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# PARKS

The international magazine dedicated to the protected areas of the world



SYSTEM PLANNING

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The international magazine dedicated to the protected areas of the world

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## PARKS is published with the following aims:

- to demonstrate the contribution which protected areas can make to sustainable development;
- to improve the quality of protected areas management;
- to communicate protected areas information amongst all involved;
- to promote the management of protected areas as a profession.

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# EDITORIAL

Paul Goriup

It seems incredible that it has taken more than a century of establishing protected areas to arrive at the relatively simple idea of system planning, or at least for it to come into vogue. This largely reflects how the functions of protected areas have increased over time: they began as sites mainly to conserve soils, watersheds, landscapes and local species populations, and to provide areas for recreation, education and scientific study. During the last three or four decades, however, the pressures on global natural resources have grown immensely. Now, it has become apparent that protected areas, as a system, form the last line of defence in the conservation of the world's biodiversity. It is imperative that all major ecosystems and species populations are included in the global network of protected areas.

This issue of *PARKS*, which has been specially extended to give better coverage of the subject, serves as an introduction to the concept of system planning, including the role and importance of buffer zones. A series of case studies shows how the concept has been applied to suit local circumstances. We hope this will encourage all those who have not yet embarked on a national protected area system plan to do so, perhaps as preparation for the IV World Congress on National Parks and Protected Areas in Caracas next February, or even for the UN Conference on Environment and Development in Rio de Janeiro next June.

The advent of conventions on the maintenance of biodiversity and on forest conservation is likely to bring about a considerable change in emphasis in the way development aid is provided. Indeed, this is already happening in both bilateral and multilateral aid agencies. There is much talk of 'technology transfer' to developing countries for

protecting biodiversity. To a great extent, this discussion has focussed on issues such as genetic manipulation, cell culture and seed banks: biotechnology has become confused with the technology of biodiversity conservation. Today, protected area system planning, implementation and monitoring can be enormously enhanced by technologies like remote sensing, geographical information systems, on-line computer data bases and telecommunications (not least the facsimile machine). The provision of these technologies, and the training to use them effectively, is what protected area managers should be arguing for with their political masters.

Because of its importance, future issues of *PARKS* will develop specific aspects relating to system planning. The idea that protected area systems are vital in their own right for sustaining human populations has not yet gained general acceptance. Economic justifications for protecting biodiversity are all too often demanded, even though econometric methods are still too crude to cope with the complex cost and benefit analyses required (how do you discount against infinity?). One of the most commonly cited economic benefits of protected areas is tourism in all its varieties. The next issue of *PARKS* will examine whether or not tourism is, or can be, compatible with biodiversity conservation and whether the economic benefits are truly tangible and positive.

The last number of this Volume will feature South America, to mark the IV Congress on National Parks and Protected Areas. On this occasion, we intend to produce both Spanish and English editions. Unfortunately, however, funding for regular editions in languages other than English has still not been secured, but every effort is being made to find a sponsors for Spanish and French versions of *PARKS*.

# PROFILE



PHC (Bing) Lucas, a member of the Commission on National Parks and Protected Areas since 1971, was elected to chair CNPPA at the 18th General Assembly of IUCN in 1990. Previous appointments in the Commission have included vice-chair for the Antarctic Realm, deputy chair and senior advisor. In addition to his extensive experience in protected areas in New Zealand (from being the first Director of National Parks and Reserves, to retiring as Director General of Lands in 1986), Bing has since worked in many other countries.

*Profile:* How does the systems planning approach for the identification of protected areas help achieve CNPPA objectives?

Lucas: The Commission's mission set by the IUCN General Assembly in Perth, Western Australia, late in 1990 is "to promote the establishment and effective management of a worldwide network of terrestrial and marine protected areas". The first objective of the Commission, adopted at the same time, is "to promote consolidation of the global system of protected areas through identification of gaps in coverage and to assign priorities for action to address the gaps identified".

Achievement of this fundamental objective is possible only by a systematic approach. Many protected areas have been established on an *ad hoc* basis to protect regions with dramatic landscapes and spectacular wildlife. The consequence is that they are not representative of the full range of habitats and ecosystems. Today's emphasis on conservation of biological diversity calls for a systematic approach if the widest possible range of habitats and ecosystems and the species they support are to be included in both national and global networks of protected areas.

*Profile:* How do you see the role of CNPPA in promoting systems planning and what further initiatives are planned to further this process?

Lucas: The Commission continues to promote the systematic approach to the establishment and design of protected areas through its publications, such as the best-selling "Managing Protected Areas in the Tropics," and by workshops and other support for countries seeking to follow a systematic approach.

A major current initiative in building the global system of protected areas is linked to preparation for the IV World Congress on National Parks and Protected Areas, to be held in Caracas, Venezuela, from 10-21 February 1992. This is a region by region review of protected areas being undertaken under the leadership of the Commission's Regional Vice-Chairs supported by a strong marine input led by the Vice-Chair, Marine. As well as identifying progress and constraints in establishment and effective management of protected areas, these reviews aim to identify gaps in their coverage. They are being built up by regional consultation and will be consolidated to produce a global overview whose goal is to identify priorities to fill gaps in the world network.

A systematic approach on the country level is essential to produce a product that is credible and will be able to convince governments and funding agencies of the needs for additional areas.

**Profile:** What are some of the recent notable achievements in this field?

**Lucas:** I believe that what has been achieved in my own country (New Zealand) provides an excellent illustration of the value of a systematic approach. New Zealand was early in the field of national parks from 1887 and subsequent establishment of more parks and reserves saw some 17% of the country's land area in publicly-owned protected areas. On the face of it, this was excellent coverage and well above the world average. However, conservationists were concerned that protection mainly covered mountain and forested environments.

The key to a more systematic approach was legislative change and the Reserves Act (1977) set a goal of ensuring, among other things, "the preservation of representative samples of all classes of natural ecosystems and landscape which in the aggregate originally gave New Zealand its own recognisable character." The National Parks Act was amended in 1980 to include as a purpose of national parks the principle of representativeness along with the

protection of areas of outstanding natural beauty and uniqueness.

With this legal base and using an example set by Costa Rica, the country was then mapped on the basis of ecological regions and districts and existing protected areas were keyed in to these maps. The result was to identify clearly where ecosystems were either unrepresented or under-represented in existing protected areas.

A start was then made with a process, which continues, of identifying priority areas needed to fill gaps in the system. Largely this involves tussock grassland, shrubland, and wetland areas as well as remaining lowland forest areas whose potential commercial value had kept them out of the protected area system.

In the case of New Zealand, the systems approach has been vital to give credibility to the case for expansion of protected areas in a country where, in terms of statistics, there was already a large area under protection. Today, there is 30% of the country's land area in the conservation estate.

This issue of *PARKS* magazine is certainly very timely in focussing on the systematic approach to protected areas which is more vital than ever at a time of increased pressure for natural resources and where clear justification is needed to convince decision makers of priorities for protection.



High Country, South Island New Zealand. A systematic approach showed that tussock grassland and wetland ecosystems had been seriously under-represented in the protected areas system.  
Photo: Bing Lucas.

# *Guidelines for Preparing Protected Area System Plans*

Jeff McNeely  
Jim Thorsell

Protected areas now dot the globe, but the process of establishing them has been piecemeal. Important areas are left unprotected, and many areas are too small to fulfil their expected roles. It is essential that each nation assess the adequacy of its protected area system, as a basis for justifying new areas and obtaining greater support for the existing ones.

**T**he good news: The latest figures show that over 6,500 major protected areas have been established, covering over 630 million ha, almost five per cent of the earth's land surface (IUCN, 1990). We are well on the way to meeting the target of ten per cent discussed at the III World Congress on National Parks in Bali, Indonesia in 1982. Protected area management is increasingly recognized as a profession built on many scientific disciplines and considerable practical experience.

The bad news: Most protected areas have been established one-by-one, because of their

individual values for wildlife, scenery and tourism. Their size and shape were the result of pragmatic considerations of what was available and politically feasible. As a result, certain key species and habitats remain poorly represented and the full values of protected areas for society are not realized. Worse, growing human population and increasing demands on resources are coupled with shrinking government budgets, generating conflicts between protected areas and surrounding lands.

The response: Protected area system plans.



Kaimanawa Forest Park, New Zealand. Mountains and forests are often well represented in protected area systems, unlike many lowland or grassland ecosystems.  
Photo: Bing Lucas.



This paper provides guidelines for preparing a systematic and comprehensive evaluation of protected areas from a national perspective. It is intended as a prelude to a workshop on this topic to be held at the IV World Congress on National Parks and Protected Areas in Caracas, Venezuela, on 10-21 February, 1992.

### *What is a System Plan?*

Considerable experience has been gained in planning systems of protected areas since the ground-breaking work of William J. Hart (1966). Plans for national systems have been prepared for several countries, including Oman, Saudi Arabia, Brazil, Chile, Costa Rica, Peru, Bangladesh, Indonesia, Botswana, Kenya, Sierra Leone, and Canada; regional system reviews have been prepared by IUCN for Tropical Asia, Oceania, and Sub-Saharan Africa; and detailed planning procedures have been proposed (Miller 1980). While the approach has been different in each case, planning the system is always seen as fundamental to the protected area management process. A systems plan provides:

- a comprehensive national statement of the objectives, rationale, definitions, and future directions for the evolving network of protected areas in a country;
- an assessment of the viability of the existing system and its completeness;
- a systematic procedure that identifies additional areas most suitable for meeting national conservation objectives;
- a clear statement of national priorities, and a plan of action for achieving the national conservation objectives.

A good protected area system plan can be used to guide research personnel, conservation organizations and international institutions in their fieldwork, public information, funding, and other support activities; to develop a strategy for funding the priority activities identified in the

plan; to assist governments and others to make choices about investments in protected areas and to present those choices to politicians, administrators, NGOs, and development assistance agencies.

A system plan can provide the protected area management authority with a powerful tool to win larger budgets, more land, more personnel, and greater public support. For developing countries, it can help convince funding agencies to invest in protected areas. For developed countries, it can help rationalize the many approaches being taken to conserving biodiversity.

### **Guidelines for Preparing a System Plan**

Each country has its own special conditions, calling for its own approach to preparing a system plan. But the following guidelines can assist the process in any country.

#### *Objectives and Priorities*

- 1 Engage a broad cross-section of society to debate the national objectives for the protected area system (realizing that this is the crucial political decision from which all else follows). Such national objectives might include, for example, providing protection to all habitat types, ensuring that sufficient habitats to ensure the long-term survival of all species are included in protected areas, managing the protected areas to provide sustainable benefits to local human populations, protecting important watersheds, providing facilities for tourism and recreation in certain areas, generating revenue from non-consumptive use, and ensuring the maintenance of certain interactions between people and nature.
- 2 Establish, in consultation with all relevant institutions, specific objectives for each individual protected area in the system,

are attained. Assign each area a management category that is given legal recognition in national legislation. Provide guidelines for the kinds of development that are permissible in each category of protected area.

- 3 Develop a system for identifying priorities for improving the management of existing protected areas in the system. Establish criteria and assign priorities for the creation of new protected areas, having justified the need for such additional areas to meet the national objectives. Establish criteria and assign priorities for research, staff assignments, funds, training and other resources.

