

Hunting can be done responsibly and sensitively, although its critics do not understand that it can increase hunters' awareness of the natural world and develop their ethics regarding humanity's role in that world. It can help to teach people about the ethical responsibilities of land stewardship as described by Aldo Leopold, the man often called the father of wildlife management.

To us, bringing hunters back as allies of land preservation and increasing their numbers will be an important component of land preservation efforts.



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Protected Areas and the

Bioregional Management Challenge

Introduction

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, just 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 with forestry, agriculture, fishing, wildlife management, and other major uses of land and water resources. We believe that conservation and development programs must first expand their geographic scales, 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.

The rubric of “bioregional management” draws upon worldwide 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. Each builds upon a strong ethic of “place” and stewardship. Each promotes the use of the best available science and information to help protect, restore, and carefully manage biodiversity and natural resources. The defining characteristics of bioregional management are shown in Table 1.

Table 1. Key Characteristics of Bioregional Management

Characteristics of bioregional management efforts—based on the experience of bioregionalism, biosphere reserves, integrated conservation and development projects, and ecosystem management—include:

1. *Large Regions.* 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 climate 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, negotiating vision statements, planning and implementing agreed-upon activities can be shared cooperatively between public and private entities, or be fully community-based.
3. *Cores, Corridors, and Matrices.* Core wildland sites 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, 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 fairly.
5. *Full Involvement of Stakeholders.* All parties who can affect or benefit from the resources have the opportunity 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.
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.
7. *Solid and Comprehensive Information.* All stakeholders have access to critical information prepared to facilitate planning and 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. (...continued)

(Table 1. *continued...*)

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.
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.* Restoration is pursued where the viability of some habitats or ecological functions have been impaired through excessive or inappropriate use.
12. *Cooperative Skills Development.* Communities and public and private organizations together locate and mobilize the skills, knowledge, and information needed 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 may be required.

To learn how well bioregional management works in practice, Miller (1995) examined experiences around the world where policy-makers, managers, and communities have attempted to unite conservation and development at broad geographic scales. The areas included: 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. Reviewing their experience provides useful insights on how bioregional approaches—including protected area management—can meet the major challenges of sustainably managing natural resources and biodiversity across large landscapes.

Balancing the Scales

In bioregional management, there is no single, right scale at which to

work. Hundreds of thousands of hectares may be appropriate for some ecosystems that comprise 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 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 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 areas, development zones, and the like.

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 have control over or an interest in old-growth or forest regeneration, critical wildlife habitat, dispersal areas for large mammals, cultural or historical sites, or resources and sites key to the regional economy. 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, 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.

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 forest habitats, or genetically improving grain varieties to enhance local economic and food security while reducing pressure on wildlands. 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.

Three Major Challenges to Bioregional Management

While the bioregional management efforts reviewed in Miller (1995) varied widely in terms of their goals and achievements, three issues emerged as major challenges in each case.

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 in other levels of government, or in the private sector, or indigenous or civil society groups. Bioregional programs should plug the gaps in or-

ganizations' and individuals' capacities—building upon existing capacity wherever possible.

Another challenge for bioregional management is engaging local residents and other stakeholders. Stakeholders who do not become full partners in planning and implementing programs can end up hindering the program's chances of success. So planners and 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.

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 po-

tential to reap huge gains for biodiversity—in part by attracting a larger, more complex pool of skills and tools. We strongly believe 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.

Guidelines for Developing Bioregional Management Programs

A set of guidelines, drawing on the experience of bioregional efforts in developed and developing countries alike, can help protected area planners and managers to understand their role in bioregional approaches and integrate or coordinate their efforts with partners outside of protected areas. Twenty guidelines keyed to the challenges of building capacity, engaging stakeholders, and promoting institutional cooperation, are presented below.

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 and implement the many tasks and functions associated with the protection and use of biodiversity and other natural resources. Typically, this means protecting wildlands; systematically inventorying flora, fauna, and microbial life; establishing *ex-situ* facilities to

maintain key genetic resources; restoring endangered species and degraded habitats; fostering biodiversity education in local schools and universities; promoting research on sustainable natural resource management; and establishing policy incentives and financial mechanisms for optimal land-use practices (WRI, IUCN, and UNEP 1992; UNEP 1995).

In most of the case studies presented by Miller (1995), 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.

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 Miller (1995).