#### *Design Elements*

- 4 Prepare (or adopt) a habitat classification for the country, at a scale appropriate to the task, covering all habitats, including freshwater, coastal and marine, and terrestrial.
- 5 Map the distribution of all habitats, all species of particular concern (especially rare, endemic, or threatened species), human population (including all ethnic groups), and existing protected areas. Use modern GIS technology to include such information on a computerized database that would enable predictions of future conditions.
- 6 Large areas are better than small, because reducing an area by a factor of ten typically results in reducing the number of species the area holds by a factor of two. The smaller the protected area, the further and faster it will change; this is especially so if it is isolated from other areas of habitat. But this rule is not invariable, as many small areas also have important contributions to make to conserving species or habitats. Determine the options for expanding the effective size of the protected area system through the use of corridors, buffer zones, easements on private land, regulations for timber concessions, and other options outside the control of the

protected area management agency.

- 7 Financial resources for managing protected areas are always limited. Therefore, a good system plan will be cost-effective, calling for no more area than is required to meet the national objectives. It will design protected areas so that maintenance costs (such as boundary surveillance) are minimized.

#### *Science and Information*

- 8 Use the information collected as part of the system planning process to establish a monitoring system which can assess the effectiveness of the system in meeting the national conservation objectives.
- 9 Develop an explicit plan to deal with key species. For each, determine the minimum number of individuals in a population needed to guarantee a high probability of survival for the species and, using known densities, estimate the area needed to sustain the minimum number (Soulé and Simberloff, 1986). On the basis of this analysis, determine which habitats and species are provided insufficient protection by the protected area system.
- 10 Since the protected area system requires broad support if it is to be successful, the system plan should be accompanied by a plan for promoting its implementation. Targets should include other government agencies, the general public and NGOs.

#### *Linkage with Surrounding Lands and Other Sectors*

- 11 Most protected areas are fragments of much greater areas of habitat that existed before human pressure on the land became so pervasive. Since conserving the habitat remnants as protected areas requires controlling external influences, the system plan should be used as the mechanism for



plan should be used as the mechanism for ensuring that protected areas are part of a coherent national land use policy. The greatest threats to the long-term integrity of a nation's protected area system originate largely or entirely outside of protected area boundaries. These threats (population growth, pollution, incompatible use of surrounding lands, economic factors, and so forth) are typically beyond the control of the protected area agency and demonstrate that protected areas are parts of regional landscapes. The system plan needs to contribute to national efforts to address the more fundamental ills of modern society.

- 12 Use the system planning process to build collaboration with other sectors. Identify the sectors which benefit from protected areas (forestry, fisheries, agriculture, energy, tourism, research, and many others), and design programmes by which those sectors can contribute to protected area management. Identify all institutions managing land and water in ways which contribute to the national conservation objectives, and therefore contribute to the system of protected areas (for

example, private land owners, NGOs, botanic gardens, universities and research stations); and ensure that these areas are given the necessary policy support by government.

- 13 Quantify, to the extent possible, the benefits flowing from the protected area system; this should include both tangible and intangible, financial and non-financial benefits. Build into the system methods for delivering benefits to local people from protected areas.

#### *Institutional Issues and International Linkages*

- 14 Review the legal and institutional system to determine the extent to which it supports the national conservation objectives; on the basis of this review, identify necessary changes in legislation and administrative structures for protected areas, including measures to give local people increased responsibility for contributing to protected area management.
- 15 Identify which areas should be proposed for recognition under international agreements and programmes, including World Heritage sites, Wetlands of International Importance and Biosphere Reserves.

Local benefits from coastal protected areas include the protection from coastal erosion and fish habitat provided by mangrove vegetation.

Photo: Paul Goring



**Table 1: Sample Table of Contents of a Protected Area System Plan**

1. *Introduction*  
Brief overview of the national legal and policy setting; purpose of the system plan; method of study; inventory of habitats and key species.
2. *National Policy for Protected Areas*  
Review of national development plans and how protected areas contribute; national objectives for protected areas; standards and criteria for different categories of protected areas; relations with other sectors; relations with surrounding lands; beneficiaries of the nation's protected areas.
3. *Evaluation of Existing Protected Areas*  
Adequacy of existing protected areas to achieve national conservation objectives; classification of each area by management category; objectives for each area; economic relationships (costs and benefits, considered in broad sense).
4. *Proposed Additions to the Protected Area System*  
Description of gaps in the system; specification of new areas; possible deletions; draft objectives for each area; possible conflicts in allocating the area for conservation objectives; costs and benefits of managing each site as a protected area.
5. *Additional Mechanisms for Achieving National Conservation Objectives*  
Assessment of the contribution of private lands to national conservation objectives; role of private protected areas; role of provincial protected areas; contribution of other government lands to conservation objectives (e.g. military reservations, forests, fishing reserves, etc.); recommended policies for enabling these lands to contribute to conservation objectives.
6. *The Proposed System of Protected Areas*  
Proposed protected area system; management responsibilities for each site and category; priority rankings; relation to national development plans.
7. *Implementing the Plan*  
Financial implications; personnel requirements; who does what; training requirements; research priorities; costs and benefits.

16 Planning a protected area system is part of the management process. It is not the last word, because conditions change. As the plan is implemented, mechanisms should be established to review progress and modify the plan.

### Concluding Remarks

As the challenges to protected areas continue to grow in the late 20th century, protected area managers must be far more effective in earning public support for protected areas. A national protected area system plan, which relates protected areas to national conservation objectives, social and economic development, the needs of modern society and the health of the rural landscape, can be an invaluable tool in this effort.

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# TRAINING

## ASIAN WETLAND BUREAU

Training for sustainable use of Asia's wetlands

**T**he Asian Wetland Bureau (AWB) is an international non-profit organisation which aims to promote protection and sustainable utilization of wetland resources in Asia.

Regional coordination is provided from an office within the Institute for Advanced Studies (IPT), University of Malaya. The Kuala Lumpur office also has staff specifically assigned to formulation and implementation of a Malaysian Wetland Program in collaboration with IPT. Day to day management of AWB's Indonesian Program is undertaken from an office in Bogor through a formal agreement with the Ministry of Forestry.

A Philippines Program is managed by an independent local organisation (AWB

Philippines Foundation Inc.) which collaborates closely with and receives support when necessary from the regional organisation.

Elsewhere in the region, AWB works through existing governmental and non-governmental bodies and supports the strengthening of local agencies working in the field.

Because of its work on so many projects throughout Asia, AWB was a major contributor in the compilation of the *Directory of Asian Wetlands* (Scott, 1989) and the subsequent *Status Overview of Asian Wetlands* which forms the basis for the organisation's strategic planning for priority action on conservation and management of Asia's wetlands.



Setting up mist nets during a bird banding workshop in the Philippines. Photo: Asian Wetland Bureau.

Scott and Poole (1989) in analysing information gathered for the *Directory of Asian Wetlands* to produce the Status Overview, identified eleven fields for priority action:-

- institutional strengthening
- survey
- national inventories
- protected areas
- training
- awareness and education
- national wetland policy
- monitoring of development projects
- management
- promotion of the Ramsar Convention

Quite apart from the explicit priority status accorded "Training" and "Awareness and Education", it is widely acknowledged that improved and on-going training initiatives are also essential components of action plans to address many of the other priorities.

Consequently, a significant proportion of AWB's staff and resources are devoted to training. Because AWB grew from the Interwader Program of the early 1980's, training activities initially concentrated on shorebird survey and habitat assessment techniques. As more Asians have become skilled in this work, other developments have dictated a changed role for AWB with more attention given to a wider range of wetland values and increasingly complex conservation and management issues.

Most courses and other initiatives are the result of direct invitations from government or other agencies who have identified a specific need.

Training needs have been identified at three levels: Resource Assessment; Site Management; and Integrated Planning and Management (Parish and Howes, 1989).

*Wetland assessment techniques* include bird, fish and mammal surveys; vegetation mapping;

remote sensing interpretation; water quality measurement; hydrology studies; and evaluation of socio-economic variables. The targets for resource assessment training are chiefly technical staff from government agencies responsible for wetland management. It is generally acknowledged that the unique nature of wetlands dictates the use of specialised techniques and the provision of specific training for technical staff. Since 1984, AWB has conducted more than 20 training courses on wetland assessment techniques in ten countries throughout Asia.

*Site management* certainly involves many considerations which are ecosystem specific and ultimately many details which are site specific. Training needs to be targeted at those directly responsible for day to day management and must use relevant case studies or demonstration sites.

For example, AWB has collaborated with WWF to provide training for the staff of Jiangxi Poyang Lake National Nature Reserve in China. In March 1988 a training course was conducted concentrating on waterbird study techniques. Follow-up work confirmed the need for training in site management techniques in association with the preparation of a draft Management Plan for the Reserve. To assist the implementation of the Management Plan, a further training course on wetland research and management techniques was held in November 1990. Because of the similarity in management circumstances, participants were also invited from other Nature Reserves in the Lower and Middle Yangtze valley.

Other initiatives in this area include a WWF-funded training course on management at Haleji Lake in Pakistan (January-February 1991) and coordinating Asian participation in a workshop on Wetlands Conservation and Management at Shordland (Australia) in February 1991. This will be followed by a post-workshop tour of wetland education facilities in south-eastern Australia, specifically for Asian participants involved in education and training work.



Limnology fieldwork at Poyang Lake, during the November 1990 training course. Photo: Jon Davies.

Integrated Planning and Management work is a challenging area calling for training of relatively senior staff employed by government economic and environmental planning agencies. Training initiatives for these and mid-level staff must cover techniques for cross-sectoral coordination, management of environmental impact assessment and planning techniques including public participation.

This area is now demanding more attention and calls for innovative training approaches offering a major challenge for AWB and other trainers over the next decade.

To enable the organisation to clearly focus its efforts and priorities, AWB is presently reviewing: its training activities to date; existing opportunities for pre-service and in-service training; and mechanisms for collaboration with local and international institutions working towards the same objectives.

To avoid "re-inventing the wheel", AWB hopes to share its training materials with other local and international agencies working in the field and would very much appreciate receiving

copies of materials developed by others which may be of use in Asia, with appropriate acknowledgement.

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# *Planning a System of Protected Areas in Saudi Arabia*

Abdulaziz H. Abuzinada  
John Grainger  
Graham Child

**This paper outlines methodology used to plan a system of 103 protected areas to represent Saudi Arabia's remarkable biophysical diversity. The cultural tradition of resource conservation areas (himas) was incorporated into a modern system of easily created protected areas to support the Kingdom's rich cultural heritage and spectacular recent development. Implementation of the model could provide a regionally significant demonstration of the vital linkages between conservation and continued human well-being.**

**S**audi Arabia, like most countries in the Arabian Peninsula, has only recently begun to establish protected areas. This is an important development as the Peninsula, of which Saudi Arabia is the largest part, is an area of great international biological significance. It represents a junction of three biogeographic realms, resulting in unique floral and faunal assemblages with African, Eurasian and Indo-Malayan affinities. A number of endemic forms are present and the fauna is enriched by numerous passage migrants.

Saudi Arabia covers 2.2 million km<sup>2</sup> of surprising biophysical diversity, ranging from high sub-humid mountain ranges to extensive hyper-arid gravel and sand deserts. Additionally, it includes portions of the deep Red Sea and the shallow Arabian Gulf.

In the span of one generation the country has witnessed unprecedented economic and industrial developments, but these have taken their toll on the natural resource base. Mechanisation has largely transformed traditional resource use and the ecological manifestations of environmental deterioration are starkly apparent. Rangelands are seriously overgrazed, much of the woody vegetation has been grubbed out, and there are increasing threats to marine resources from development

and pollution, as evidenced by the recent massive oil spill in the Gulf. Wildlife populations have declined precipitously through habitat loss and overhunting, and several species have become extinct in the wild in recent decades.