First, where various jurisdictions and levels of government converge in the bioregion, a new institution can be established to integrate capacities and skills to implement a regional cooperative program for protecting and

managing the use of natural resources. A prime example of this option is Australia's 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, 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 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 avoided duplication in establishing and financing a new Commonwealth protection service for the reef, and expanded the Queensland Park Service's capacity to protect resources. GBRMPA established similar partnerships with local universities and research centers to cover aspects of its 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 implementation programs.

Third, in the CAMPFIRE program in Zimbabwe, and in 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 it is too early to assess the relative success of these efforts.

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 Miller (1995) show the importance of both according high priority to science, information, and analysis, and focusing on social and governance issues.

The cultural values and social organizations of the Maasai of Serengeti, fishers of the Great 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 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.

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 upon local circumstances.

In La Amistad in Costa Rica, regional constituents asked government to establish 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.

As needed, redistribute power over land and resources to develop authority and responsibility in the bioregion. The Zimbabwe CAMP-FIRE Program illustrates an issue fundamental to all the examples: 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 re-

sources 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.

Identify and assess the capacities of organizations and individuals in the bioregion and fill in the gaps. The Wadden Sea countries (i.e., 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 Amis-

tad 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.

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 Great Barrier Reef program strengthened universities, state agencies, and research centers in the region.

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.

India's Hill Resource 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. Costa Rica's La Amistad experience 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 programs otherwise.

Foster Stakeholders as Co-managers to Address Biodiversity Goals in the Core Areas, Corridors, and Landscape Matrix

By reaching out beyond protected areas, proponents of bioregional management 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. In general, many more restricted protected areas (i.e., IUCN's Categories I-IV) are working with adjacent communities and regional development programs than was the case a few short years ago.

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. 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, possibly conflicting, goals.

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 invested considerable time in 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.

Initially, focus tasks on a few issues of interest to the widest possible set of stakeholders in the region. Although a principal aim of bioregional programs is to conserve a region's biodiversity, experience suggests the need to begin simply, limiting the program to a few issues of common concern. Gradually, programs can grow to embrace a more comprehensive list of the region's issues and opportunities.

The Great Barrier Reef program began by addressing such specific issues as tourism's impact upon the reefs, sport fishing's effect on fisheries, and mangrove protection. 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 hedge rows. In contrast, public agencies in the Greater Yellowstone ecosystem 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.

Link conservation and restoration activities with socioeconomic development goals in the bioregion. Goals to conserve biodiversity can hardly be separated from the needs and perspectives of local constituents. The challenge is thus to integrate development with conservation goals and measures. Kenya's Amboseli National Park (part of the Serengeti regional ecosystem) demonstrates how, through sensitive and open dialogue—in this case, with local Maasai residents and ranchers—it is possible to start a well-focused regional pro-

gram 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 dominated regional programs, prompting concern and opposition from local residents.

Give local residents and communities access to decision-making processes and the skills needed to participate fully in the development and implementation of 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 provide human health facilities and road maintenance have not been honored. Government policies that encourage plowed agriculture around the periphery of the Greater Serengeti

Ecosystem and provide incentives to convert communal reserve lands and group ranches to private holdings place pastoralism's very future at risk and 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 European coast of the Mediterranean Sea were dealing with a developed-country agenda (environmental degradation, habitat and species loss, etc.), countries along the North African coast were addressing developing-country issues (employment, nutrition, housing, institution building, etc.). 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.

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, GIS, etc.

Perhaps uniquely, the Great Barrier Reef project 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, 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.

Give stakeholders incentives to get involved in and committed to bioregional programs. Even where interest in conservation is great, 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, 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.

In the North York Moors, neighboring farmers in the bioregion's matrix were offered contracts to restore and maintain hedge rows 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-es-

tablished appropriate habitat for less than it would cost to buy new land and hire workers.

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.

To foster involvement and commitment, ensure that individual and group stakeholders receive a fair share of the benefits. In Zimbabwe, the CAMPFIRE program placed potential sources of income 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, in both the Tanzanian and Kenyan sectors of the Greater Serengeti Ecosystem program, the Maasai who have basically delivered on their side of the deal are still waiting for the benefits promised.

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 in Costa Rica had jurisdictional responsibili-

ties in the Talamanca mountains when the country joined Panama in establishing the La Amistad Biosphere Reserve. In the Mediterranean, 21 nations have sovereignty over portions of the terrestrial, coastal, and marine components of that ecosystem.