Concern for the situation in Saudi Arabia led to the establishment in 1986 of the National Commission for Wildlife Conservation and Development, an autonomous government body whose mandate includes the establishment and management of protected areas. NCWCD, with the assistance of IUCN, has recently completed a plan for a representative national system of protected areas (Child and Grainger, 1990).

## **The Basis of the Plan**

The absence of any recognised protected areas in Saudi Arabia, prior to the creation of the NCWCD, provided an ideal opportunity for developing a uniform methodology for identifying, justifying and creating an integrated system of protected areas. However, the foundation of the system had already been laid with proposals to protect a number of marine and terrestrial areas. A report identifying potential terrestrial sites had been presented to NCWCD in 1987 (Buttiker and Grainger, 1987). Extensive surveys of the Red Sea and Gulf coastlines

between 1984-1987 (MEPA 1987a and b) recommended a number of marine protectorates.

These proposals and extensive NCWCD surveys together led to the identification of 103 terrestrial and marine sites for protection and provided the basis for developing the system plan.

Creation and management of a system of protected areas is an on-going process, which must remain amenable to prevailing circumstances. Rather than simply describe a number of candidate areas and a prescription for action, the Saudi system plan presents a rationale and methodological guide to the establishment of protected areas. Though certain priorities and an agenda for action are suggested, the aim was to illustrate an organic approach to the creation of the system.

The Arabian Peninsula has a cultural tradition of conserving biological resources through the *Hima* system, which dates back over 1,400 years. *Himas* are areas of variable size which were set aside by local communities to conserve seed stocks, as sources of fodder, for honey production, to regulate use of fuelwood and for the preservation of game animals. Although there

are unfortunate indications that the tradition is waning, it provides a powerful, versatile, culturally acceptable and well understood model for a modern system of protection areas in Saudi Arabia. In particular, it provided a valuable guide to the categorisation of protected areas into five broad classes (see Table 1) and in the preparation of flexible enabling legislation to direct their management. The system plan sought to emphasise the socio-economic strengths of traditional conservation, within a classification of protected areas in which the goals are comparable with IUCN protected area categories.

### Guidelines for the Plan

At the outset, it was decided that Saudi Arabia's system of protected areas should have two major objectives:

- 1) the representation and conservation of the full range of the Kingdom's physiographic and biological diversity, and
- 2) the creation of reserves where the use of resources can be properly regulated, so as to develop solutions for sustaining rural productivity.

*This ibex reserve in central Saudi Arabia exemplifies the country's diverse landscape and habitats. Photo: John Grainger, NCWCD.*





Certain criteria emerged from these guiding principles which were used to design the framework for a functional and representative national system plan. The system was to be of adequate size to underwrite the nation's ecological viability and the durability of its development. In addition it should ensure:

- adequate coverage of the country's physiographic diversity, especially in view of anticipated climatic changes;
- adequate coverage of the Kingdom's ecological diversity, based on a reliable spatial analysis of the plant communities;
- adequate coverage of species diversity, based on the natural ranges of a representative selection of species of high conservation interest;
- high coverage of key biological areas, such as wetlands, mangroves juniper forests; and
- an as equitable distribution as possible of protected areas throughout the Kingdom's administrative regions.

## The Extent of Protected Area Coverage

The arid nature of most of Saudi Arabia and the degraded state of most of its ecosystems would argue strongly for a level of protection higher than the 10% recommended by IUCN as a minimum basis for ecological viability. However, the perceived need for an extensive protected area system was counterbalanced by the presently limited resources, particularly of indigenous managerial experience.

An analysis of global protected area coverage in arid and semi-arid situations indicated that 8.5% cover was a realistic initial target for Saudi Arabia. The 103 proposed reserves in the system plan cover 172,400 km<sup>2</sup>, or about 8.1% of the Kingdom. However, this must be considered to be the absolute lower limit of coverage to be attained. As warm deserts are one of the least well protected biomes, and as protected area coverage should increase with aridity, eventually Saudi Arabia will have to aim for a higher level of protection of its ecosystems.

**Table 1: Categorisation of Protected Areas in Saudi Arabia**

Category	IUCN Equivalents
<i>Special Natural Reserve</i> Areas of great ecological excellence, fully protected from grazing and conflicting land use. Managed by NCWCD.	I Strict Nature Reserve/Scientific Reserve. II National Park. IV Nature Conservation Reserve or Managed Reserve/Wildlife Sanctuary.
<i>Natural Reserves</i> Areas of ecological importance or small areas of ecological excellence protected from conflicting land use. Administered by NCWCD or a delegated authority.	I National Park. IV Nature Conservation Reserve or Managed Reserve/Wildlife Sanctuary.
<i>Biological Reserve</i> Generally small areas, for preserving local propagules (seed stock) or other conservation purposes. Managed mainly by local authorities.	I Strict Nature Reserve. IV Managed Reserve.
<i>Resource Use Reserves</i> Large areas, where resource use is regulated by the NCWCD in consultation with appropriate government agencies and local resource users.	V Protected Landscape or Seascape. VI Multiple Use Management Area/Managed Resource Area.
<i>Controlled Hunting Reserve</i> Large areas, in which the NCWCD is solely concerned with the management of hunting in liaison with local people.	XI Biosphere Reserve VIII Managed Resource Area.

Rangeland resources have been severely degraded, a system of protected areas would assist in their rehabilitation. Photo: M. Mirreh, Ministry of Agriculture and Water.



### Assessing Biophysical Coverage

In assessing the degree to which the putative units of the system plan are representative of the nature of Saudi Arabia, broad schema were used which took account of political and economic considerations in addition to the usual biophysical factors.

A physiographic map of the Kingdom, prepared for the report, and a published rangeland classification map, incorporating floristic, edaphic and climatic parameters, were used for evaluating physiographic and ecological representation. Coverage of the various categories were determined planimetrically to reveal levels of representation and gaps in the system.

Identification of potential protected areas on the basis of species presence is a useful and practical method for ensuring representational coverage, though it is generally impossible to review the habitat needs of every species. The ecological requirements of a number of dominant species therefore become central to determining the sizes and design of reserves, though their responses to prevailing conditions are likely to reflect those of associated species.

To assess the availability of potentially suitable reserves for species, the distribution of the 11 large mammals and three birds with high conservation profiles for Saudi Arabia were analysed. Also reviewed were the endemic and near endemic birds and two groups of species with contrasting behaviour: the avian raptors and the 97 terrestrial reptile species known from Saudi Arabia.

The proposed system of protected areas was found to cater reasonably well for the requirements of the main species of conservation interest. However, the lack of consistent distributional data was recognised as a weakness. These analyses were illuminating in revealing the critical importance of particular sites in the conservation of assemblages of species.

Key biological areas, as their name implies, are localities of great biological importance, often quite out of proportion to their generally small size. In many cases they have a positive influence on species diversity and ecological processes well beyond their borders. In Saudi Arabia, these include islands, high mountains, wetlands, mangroves, forests, riparian communities, coral reefs and seagrass beds.

**Table 2: Criteria and Weighting for Prioritising Recommendations of Sites for Protection**

<i>Natural criteria</i>	<i>Weighting factor</i>	<i>Guide to scoring</i>
Species value	x3	Site scores highly if it does or has supported flagship species and/or other species of special conservation interest OR supports a high diversity of species.
Biomes	x3	Site scores highly if it will add significantly to the representative cover of an ecological type or sub-type OR includes good examples of more than one sub-type OR is an important key biological habitat.
Physiographic	x1	Site scores highly if it is an important representative of a physiographic region or sub-region OR represents good examples of more than <u>one</u> sub-region.
Processes	x2	Site scores highly if the status of habitats is good, or the trend is improving OR the site is of such a size that processes can be expected to proceed without undue outside interference OR the site is especially significant to habitat rehabilitation outside.
Other features	x1	Site scores highly if it has high aesthetic appeal, is natural or has special natural features, including geomorphological features.
<i>Practical criteria</i>		
Conflicts	x1	Site scores low if there are high grazing pressures that cannot be resisted OR there are major physical developments OR the land is owned and if it is in an emirate that already has a disproportionately high level of protection.
Benefits	x3	Site scores highly if it will generate tangible benefits, especially for local people OR is important nationally for recreation, education and/or research.
Local support	x3	Site scores highly if it has local support and offers opportunities for development of improved institutions and management practices.
Configuration	x1	Site scores highly if it is in close proximity to other complementary sites, security zones or straddles international borders.
Threat	x2	Site scores highly if current activities impact negatively on its natural value OR it is likely to be affected by unregulated development.

*Each criterion is given a value score of 1, 2 or 3.*

Proposed sites in which key habitats were either "extensively represented", of high quality, or of "major significance" were reviewed. This emphasised the poor coverage of juniper forest associations offered by the present plan. It also highlighted the need to accelerate the protection of other key habitats.

For the protected area system to be useful as a vehicle to enhance sustainable development, there has to be an equitable geo-political spread of protected areas throughout Saudi Arabia in order to apportion fairly the benefits, and any perceived costs, of conservation.

Until the benefits of protected areas are made apparent, there is likely to be certain prejudice against them, especially among rural people who have a vested interest in the natural resource base. Analysing the distribution of the plan across the Kingdom's administrative provinces showed it to be uneven, but not unduly so; however, careful consideration must be given to the distribution of protected areas as the system plan is assembled.

### Setting Priorities for Action

To ensure systematic progress, each protected area will be evaluated in the light of the above criteria and the prevailing level of coverage of the various biophysical elements when deciding the priorities for future action.

A procedure was evolved whereby criteria for "natural" values and "practical" considerations, are weighted and scored. This proved effective in prioritising sites for protection. Priorities for action have to be re-evaluated periodically so as to incorporate additional knowledge and understanding, to admit new sites to the system, and to adjust priorities as representative biophysical coverage is achieved progressively with the creation of each additional protected area.

### Conclusion

The system of protected areas in the Kingdom is still in its infancy. However, eight terrestrial

reserves have now been established, extending over 51,000 km<sup>2</sup>. The creation of the complete system over a period of ten years has been proposed and this will be a formidable task. Nevertheless, the Kingdom is in the fortunate position of having the resources to devote to the development of a representative system of properly managed protected areas. As the system evolves not only will it help underpin the Kingdom's development, but it will also go a long way to closing a major gap in the world's protected area network.

### Acknowledgement

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# SPOTCHECK

Updates on protected area issues



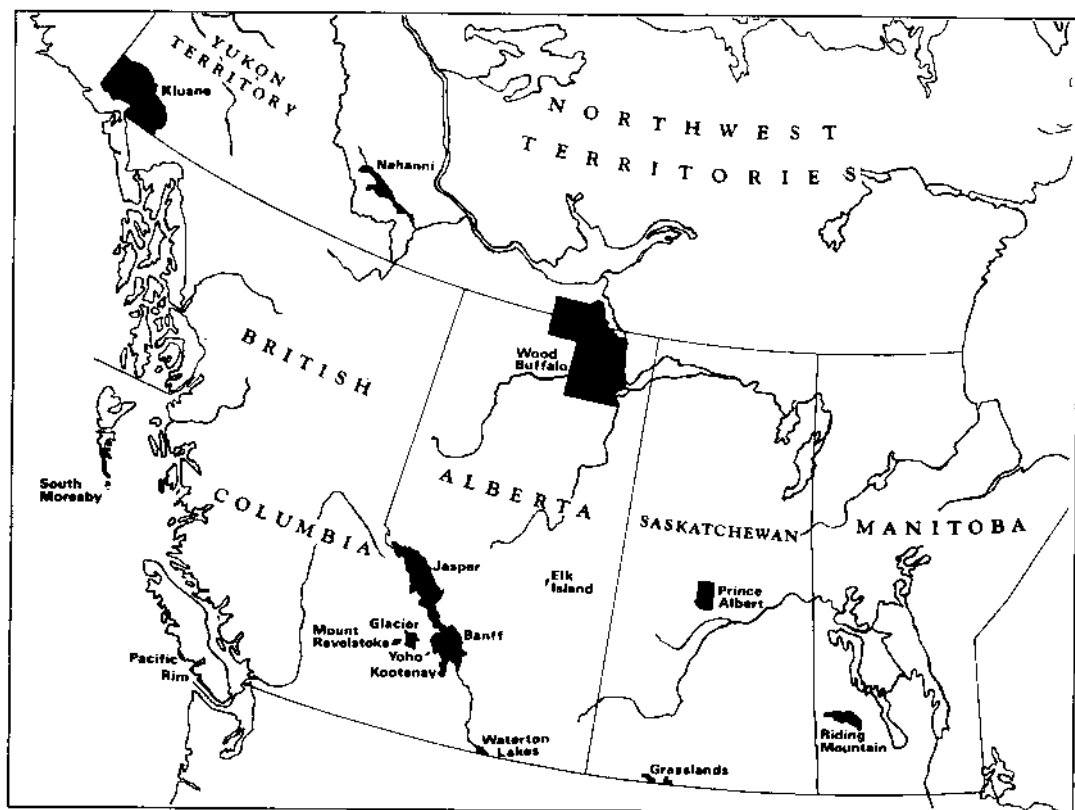
## Wood Buffalo National Park

encompasses 44,807 km<sup>2</sup> straddling the border between Alberta and the Northwest Territories,

Canada. Among numerous valued features, this primarily boreal forest park contains the breeding grounds of the endangered whooping crane, about 80% of the 4,800 km<sup>2</sup> Peace-Athabasca Delta, and a large free-roaming bison population. The park is increasingly subject to external influences from hydro-electric power generation, forestry and other human activities.

## Bison history and controversy - a brief outline

In the late 1800s, Northern American bison were nearly exterminated. At that time, in what is now the northern two thirds of WBNP, the wood bison (the northern form of the bison) had declined to a few hundred animals. The wood bison were provided police protection after 1890, and in 1922, with a population of about 2,000 wood bison, a large portion of their remaining range became WBNP. Meanwhile, criticism to the culling of the plains bison led to the transfer of more than 6,000 young plains bison from Alberta in the south to WBNP. These animals brought tuberculosis and probably brucellosis



Wood Bison, Wood Buffalo  
National Park, Canada.  
Photo: W. Lynch



with them. The plains bison quickly populated the southern part of WBNP and the neighboring Peace-Athabasca Delta, which led to its addition to the park in 1926. The wood and plains bison subspecies readily interbred and the population in and around the park exceeded 12,000 in the 1940s. It has subsequently declined to 4,000 or fewer animals. Population growth is offset by diseases, accidental deaths, legal and illegal kills, habitat conditions and wolf predation.

In 1957 a herd in northern WBNP was determined to have the physical characteristics of wood bison. Modest numbers were relocated to found disease-free wood bison-like populations in the Northwest Territories' MacKenzie Bison Sanctuary and at Elk Island National Park, Alberta. Although today's WBNP bison population is an assortment of plains and wood bison genotypes, the remaining breadth of the wood bison genetic material is believed to reside only in the WBNP region bison population.

In 1957, Canada declared its livestock to be brucellosis-free. That led to increased disease concerns centring on WBNP and the establishment of a federal Environmental Assessment Review Panel. In August 1990, the Panel recommended that, with limited salvage, all bison in and around WBNP should be

slaughtered. The Panel's recommendations have not been accepted by the federal Environment and Agriculture ministers, who are presently discussing alternatives with local communities and indigenous peoples of the WBNP region.

Lessons from this experience of potential value to other park agencies include:

1. Terms of reference for an expert panel must be carefully formulated, otherwise definition of the "problem" becomes distorted.
2. Great care must be given to the selection of panel members. Experts, by definition, tend to have a narrow focus. To offset this tendency towards "tunnel vision", one or more of the panel members should be "generalists".
3. "Park values" can rarely stand up to direct challenge from real or perceived significant economic values.
4. Few national parks, even the world's second largest, can operate in isolation from their surrounding region. Park managers must promote and be active participants in regional planning to minimize conflicts between the protected area and adjacent economic development zones.

David M. Lohnes, Director, Natural Resources, Environment Canada, Parks Service, Canada

# *Buffer Zones in Rainforests: Fact or Fantasy?*

Jeff Sayer

**The buffer zone concept is now widely used to extend the benefits of protected areas for the conservation of their flora and fauna and to meet the needs of local populations. Not all buffer zone projects have been successful, and the author proposes some principles which should ensure that future initiatives achieve their aims. The article is based on a review of buffer zone projects in rainforest parks and reserves, published by IUCN.**

Concern for rainforest conservation during the past two decades has resulted in the gazettelement of many new protected areas. We now have about 5% of the biome in national parks or equivalent reserves, but the rate of acquisition of new protected areas is declining; human pressures on rainforests are simply too intense for very much more land to be allocated exclusively for nature conservation. This is especially so in the peripheral areas of the main forest blocks, where human populations are dense and still growing rapidly, and where the forests are already fragmented. In West Africa, Madagascar, mainland Southeast Asia and the Atlantic and Pacific coastal forests in South America, we face the prospect of networks of small isolated protected areas in landscapes which are otherwise totally transformed for intensive human use. Biogeography theory tells us that these islands will not be sufficient to maintain viable populations of all the native animal and plant species of the forests, and common sense tells us that these islands of forest in largely deforested landscapes will inevitably be subject to intense pressure from small farmers in search of agricultural land and poachers in search of a variety of forest products.

Clearly, protected areas will perform their conservation function more effectively if they are

separated from intensively used land by buffers of natural vegetation, which will serve to extend the habitat of some of the species of the protected area itself. Similarly, the integrity of the core protected area is likely to be enhanced if other forest areas exist on its periphery, from which local people can satisfy their needs for forest products. The concept of buffer zones has, therefore, evolved to describe these areas which are managed to reconcile the inevitable conflicts that occur between the needs of local people and the needs of the flora and fauna of our protected areas. The concept is not new: zoning into wilderness and multiple use areas within and around parks and reserves has existed for decades and the majority of management plans for tropical forest protected areas include provision for buffer zones. But recent reviews of buffer zone plans (Wells *et al.*, 1990, Oldfield, 1987 and Sayer, in press) show that, in practice, success in implementing these plans has often been very limited.

The issue has attracted considerable attention recently because of the new environmental orientation of aid agencies. Buffer zone projects are particularly attractive to aid agencies because, in principal, they provide a formula for spending money in a way which will both contribute to nature conservation and address the basic needs of poor rural people. Conservation organisations





Wild fruits may be important buffer zone crops (Indonesia).

Photos: Jeff Sayer

have suddenly found a productive area of common ground with the agencies who have often in the past been their adversaries. They have also found a potential source of money, often orders of magnitude greater than anything that they have been able to tap in the past. For many conservation organisations, buffer zone projects are funding a very rapid expansion of field operations into development activities where they have little expertise. The newly established Global Environment Facility, operated by the World Bank, UNEP and UNDP, will alone provide \$250 million for biodiversity conservation and a large proportion of this is likely to be for buffer zone-type projects. The conservation community has successfully marketed the concept, the question is, can it now deliver?

I think that the answer lies in an examination of experiences with another controversial element of development assistance programmes; integrated rural development (IRD). In the 1960s and 1970s, IRD appeared to present development assistance agencies with an attractive mechanism for delivering assistance to

poor rural communities. Many of the original attempts failed and a considerable literature on the subject has now developed. Some of the early attempts at buffer zone projects have been unsuccessful for the same reasons and we can learn a lot from these failures.

Many failures can be attributed to the tendency for aid agencies to focus on technological solutions to development problems. They often assume that, because soils and climate are good for a particular crop and international markets are favorable, a project may legitimately aim to promote the crop in question amongst rural communities. Buffer zone project proposals frequently stated the intention of the donor agency to promote a certain tree crop amongst people living around protected areas. The projects were often staffed with people whose expertise lay in the cultivation of the chosen crop. The Korup project in Cameroon aimed to develop agroforestry in buffer zones, the Talamanca project in Costa Rica targeted fruit tree development, the World Bank chose rattans in Dumoga Bone in Sulawesi, and IUCN has opted for palm frond harvesting for export for



Collecting medicinal plants can provide incomes for local people in forested buffer zones, Thailand.  
Photo: Jenne de Beer

floral arrangements from the Peten in Guatemala. A recent EEC project proposes that the Pygmies in the Odzala national park in Congo will henceforth become collectors and cultivators of medicinal plants. Forest dwelling peoples around the Salonga national park in Zaïre will find themselves breeding parrots for the international pet trade.

These proposals are all based on the application of an analysis based on western industrialised logic to the problems of people whose culture may be very poorly understood by their distant benefactors. There may be very good reasons why the people living around these protected areas may not be interested in collecting medicinal plants, or raising parrots, or even agroforestry. The first rule for IRD and buffer zone projects is that they must not consist of the 'parachuting-in' of a "blueprint" package where the important decisions are taken by people other

than those who are ultimate recipients of the aid. The ideal buffer zone project should consist of a process by which appropriate assistance can be given to people living near a protected area. The project must help these people to evaluate and choose from all available development options which are compatible with conservation. The project must then provide them with money, materials or technical help in attaining the development goal that they have themselves chosen. Such flexible projects, where the detailed activities are unknown at the time of project initiation, are not very satisfactory to aid donors. The donors usually express the concern that if they don't have clear objectives they cannot evaluate their success. Agencies that implement their

projects through a competitive bidding process have particular problems with requesting tenders for projects whose final form is only vaguely known.

In reality, even the most rigidly defined projects have to respond to the realities of the local situation. Good technical advisors will always develop a relationship with the recipients of their advice and will make their assistance respond to the needs expressed by the people. The IUCN/EEC project in the Usambara mountains in Eastern Tanzania provides an interesting example. The original project preparation mission identified a number of possible development activities which might have been used to lessen the harmful impacts that local people have on the remaining natural forests in the area. Only a few of the options proved to be of interest to local communities. The planting of Arabica coffee, cloves and fruit trees in private

home gardens has been widely adopted, and help in constructing contour terraces and fish ponds appears to be contributing to improved local food self-sufficiency. In the Talamanca region in Costa Rica, only one or two of at least 50 sorts of fruit trees promoted by a project have achieved significant local acceptance.

The most successful element of the Usambara project was the participatory mechanism that was put in place to facilitate dialogue with local communities. Village coordinators were appointed from amongst local people and one was sent to live in each of the 13 villages in the project area. The village coordinators formed committees in their village and themselves comprised a central project committee which met once a month with the project's senior staff. Ideas emerging from the village committees were reviewed by the entire project team and, if they were felt to be worthwhile, then the villagers were provided with whatever support they needed to implement them. The most common support needed took the form of seeds and seedlings for tree nurseries, plastic bags for raising seedlings, gardening tools, technical help with surveying

contour terraces and help with design, construction and stocking of fish ponds.