Mechanisms can be designed to convene a bioregion's constituents and potential answers and promote appropriate action without challenging national sovereignty. The biosphere reserve approach leaves the authority of public agencies and private property rights intact in the Talamanca. The Mediterranean Regional Sea Program encourages activities to address oil pollution within each country and establishes cooperative research and monitoring at new centers around the region.

Honor all commitments that result from negotiations. Evidence from 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 to the national park with their herds. In such cases, cynicism sets in—a further obstacle to future progress.

Promptly implement projects that respond to community needs. Government agencies and regional organizations must quickly implement projects agreed upon by the communities whose livelihoods are affected by a bioregional management program. Non-governmental organizations, which can often move funds and carry out activities faster than public agencies, can often fill a special niche to address this need—at least temporarily. 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.

Establish Cooperative Arrangements Among Institutions

Initially, each of the bioregional management programs examined found that the ecosystems of interest were already occupied by an array of public and private organizations and institutions. Along with formal organizations, communal institutions already operating have an important role to play. The indigenous peoples of La Amistad, the Maasai and other peoples of the Serengeti, and the ranchers in the Greater Yellowstone Ecosystem 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.

Don't hesitate to rely on short-term financial support from external

sources 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 illustrate the pitfalls of relying for too long on short-term external support. In both, programs were halted 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. Such approaches hold out the possibility of long-term planning and program security.

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 giveaways 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 protected areas. 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 protected areas 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 cooperate with the government to prevent poaching of an animal that is worth more to them alive than dead.

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. When engineers building the small reservoirs joined forces with community leaders to pace the program so that the community could more easily adapt to 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.

Conclusion

Since most bioregional management efforts have not systematically monitored progress toward conservation and development goals, it's too early to systematically assess their impacts. With more focused attention on the development and use of biophysical, social, economic, and insti-

tutional indicators to measure conservation progress, we hope this will be possible in the not-too-distant future. Still, we believe there is indirect evidence to suggest that bioregional management is making a positive impact on the conservation and sustainable use of biological resources. For example, where bioregional management approaches are being employed, a larger and more varied pool of skills and tools are being used to address conservation problems. In other cases, individuals and groups sometimes seen as adversarial to con-

servation interests are not only cooperating with bioregional programs, but they are volunteering to accept responsibilities and play active roles in habitat protection, restoration, and sustainable resource management. And, where bioregional management is a reality, greater attention to social, economic, and institutional concerns is easing suspicion of technical issues and experts so that, paradoxically, science and information are assuming new importance as tools of empowerment and choice.

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Editor's note: This article was adapted from Balancing the Scales: Increasing Biodiversity's Chances through Bioregional Management (see reference above) and was presented in similar form at the IUCN Commission on National Parks and Protected Areas North American Regional Meeting, Lake Louise, Banff National Park, Alberta, October 1995.

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Selected Excerpts Related to Science and Management from the CNPPA-NA Draft Regional Action Plan

Note: Leaders for these actions have been determined, but are omitted here for reasons of space, as are links between actions and timetables for completion. The numbers are those assigned to each action in the Plan.

1.1.1 Short-Term Interventions

Action: Participate/intervene in marine protected area initiatives (Canada Oceans Act, British Columbia Marine Protected Areas Strategy development, NMSS reauthorization, CSD4, and AEPS/CAFF process) based on consultations among CNPPA-NA members.

Product: Briefs and submissions.

1.1.2 Marine Network

Action: Establish a regional marine protected areas network.

Product: Operative network.

1.1.3 National Marine Working Groups

Action: Establish/energize national marine working groups with the following specific objectives in mind: (1) Focus on both new area designation and existing area management; (2) Identify key people, organizations, and the funding for priority work; (3) Identify opportunities to promote marine protected areas.

Product: Functioning marine working groups in Mexico, USA, and Canada.

1.1.4 Marine Protected Areas Workshop

Action: Organize workshop to focus on case studies of successful marine protected areas that embrace adaptive solutions to socio-economic issues in establishing and managing marine protected areas and can assist the development of science and socio-economic instruments required to accelerate marine protected areas systems completion.

Product: Workshop, followed by report for practitioners worldwide; report to include recommended follow-up actions.

1.2.1 Clarify Role of Science and Management in CNPPA-NA

Action: Consider and clarify CNPPA-NA's role with respect to science and management: what is the potential contribution of CNPPA in this complex area?

Product: Statement/report.

1.2.2 Adaptive Management

Action: Explore the concept of adaptive management as it applies to protected areas, including an analytical approach to decisions, promoting a team approach to science and management, and treating management actions as experimental manipulations.