The costs of the inputs at the village level were relatively low and the main costs of the project lay in salaries, housing and transport for expatriate and local supervisory staff. Similar projects in Central America and South Asia have been implemented without permanent supervisory staff, and have been much cheaper.

An important conclusion of several such projects with which IUCN has been involved is that it takes a long time to build up the confidence of the target populations. However, it has also been observed that as the confidence develops, the population comes to appreciate that the project is really there to help. As they see that the project is indeed interested in listening to local ideas and is sympathetic to local problems, so the enforcement of laws governing access to, and use of, the forests in the core protected area become much more readily tolerated. Improvement in the efficiency of law enforcement, and the avoidance of polarisation of views of protected area staff and local people, is one of the main benefits of such projects.

Tree nurseries provide trees for land restoration in buffer zones in Laos.  
Photo: Paul Anspach





Tree crops such as Cacao mimic the structure of forest ecosystems and provide income for buffer zone inhabitants. Photo: Jeff Sayer

Nonetheless, the fact that confidence and practical developments can only be achieved over time, means that project support must be sustained for long periods. It is useless to embark upon solving buffer zone problems in a three year project. It is better to start small and sustain support over at least ten years.

IUCN's reviews of buffer zone projects have shown that few are totally successful, but many of the attempts reveal elements which show signs of promise. The bad news for the aid agencies is that the key ingredient for success is not the rapid disbursement of large amounts of money. It is low level support, sustained over a long period of time, with project executants who are genuinely concerned about both the people and the protected area. Project advisers must be flexible and respond and assist in whichever way is appropriate as the project evolves over time.

### Principles of Buffer Zone Management

- Assistance must be provided in response to locally expressed ideas. There must be a continuing dialogue with local communities. Funds and materials must be available to support local initiatives.
- Help must be provided at a modest level over a long period. Large scale projects with a two

or three year duration will not change the attitudes and behaviour of poor rural people. Ten years is probably the minimum commitment needed for a buffer zone project.

- Attempts to impose new crops, agricultural systems or ways of exploiting forest products on local people will almost certainly fail. Instead, projects should put in place a process for responding to needs identified in consultation with the communities.
- Enforcement of laws restricting access to, and use of, forests in the core protected area must be effective, and must be seen by local people to be linked to the buffer zone activities.

### Acknowledgements

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# ***Preparing a National Parks and Protected Areas System Plan: a Case Study from Grenada***

Arthur Heyman

**This paper outlines the process by which OAS provided technical assistance in the production of a policy and a plan for a national system of parks and protected areas to the Government of Grenada. The sequence of events involved is described and a number of principles generalised from OAS experience in the field are provided as a conclusion. These principles cover the function of a national system within an integrated land-use policy, guidelines for developing and operating the system and the importance of assessing and integrating economic costs and benefits throughout.**

Many countries have recognised that an *ad hoc* process of designating protected areas is not satisfactory. The creation of national parks came to be seen as an aspect of comprehensive land-use planning, requiring a systematic process that addresses and balances such divergent criteria as protection of endangered species, watershed conservation, provision of recreational opportunities, and generation of tourism income. The process has an important economic dimension, because a national systems plan of protected areas must meet criteria of economic efficiency and political expediency (Dixon *et al.* 1990).

The following case study, an example of the Organisation of American States (OAS) technical cooperation in establishing a national system plan for parks and protected areas, describes the sequence of events involved and concludes with some principles generalised from OAS experience in this field (Huber *et al.* 1988).

## **Background**

The 1980s was a period of active development of Grenada's natural resources for agriculture, forestry, fisheries, and tourism. The government recognised the value of the upper water-sheds for water storage and erosion control. It also understood that some areas could be useful as wildlands and have other uses as well, and so it adopted a policy of multiple land use planning. The "Spice

Island", long famous for its tropical beauty, had to protect its natural, cultural, and historical attractions, the basis of the nation's tourism. Furthermore, the government acknowledged the importance of other considerations such as maintaining biodiversity and protecting endangered flora and fauna. Thus, the government decided to establish a national system of parks and protected areas even though sufficient funds were not then available to implement it fully. The plan could help orient development of the nation's natural resources, identify irreversible decisions on resource use before they were made, and set priorities for the development of protected areas.

In 1984 a joint team was assembled to draft a policy and plan for a national system of parks and protected areas for approval by the government. It consisted of representatives of all relevant government agencies, private organisations including environmental and cultural NGOs and the tourism industry, and OAS consultants with support from the US Peace Corps.

## **Sequence of Activities**

### *1. Design Institutional Arrangements*

It was agreed that deciding on institutional arrangements had to come first because: the responsible institutions would provide the national personnel for the study; by participating

in the study, these people would receive in-service training; unless management of the plan could be reasonably expected, there was no point in preparing the plan. Following a detailed analysis of all government and private entities that had a potential role to play, it was concluded that the system should be managed by the Ministry of Agriculture, Tourism and External Affairs, with the Forestry and Fisheries Departments having responsibility for terrestrial and marine protected areas, respectively. A Cultural Landmarks Steering Committee would be established to advise the Forestry Department, and a number of public and private groups would cooperate in management, thus helping to alleviate the severe limitations of financial and human resources. Responsibilities of each public and private agency involved in establishing, planning, and managing the system were specified as well as arrangements for the inter-relationships among them, for strengthening their capacity to fulfil their roles, and for the acquisition and training of additional personnel.

## *2. Establish National Policy and Objectives for Protected Areas*

In drafting goals and objectives for the national park system, the team first had to agree on which of the potential benefits that protected areas might provide would be considered. The most obvious were short-term direct benefits such as attracting tourists and maintaining fisheries productivity. Indirect benefits (i.e. maintaining water storage capacity and preventing siltation of downstream farm land) were also important for integrated development. It was decided that biological, psychological, scientific, educational, and aesthetic benefits would be counted as well, whether or not these could be monetised or quantified. It was acknowledged that these benefits would be offset to some extent by income foregone when management regulations of a protected area restrict its use for some other purpose. The system design would feature

flexibility; that is, by favouring uses that did not preclude other future uses, the system would be able to accommodate evolving conditions.

A review of the national situation disclosed deterioration of the natural areas, increasing recreational demand, inadequately developed tourism potential, and undefined executive responsibility and lack of management guidelines for natural resources and protected areas. Analysis showed protected areas legislation and existing tourism, forestry, soils and water conservation policies to be patchy, overlapping, and outdated. A coherent national policy on parks and protected areas was needed.

It was agreed that the systems plan should include cultural and historical sites as well as natural ones, and that areas critical to water quality and supply and that provide important economic and natural services such as beach erosion control or fish nurseries should also be included. The resource conservation policy should seek a reasonable balance between preservation and economic development. The list below of the specific objectives agreed upon demonstrates the compatibility of the conservation and development objectives:

- Maintain examples of the country's terrestrial and marine ecosystems.
- Protect natural resources for outdoor recreation and provide appropriate services.
- Protect scenic beauty and open space.
- Stimulate national and international tourism and provide appropriate services.
- Conserve genetic materials as elements of natural communities.
- Maintain biodiversity and environmental regulation.
- Protect and manage fish and wildlife resources for sport and recreation to ensure sustainable yield of protein and animal products and for environmental regulation, protect commercially valuable species and replenish depleted stocks.
- Provide research, education, and monitoring of natural processes.

Features of natural and cultural heritage that merited protection were examined through extensive literature review, interviews, overflights, and field trips. Protected areas were proposed that would cover these features with a minimum of overlap (e.g. at least one occurrence of a distinctive geologic formation should be protected, but it need not be protected everywhere it occurred). The key natural functions and assets of each proposed protected area were catalogued, as well as its present human use. A matrix was designed to analyse the full range of terrestrial and marine ecological zones, vegetative communities, wildlife, geology, geomorphology, and cultural and historical data as well as the educational, recreational, and scientific potential of the proposed areas. Overlay maps were prepared to ensure that all features judged to be important

Reaching decisions on management categories for the proposed protected areas proved to be surprisingly contentious. For the original list of some 50 areas proposed for protection, some 17 management categories were considered. After much discussion these were reduced to five national categories (national parks, natural landmarks, cultural landmarks, protected seascapes, and multiple use management areas) and two international categories (world heritage sites and biosphere reserves).



National Parks and Protected Areas in Grenada, as  
Proposed by the System Plan



### 5. Negotiate the Final List of Proposed Protected Areas

This is the key step in the process. The list of candidate protected areas will inevitably be much longer than the number finally selected for protection. Three workshops were held to reduce the number of candidate areas and fit them into management categories. Participants included ministry personnel representing agriculture, tourism, education, culture, and sports; the science and technology community; historical societies and the National Trust; private environmental groups and experts on the natural history and culture of Grenada; and commercial interests such as the Grenada Hotel Association. International advisers included the OAS team and IUCN, Caribbean Development Bank, OECS, ECNAMP and UNEP representatives.

Some areas with very high ecological and recreational values were agreed upon from the outset as meriting national park status; examples are Grand Etang and Levera Archipelago. Areas with critical environmental roles also made for easy decisions. For example all mangrove areas were included for protection, and the Grand Etang Forest Reserve (already developed with technical assistance from USAID and Peace

Corps) and St. Catherine National Park were established for watershed protection. Areas that offered unique attributes such as many of the cultural and historical sites, scenic wonders such as waterfalls and coral reefs, seascapes, and recreational areas were analysed, and the most outstanding were recommended for protection. Controversy over areas that merited protection but had important values for timber or other productive activities was resolved by establishing them as multiple use areas. After the relatively easy decisions were reached, the group addressed the remaining proposed areas, balancing qualitatively the cost of managing an area versus the benefits it offered and the value of alternative uses. In the end, relatively few of the proposed areas were rejected, partly because the team could not obtain from the government the economic limits on the park system.

### 6. Design Management and Administration Procedures

The team proposed guidelines for a comprehensive revision of legislation relating to protected areas and resource conservation. A procedure was established for creating new protected area units, and guidelines were prepared for the principal management functions of the system. The types of planning deemed necessary were: a National Parks and Protected Areas System Plan and Strategy and, for each unit, long-term Management and Development Plans, Specialised Plans (e.g. Interpretation and Environmental Education Plan or Forestry Management Plan) as needed, and annual Operations Plans. More specific management policies and guidelines were also prepared for each proposed management category. It was recommended that a



National Parks and Protected Areas in Carriacou, as proposed by the System Plan

set of regulations and penalties be instituted as soon as the legislation is in place. Finally, a basis for financing the system was proposed, and the need for a long-term funding strategy and the gradual internalisation of costs was made clear.

## Results

Grand Etang National Park and Fort Frederick Cultural Landmark are now in operation having received financial support from USAID. Levera Archipelago National Park has received financial support from the EEC. It can be assumed that the existence of a clear plan and well established priorities for park development helped to attract this outside assistance to put them into operation.

## Principles Derived From The Technical Assistance

- A national system of parks and protected areas should be a critical component of an integrated land-use policy. Such a system, particularly in a developing country, should be designed for both protection of the natural and cultural heritage and sustainable management of natural goods and services. Maintaining biodiversity, enhancing tourism and providing recreational facilities are important goals in most countries.
- If technical assistance is used to develop a protected areas system, the institutional arrangements for managing the system should be determined early in the process, and the national personnel participating in the study should be representatives of those institutions so that preparation of the plan also serves as in-service training.
- Begin the process of seeking financial support for implementing the plan from the outset. Include potential financing (granting and/or lending) institutions in the process of preparing the plan to avoid having to change it later to meet financing requirements.
- Drafting a clear statement of national policy on parks and protected areas with explicit goals and objectives and obtaining the concurrence of all important players in the process is the best point of departure.
- A comprehensive survey of natural and cultural features should be conducted and the results arrayed against information on potential land use to identify possible conflicts between protected areas and other uses of the land.
- The general public, particularly those directly affected by the establishment of a protected area, should participate in the process of selecting protected areas and their management categories.
- In developing a systems plan, its economic constraints should be considered from the outset. Decisions on protection of an area should be based on analysis of the value and uniqueness of the benefits it offers *versus* the cost of management and the opportunity costs of foregoing alternative uses.
- To the degree possible, each unit should be responsible for generating its own operating costs (through entry fees, concessions, sales of goods and services rendered such as water supply). The system's regulations should facilitate this.

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*This article is derived from one of a series of case studies on the economics of protected areas by Arthur M. Heyman, Department of Regional Development and Environment, OAS. The collection will be published in 1992 under the title Parks and people: OAS Experience in the Planning and Development of Parks and Protected Areas.*

# FLAGSHIPS

The story behind the emblem



## The Broads

area is a wetland situated in the eastern part of Norfolk in East Anglia, England. The Broads themselves are shallow

lakes, formerly peat-diggings, associated with rivers which wind slowly to meet the North Sea at Great Yarmouth. Alongside the rivers there is a magnificent series of fen communities, more extensive and richer than that surviving elsewhere in Britain. Much of the lower valleys has been embanked and drained to form lush marshes which cattle graze in summer.

This area has always been intensively used by man but settlement, intensification of agriculture and development of a motorised boating industry have caused major environmental damage, reaching to crisis proportions in the late 1970s. The area was then described as a "battleground of conflicting interests". Nutrient enrichment had transformed the open waters of the broads, once a wilderness of water plants, to lifeless muddy pools. The attractive reedswamp which fringed the rivers had mostly gone, swept away by the wash of more and more motor-boats and weakened by the insidious effects of nitrates. The famous wide-horizoned skies and diverse open

landscapes of the area were screened from pleasure boat users by a wall of scrub and woodland, advancing over the neglected fens. In recent years, agricultural incentives from Europe also triggered a wholesale arable conversion of the grazing marshes which are so vital for waders and wildfowl and for the network of fresh water channels.

Crisis often breeds opportunity. In this case, the opportunity was in the form of a new managing authority for the Broads, the Broads Authority. An experimental joint committee of local authorities and countryside agencies was formed in 1978 to develop and oversee a strategy to restore and manage the area, in the interests of everyone. The arrangement was formalised



*Wherry Hather - a restored Edwardian craft (built around 1900) now on charter in the Broads.*

*Photo: Richard Denyer, Broads Authority.*

Cockshott Broad - a newly restored broad.  
Photo: Richard Denyer, The Broads Authority.

in 1988 through a Broads Act which gave a new independent Broads Authority duties for conservation, public enjoyment and navigation. The Broads have national park status, although the special tailor-made constitution of the authority separates it from the other ten national parks in Britain (all are equivalent to IUCN Category V, Protected Landscape).

The dragonfly logo is an important symbol for the Broads, indicating the importance of wildlife conservation to the area. Although conservation, recreation and navigation are given equal status in the Broads Act, priority must be given to investment in a scientific conservation-led restoration programme – for water quality and fen management and for landscape enhancement measures. Without this, there would be few wild areas for people to enjoy, little to fish and greater problems with pollution symptoms such as blue-green algae. In turn, the boating and tourist industries would suffer.

The rich dragonfly population of the Broads area is a good barometer of the health of the ecosystem, since dragonflies depend on all components of the wetland complex and some are particularly sensitive to ecological damage. Two species – the Norfolk hawk *Aeshna isocetes* and *Coenagrion armatum* – are confined to the Broads in Britain.

Dragonflies can be seen by the ordinary holiday-maker in the Broads – if they seek out the wilder spots. Unfortunately, some ugly riverside developments and the polluted waters of the Broads have detracted from the remoteness and charm of the area. In addition, larger and faster boats have separated visitors from the natural world. Increasing pressures on waterspace make



it difficult to protect or recreate wilder, quiet areas. Restoration of the image of the Broads as a place for refreshing the soul is consequently one of the greatest challenges facing the Broads Authority. Green tourism initiatives such as the restoration and chartering of traditional wherry boats, the provision of quiet, pollution-free electric propulsion, and the development of low-wash hulls, are some current initiatives.

The restoration of Broadland is a major challenge and it will take decades before real changes materialise. The history of the Broads' decline should serve as a warning to those in control of national environmental assets. However, progress by the Broads Authority made under the name of the national parks family, with its distinctive dragonfly emblem, will hopefully be an important example to others.

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# Wildlife Conservation and Nature Reserves in Hunan Province, People's Republic of China

Guangchun Lei

Hunan Province is located in the mid-subtropic evergreen-deciduous forest region and is situated in the middle reaches of the Chan Jiang (Yangtze River) drainage between 24°39' to 30°08'N and 108°47' to 114°15'E. It has been estimated that there are more than 5,000 species of higher plants in Hunan, among which 120 species are rare or endangered, including such famous species, often regarded as living fossils, as *Metasequoia glyptostroboides*, *Cathaya argyrophylla*, *Ginkgo biloba*, *Glyptostrobus pensilis*, *Davidia involucrata*, *Bretschneidera sinensis*. Research has shown that three genera, *Deltocheilos* (Gesneriaceae), *Ombrocharis* (Lamiaceae), *Hunanioanax* (Araliaceae) and more than 50 species are distributed only in Hunan. There are also many wild animal species; 750 species of vertebrates have been recorded from the province, 60 of which are nearly extinct (for example *Panthera tigris amoyensis*, *P. pardus*, *Neofelis nebulosa*).

To prevent the loss of these very valuable resources, 23 provincial nature reserves and 8 county nature reserves, with a total area of 350,000 ha, have been designated since 1958 (Table 1). Three legislative acts (on the management of nature reserves, on wildlife resource protection and on wild animal conservation) have been passed. During the same

time, we have also set up a wildlife protection fund to provide wildlife conservation careers with an economic guarantee. A wildlife management network has now been constituted at every administrative level. On the basis of the actions briefly mentioned above, we believe that a career in wildlife conservation will become a highly desirable profession.

I acknowledge and thank David E. Boufford for reading an earlier draft of this paper.

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Zhangjiajie State Forest Park, northwestern Hubei. Unusual columnar rock formations project upwards 200 metres or more from the base. Primarily a geological park, the natural vegetation has been replaced in areas by plantings of *Cunninghamia*. Along the trails the vegetation is trampled by an increasing number of tourists and the vendors who cater for their needs. Photo: David Boufford.



Table 1: Hunan Nature Reserves

Nature Reserve	Area (ha)	Type	Coordinates		Important Species
			N	E	
So-qiyu	5,000	FES & LS	29°20'	110°30'	<i>Davidia involucrata</i> , <i>Eucommia ulmoides</i>
Tian-zhi Mountain	5,000	FES & LS	29°23'	110°35'	<i>Ginkgo biloba</i> , <i>Eurycorymbus cavaleriei</i> , <i>Manglietia patungensis</i>
Hu-ping Mountain	7,000	FES	30°05'	110°40'	<i>Davidia involucrata</i> , <i>Bretschneidera sinensis</i> , <i>Sinojackia dolichocarpa</i>
Lo-ta	100	FES	28°50'	109°10'	<i>Metasequoia glyptostroboides</i>
Xiao-xi	11,000	FES	28°45'	110°15'	<i>Davidia involucrata</i>
Dong-tin Lake	184,300	wildlife	29°27'	113°05'	5 species of cranes, <i>Acipenser sinensis</i>
Da-we Mountain	6,300	FES	28°25'	114°04'	<i>Liriodendron chinensis</i> , <i>Cephalotaxus oliveri</i>
Yuen Mountain	1,330	FES	26°38'	110°45'	<i>Ginkgo biloba</i> , <i>Eucommia ulmoides</i>
Huang-shong	25,350	FES	26°17'	110°00'	<i>Bretschneidera sinensis</i>
Zhi-yuen, Wan-fong	11,000	FES	26°15'	110°21'	<i>Cathaya argyrophylla</i> , <i>Panthera pardus</i>
Xinling Shuen-huang Mountain	12,600	FES	26°58'	110°59'	<i>Abies ziyuanensis</i> , <i>Eurycorymbus cavaleriei</i> , <i>Panthera pardus</i>
Dongan Shuen-huang Mountain	16,400	FES	26°40'	110°38'	<i>Abies ziyuanensis</i> , <i>Tetracentron sinensis</i> , <i>Cercidiphyllum japonicum</i> , <i>Panthera pardus</i>
Nan-yue Mountain	8,000	FES & LS	27°17'	112°45'	<i>Gleditsia vestita</i>
Taoyuan-dong	7,000	FES	26°30'	114°00'	<i>Abies ziyuanensis</i> , <i>Panthera tigris amoyensis</i>
Ba-mian Mountain	4,300	FES	26°00'	113°45'	<i>Cathaya argyrophylla</i>
Quian-ja-dong	5,300	FES	25°29'	110°30'	<i>Abies ziyuanensis</i> , <i>Fokienia hodginsii</i> , <i>Pseudotaxus chienii</i>
Jou-li Mountain	5,000	bambooES	26°40'	111°25'	more than 20 species of bamboo
Da-yuan, Yuan-kou	11,000	FES	24°56'	110°59'	<i>Abies ziyuanensis</i> , <i>Tetracentron sinensis</i> , <i>Tsoongiodendron odorum</i>
Yang-ming Mountain	2,600	FES	26°49'	110°50'	<i>Pseudotsuga sinensis</i>
Mang-san Mountain	6,500	FES	24°53'	113°00'	<i>Panthera tigris amoyensis</i> , <i>Disanthus cercidifolius</i> var. <i>longipes</i> , <i>Davidia involucrata</i> , <i>Changnienia amoena</i>
Zhang-jia-jie State Forest Park	5,000	FES & LS	29°18'	110°28'	<i>Davidia involucrata</i> , geological formations
Ba-da-gong Mountain	20,000	FES	29°25'	109°30'	<i>Davidia involucrata</i> , <i>Panthera pardus</i>

FES: Forest Ecological System

LS: Landscape

# *Biodiversity Reserves: Setting New Priorities for the Conservation of Wildlife.*

Chris Humphries, Dick Vane-Wright and Paul Williams

**This paper is concerned with three questions about biodiversity: what is it, where is it, and how should we establish priorities for its protection? Biodiversity, the sheer variety of life, is about to undergo drastic reduction through mass extinction. Faced with this reality, conservationists have called for an International Convention to set priorities for biodiversity protection. To do this effectively will require rapid development of new means of evaluation for this specific task. Three fundamental properties of faunas and floras are identified: species richness, complementarity and taxonomic distinctness. These parameters can be measured and integrated, using the WORLDMAP programme, to identify priority areas for conserving biodiversity within a taxonomic group. The potential of this method for development as a global biodiversity conservation evaluation system is briefly discussed.**

**B**iodiversity is the sheer variety of life – the variety of species, including the genetic variation between and within them. The number of animal and plant species is estimated to be in the range 3-30 million, of which less than 2 million have been named or even recognised (May, 1990). Faced with this huge number, and the ecological devastation affecting the world, many biologists are convinced that a period of massive extinction is imminent. In the next few decades we may witness the loss of millions of the species that make up the web of life on our planet – the unique system from which we evolved, and upon which we are totally dependent.