Product: Progress report and action plan.

1.3.2 Shared Species Management

Action: Identify key terrestrial and marine species which share habitat in all three countries of North America (i.e., butterflies, migratory birds, marine mammals), their habitat requirements, and their interrelationships with protected areas.

Product: Report.

2.1.1 Current Status of North America Protected Areas

Action: Evaluate the current status of protected areas in North America.

Product: Report to World Conservation Congress in October 1996.

2.1.2 Comparative Study of System Planning

Action: Carry out a preliminary comparative study of protected areas system planning in the three countries to get a sense of the relative strengths and weaknesses, comparative rationale, and foreseeable trends.

Product: Progress report to World Conservation Congress in October 1996.

2.1.4 Evaluation of Threats

Action: Develop regionally consistent criteria to evaluate threats to terrestrial and marine protected areas.

Product: Report to World Conservation Congress in October 1996.

2.2.1 Task Force on Information Management

Action: Prepare a discussion paper on information resources and needs of the region; draft terms of reference for an Information Management Task Force.

Product: As above.

2.2.2 *Biogeographic Classification for North America*

Action: Conduct a preliminary assessment of existing (ongoing) biogeographic classification schemes (ecoregions, ecozones, etc.) from which CNPPA-NA could choose the most appropriate to suit regional needs (e.g., for ecosystem-based management gap analysis)

Product: Report to World Conservation Congress in October 1996.

2.2.3 *Implications of Contrasting Approaches to Biogeographical Mapping*

Action: Develop the case for a sensitivity analysis of the implications for gap analysis of different approaches to biogeographical mapping in North America.

Product: Prospectus for presentation to World Conservation Congress in October 1996.

2.2.4 *Identify Indicators*

Action: Identify baseline biophysical, social, and other indicators or hard data that are already or should be monitored in North American protected areas.

Product: Draft monitoring protocols and identification of practical approaches for review at World Conservation Congress in October 1996.

There are a number of other actions that relate to science and management, including:

- Strengthen the existing Mountain Protected Areas Network and create networks on Temperate Grasslands, on Local Communities and Protected Areas, on Arctic Protected Areas, and on Marine Protected Areas.
- Develop monitoring methods for World Heritage Sites.
- Establish a CNPPA-NA e-mail list and Worldwide Web site.
- Explore the feasibility of starting a peer-reviewed journal of protected area research and management.



About the GWS . . .

The George Wright Society was founded in 1980 to serve as a professional association for people who work in or on behalf of parks and other kinds of protected areas and public lands. Unlike other organizations, the GWS is not limited to a single discipline or one type of protected area. Our integrative approach cuts across academic fields, agency jurisdictions, and political boundaries.

The GWS organizes and co-sponsors a major U.S. conference on research and management of protected areas, held every two years. We offer the FORUM, a quarterly publication, as a venue for discussion of timely issues related to protected areas, including think-pieces that have a hard time finding a home in subject-oriented, peer-reviewed journals. The GWS also helps sponsor outside symposia and takes part in international initiatives, such as IUCN's Commission on National Parks & Protected Areas.

Who was George Wright?

George Melendez Wright (1904-1936) was one of the first protected area professionals to argue for a holistic approach to solving research and management problems. In 1929 he founded (and funded out of his own pocket) the Wildlife Division of the U.S. National Park Service—the precursor to today's science and resource management programs in the agency. Although just a young man, he quickly became associated with the conservation luminaries of the day and, along with them, influenced planning for public parks and recreation areas nationwide. Even then, Wright realized that protected areas cannot be managed as if they are untouched by events outside their boundaries.

Please Join Us!

Following the spirit of George Wright, members of the GWS come from all kinds of professional backgrounds. Our ranks include terrestrial and marine scientists, historians, archaeologists, sociologists, geographers, natural and cultural resource managers, planners, data analysts, and more. Some work in agencies, some for private groups, some in academia. And some are simply supporters of better research and management in protected areas.

Won't you help us as we work toward this goal? Membership for individuals and institutions is US\$35 per calendar year, and includes subscription to the Forum, discounts on GWS publications, reduced registration fees for the GWS biennial conference, and participation in annual board member elections. New members who join between 1 October and 31 December are enrolled for the balance of the year and all of the next. A sign-up form is on the next page.

The George Wright Society

Application for Membership

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Please ☒ the type of membership you desire:

- ☐ Patron \$500/year
- ☐ Life Member \$350/life
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