Parks and wildlife reserves are chosen on many different, often conflicting criteria. These include needs for recreation, material resources and ethnic minorities, as well as species conservation. The recognition of an urgent new need, the conservation of biodiversity itself, demands the rapid development of efficient means of evaluation for this specific purpose (Margules and Austin, 1991).

Adequate protection of biodiversity will require a global strategy, including the

establishment of an international network of reserves to act as refuges for as wide a variety of animal and plant life as possible. In response to this idea, and in particular the call for an International Convention to conserve biological diversity (IUCN, 1990), a team of scientists at the Natural History Museum in London is developing basic evaluation methods for this task. Collaboration is being sought with international organisations including IUCN, SSC, ICBP, WCMC, WRI and CSIRO. Groups of organisms to be analysed include butterflies, moths, birds, bats, antelopes, conifers and, in conjunction with the Royal Botanic Gardens, Kew, trees of the Amazon Basin.

The task involves deciding how to recognise and set priorities for the selection of reserves so that, as sites are added to the network, they progressively protect the maximum possible diversity. To do this we need to measure biodiversity in a way which will allow us to compare areas on both absolute and relative scales. These requirements can be met by measuring three properties of floras and faunas: species richness, complementarity and



taxonomic distinctness (Vane-Wright et al., 1991; Williams et al., in press).

### The principle of complementarity

Imagine being given the choice of protecting two areas out of a set of three, as biodiversity reserves. You can choose any two. You must put them in priority order because you can only afford to buy one of them now; the second area of your choice will remain unprotected; the third area will be redeveloped immediately, as a parking lot. The only other information you are given is a list of plant species for each area, and that the cost of conserving any area would be equal. Using species richness as a working measure of biodiversity, your first choice will be the area with the most species; it offers the potential of conserving the largest "amount" of biodiversity. What will be your second choice – a choice which will result in the immediate extermination of all wildlife in the area not selected? Will it be the area with the second highest number of species? In terms of setting priorities, the correct answer is "not necessarily". We need to identify as second choice the site containing the highest number of additional species, i.e. those not represented in the first area.

Putting some figures to the example, imagine that area 1 has 60 species, area 2 has 55 species of which 10 are not found in areas 1 or 3, and area 3 has 45 species, of which 30 are not found in either areas 1 or 2. Areas 1 and 2 are woods, area 3 is a marsh. The number of species in all areas combined is called the *complement*, totalling 100 in this case. If we take the richest area (area 1, 60 species) as first choice, this determines the *residual complement* (40 species unaccounted for). The ideal second choice is then the site giving the greatest additional biodiversity to the first – the site having the highest proportion of the residual complement. Area 2 offers 10% increment, but area 3 offers 30%. So, in this very simple example, we would buy the richer and sacrifice the poorer of the two woods, and hope that funds would eventually be found to protect the marsh.

### The notion of taxonomic distinctness

In order to rank sites in this way it is necessary to measure their diversities in terms of absolute values, and also in terms of their relative contributions to residual complements. In the example, species richness was employed for both purposes. However, there are many situations where this simplest of measures, which treats all

Figure 1. Taxonomic distinctness. Not beautiful or cuddly for even taste in southern Angola), the extraordinary *Welwitschia* (the only member of the *Welwitschiaceae*) is abundantly distinct. As a result, it would score heavily in favour of conserving the Namib desert, the only ecosystem in which it occurs.



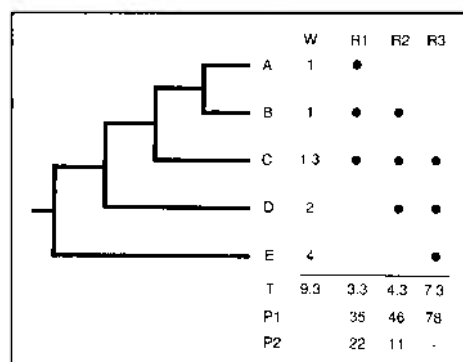


Figure 2. The basics of priority analysis - species, areas, complementarity and taxonomic distinctness. A theoretical example for five species (A-E), and three areas (R1-R3) each with three species (dots). Taxonomic distinctness calculated by the root weight method gives a set of additive weights (column W) reflecting the position of each species in the taxonomic hierarchy. Total diversity for A-E (complement) and each area is given in row T. Scores as percentages of the complement are given in row P1. Row P2 gives diversity increments for R1 and R2, based on residual complement after selecting R3 as first choice. Note that  $P3_{max} > P1_{max}$  and that  $P1_{max} + P3_{max} = 100\%$ , indicating priority is R3 then R1, and that R1 + R3 form critical faunas set. (Reproduced from Vane-Wright et al., 1991: fig. 5, with permission of Elsevier Science Publishers Ltd.; see also text.)

species as equally valuable, is not appropriate. Imagine that the 10 species unique to area 2 belong to 10 separate and highly distinct plant families unrepresented in the other areas, whereas all but two of the species restricted to area 3 are members of a single species complex which, moreover, belongs to a family well represented in area 1. Armed with this information, you might want to reverse your decision about the second priority area - or even the first. 'Megadiversity', as measured simply by species richness, is by no means always best.

We thus have an intuitive idea of *taxonomic distinctness*. It is based on an appreciation of the taxonomic hierarchy. Some species are very closely related to each other (low relative rank), while others are very distinct. Single species can

represent whole families (Fig. 1), orders or even phyla. In terms of biodiversity, to equate one of these with a single member of a sibling species complex seems quite wrong. This is one of the reasons why it is easier to get money to protect the giant panda rather than a species of rat, or for the monkey-puzzle rather than a single species of fir. If there were hundreds of species of pandas or monkey-puzzles, but only one sort of rat or fir tree, the reverse would be true. In species conservation terms we value rarity; in biodiversity terms we value distinctness.

In practice, real faunas and floras consist of a wide variety of more or less distinct species. How can we devise an acceptable measure that will reflect this? We are appraising a variety of measures designed to do this, and now have some

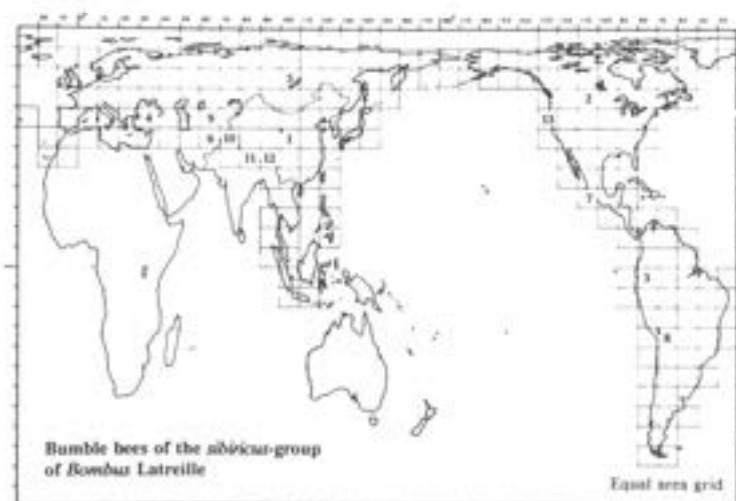
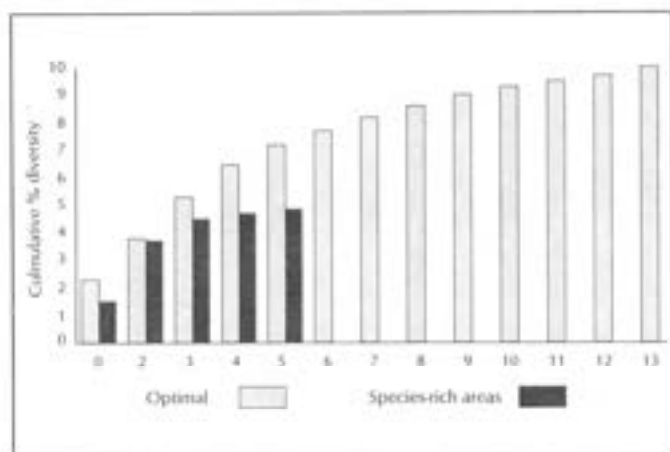


Figure 3. Priorities for bumblebees of the *Bombus sibiricus* group - a critical faunas set and priority analysis. The 43 species of the *sibiricus* group occur in 120 of the grid squares shown on the map (Williams, 1991). To complete the priority area analysis using root weight as the taxic diversity index requires 13 areas (Williams et al., in press). The diversity accumulation sequence is shown in Fig. 4. (Reproduced from Vane-Wright et al., 1991: fig. 7, with permission of Elsevier Science Publishers Ltd.)

Figure 4. Optima and suboptima - complementarity versus megadiversity in the search for an efficient solution. The main data range shows taxic diversity accumulation at each step of a priority area analysis (using root weight) for bumblebees of the *Bombus sibiricus* group, starting with the Chinese region of Gansu (1), and finishing with northern California (13) (from Williams *et al.*, in press; see also Fig. 3). The second range of data (five columns) shows stepwise accumulation of diversity (on same root weight scale) if regions are chosen to maximise local species richness without optimising complementarity. In this suboptimal sequence, area 1 = Ecuador (10 spp.), 2 = Kashmir (9 spp.), 3 = Gansu (9 spp.), 4 = northern Peru (8 spp.), 5 = central Bolivia (8 spp.); all other areas have less than eight species. Note that by third step optimised sequence exceeds 50% taxic diversity, whereas aggregate for the five 'megadiversity' sites does not even reach 50%.



very promising candidates (Williams *et al.*, in press). The measures can also be made sensitive to species richness. We call these measures taxic diversity indices (Vane-Wright *et al.*, 1991).

#### Priority areas: combining taxic diversity measures with complementarity

Using a taxic diversity index in a priority area analysis applies differential weighting to the species. Weighting can be fixed or relative. Species richness is a special type of fixed weighting: all species are simply given unit weight. Root weighting (Fig. 2) is another fixed weight index, species being valued for distinctness according to their position in the taxonomic hierarchy (Vane-Wright *et al.*, 1991). For priority area analyses, fixed weights are simply summed for all species represented within an area. Calculation of increments based on residual complements is equally straightforward (Fig. 2). Relative weights, such as dispersion measures (Williams *et al.*, in press), are more complex to apply because they are not simply additive at each step, but the fundamental principle remains the same. The ideal first choice is assessed by the maximal score: subsequent

areas are assessed by calculating increments based on their representation of the residual complement in combination with the species already selected. In practice, for anything other than a few areas and species, a computer programme is needed (Williams' WORLDMAP, essential even when just using species richness).

A priority area analysis is completed by the step which finally accounts for the entire complement (Figs. 3, 4). This identifies a list of sites identical or similar to the critical fauna (or flora) set. This is the minimum set of areas containing all species under analysis. In reality it will rarely be possible to establish reserves in areas corresponding to the optimal sequence. Probably the greatest value of our approach lies in being able to assess or compare suboptimal choices. The second range of data plotted in Fig. 4 gives an idea of how this can work.

#### Prospects

The system we have outlined is under development. A further essential step will involve finding a satisfactory way to combine data for different organisms. We ultimately envisage analysing 100 or more well-known groups of

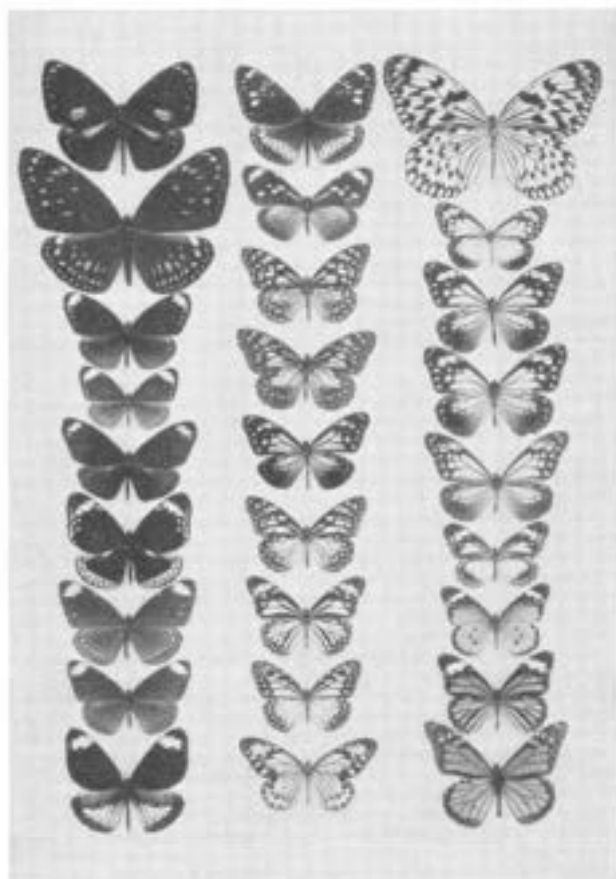


Figure 5. A very critical fauna. Many animal and plant species can only be found in the Philippine islands. These butterflies represent the 26 Danainae found in Luzon. Five are not found outside the Philippines, and one is restricted to Luzon (Parantica phyle, no. 94). In global priority analyses of over 300 areas where danainae occur, Luzon is always in the top 10 of 35 regions forming the critical faunas set (Vane-Wright and Williams, unpublished). The Philippines once had 90% forest cover; the forests, including those of Luzon, are now almost gone. Time for nos. 79, 82, 93, 94 and 95 is almost up – only action now can save them.

animals and plants, on a global basis. The basic flexibility of the method, applying weights and assessing suboptimal choices, means that it could also be extended to give a general planning system.

Such systems can be refined and extended indefinitely. The inevitable scientific debate over detail has already begun (e.g. May, 1990). But, as Samuel Johnson understood, what is needed most is action. To be sure, an efficient selection procedure is vital to give value for money. But action within the decade is equally vital, as our options for choice are decreasing day by day (Fig. 5). We must strive to keep these options alive (Reid and Miller, 1989). In the future, the reserve network will be called upon to supply the raw materials needed to restore to the Earth that most universal of all qualities: diversity.

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# GROUNDTRUTH

Practical information for protected area managers

## Wildlife Management

### Wild dog control

New South Wales National Parks and Wildlife Service field staff have been testing the use of a method of poison bait stations for the control of wild dogs where they prey upon sheep in areas adjoining national parks.

Until recently, the only methods used in wild dog control in New South Wales have been the traditional techniques of steel-jaw trapping, broad scale aerial or ground baiting and electric fencing.

All these methods have potential effects upon populations of non-target native species. For example, tiger quolls *Dasyurus* spp. are thought to be especially susceptible to Compound 1080 poisoning and birds may be affected, other animals including wombats or wallabies are occasionally trapped, and the clearing for and erection of an electric fence can seriously affect the movements and territories of native species.

The new method involving bait stations originates in Victoria where no aerial baiting takes place. Briefly, the method is as follows.

A station is set up with three raised mounds of soil in which are placed either unpoisoned baits for free feeding or poisoned baits when wild dogs are noted to be eating the meat. The stations are located strategically to cover known areas of wild dog activity between the park and the adjoining freehold areas. The locations are often similar to those chosen for the setting of traps by an experienced trapper.

Raised mounds are used for the following reasons:

- water can drain from the mounds;
- the smell of the lure and the meat permeates easily through the loosened soil; and
- the presence and the type of animal is determined by its tracks or scratchings in the loose soil.

It is important to have an indication of the type of animal using or travelling through the area. If it is a wild dog, fox or cat, then poisoned baits can be substituted for the unpoisoned ones. However, if a native animal which could be affected by the poison is detected, then the placement of poisoned meat baits can be delayed. The poisoning of non-target, native animals is therefore reduced.

The baits are buried to discourage native species and are smaller, with a higher concentration of poison, than meat baits normally used in wild dog control programs.

The principle area where the technique has been tested is along the south-eastern boundary of Kosciusko National Park in locations where there is a history of stock loss to wild dogs. Although only tested for a short while in New South Wales, it is clear that the method does have a role along with (or replacing) other traditional methods in the control of wild dogs and will be forwarded to the Department of Fisheries and Agriculture of NSW for registration.

*For any other information, please contact Stephen Dovey, Protection Systems Officer, NSW National Parks and Wildlife Service, South-Eastern Region, PO Box 733, Queanbeyan, NSW 2620, Australia.*

### Pig control using hog hopper and portable bait station

A pig feeder for safely dispensing Compound 1080 poison has been developed by Dr Ashok Rathore and New South Wales National Parks and Wildlife Service (NPWS) staff at Oberon.

Baits for pigs are placed on major trails, particularly around watering points. If stock cannot be removed from the area and native wildlife are endangered by poison baits, then a bait station can be used to exclude non-target species. This consists of an area surrounded by a five wire fence, which will exclude livestock and kangaroos, but which feral pigs can push under.

To reduce the time spent setting up stations, by driving in posts and stringing wires, portable panels were developed by NPWS staff. These consist of steel frames 240 cm long and 120 cm wide, with a brace in the centre and four wires (plain wire at 21 cm above ground, and three strands of barbed wire at 35 cm and above). The four panels for each station are assembled and inter-locked with four tri-star posts.

The new 'hog hopper' for dispensing bait is a modified 200 litre (44 gallon) heavy duty plastic drum. A 21 cm wide strip is removed from the length of the container and the lower lip of the slot rolled to about 20 cm above ground level. The device is then firmly secured in the middle of

the bait station. The drum has many advantages over more traditional baiting methods:

- it is economical, durable, light and easy to handle;
- it protects bait from rain, snow and dew so that baiting can proceed in any weather;
- it prevents waste and spillage, prolonging the effectiveness of the bait and preventing leaching into the ground;
- there is no spillage, which means that consumption and pig numbers can be more accurately estimated;
- it can be used on farms in areas which will later be grazed, as it leaves no poison on the ground;
- in natural areas, it prevents non-target animals from being poisoned; and
- it allows bait left over after control programs to be removed and disposed of safely.

For further information, contact Dr Ashok Rathore, Special Scientific Officer, National Parks and Wildlife Service, P.O. Box 95, Parramatta, N.S.W. 2124, Australia.

The two articles above are reproduced from *Australian Ranger Bulletin* (Wildlife Management feature), the publication established to provide a forum for training, communication and sharing ideas on a national level by and for rangers about parks and wildlife.



Hog hopper and portable bait station, developed by Dr Ashok Rathore with assistance from Blue Mountains District, Oberon's New South Wales National Parks and Wildlife Service staff. Photo: Dr Ashok Rathore

### The use of electronic implants for identification of wildlife

Transponders offer a technology for unobtrusive permanent individual animal identification applicable to most vertebrates and some invertebrates. Implanting wildlife with electronic identification devices has been used for several years now, both in wild populations and captivity, for ecological and behavioural studies, breeding and commercial purposes. Registration of the unique identification number with the International Species Information System (ISIS) provides an important technique for following individual animals throughout their life.

A Working Group of the IUCN Captive Breeding Specialist Group (CBSG) has been assembling and evaluating information on various transponders available. Due to the lack of consistent information available, a recommendation as to which system should be used as a global standard could not be made until all the competing systems had been independently evaluated side-by-side by the Working Group, independently of manufacturer's performance claims. The criteria for evaluating the systems were: (1) product performance, (2) commercial availability by January 1, 1991, (3) international distribution and (4) price.

Details of the methodology used to assess product performance are given in the CSBG Newsletter. In addition to the findings listed in Table 1, several other considerations were made by the Working Group:

1. Medium (3 x 18 mm) and large (3.5 x 29 mm) transponders would not be acceptable in the majority of specimens. Therefore, product choice should be based on the performance/price of small transponders (app. 2 x 11 mm).

2. Most experience with transponders has been based on bulk-packed implants which were sterilized by the user and required re-use of the implanter needle. The availability of pre-packaged, sterile transponders packaged in needles will result in easier and less traumatic use of these systems.

**Table 1. Results of Transponder System Tests**

Manufacturer	Manufacturer's Suggested Read-Range	Actual Read-Range (Mean±SE)
Destron/IDI	5.0 cm	2.6±0.1 cm
AVID	5.8 cm	5.2±0.1 cm
Destron/IDI		
small	11.4 cm	5.6±0.6 cm*
medium	29.2 cm	12.9±0.2 cm
large	38.1 cm	16.4±0.4 cm*
Trovan/AEG	15.0 cm	10.7±0.4 cm

\*Actual Read-Range calculated from only five readings due to battery problems in the reader. Statistical analysis by ANOVA for repeated measure of the read distances for the four similar-sized products ( $F = 91.3$ ,  $P = 0.001$ ). The Trovan had a greater read distance than the small Destron/IDI and AVID products ( $P = 0.01$ ).

Based upon the criteria listed above, the Working Group has chosen the Trovan/AEG transponder system (out of those tested, listed in Table 1) as the preferred system for the development of global standard. The reader for this system costs \$US837.00 and sterile transponders are \$5.85.

These findings will be forwarded to numerous international authorities (CITES, EEC, USFWS, etc.) along with the recommendation that they adopt similar standards.

The Trovan/AEG system can be purchased from: International Infopet Systems, 31264 La Baya Drive, Suite A, Westlake Village, CA 91362, USA. or Euro ID, Grossbuellesheimer Str. 56, 5350 Euskirchen 16, West Germany.

*Taken from the IUCN Captive Breeding Specialist Group's News Vol. 2, No. 1, 1991.*

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# *A Systematic Approach to Wildlife Conservation in Ethiopia*

Tim Allen-Rowlandson

**The key problems facing conservation efforts in Ethiopia's current protected areas are land-use conflicts, and lack of status, integration and finance. As a result, there must be some fundamental concerns about the long-term viability of these wildlife areas under the present system of designation, management and budgetary allocations. If improvements are to occur in the near future, this is an opportune time to assess existing and potential protected areas in terms of their adequacy in safeguarding representative samples of the country's major habitats.**

Ethiopia, a country of 1,220,000 km<sup>2</sup> is internationally recognised as a very significant conservation region mainly because of its biogeographically isolated highlands (which contain a large number of endemic species) and also because of the great diversity of its numerous natural ecosystems. Theoretically, Ethiopia's wildlife resources are protected in ten national parks, three wildlife sanctuaries, eleven wildlife reserves and 18 controlled hunting areas. However, only the national parks and wildlife sanctuaries are staffed; combined they cover an area of 32,343 km<sup>2</sup> (2.6% of the country's total area), but the level of actual control even in these areas varies from reasonable to non-existent. The administration and management of these protected areas is the responsibility of the Ethiopian Wildlife Conservation Organisation (EWCO).

Wildlife conservation in Ethiopia has had a relatively short history compared to many other African countries. Initially, efforts by the EWCO and assisting international organisations concentrated on affording protection to the endemic (mainly large mammal) species that were considered threatened; these included the Walia ibex *Capra walie*, mountain nyala *Tragelaphus*

*buxtoni*, Swayne's hartebeest *Acellaphus buselaphus swaynei* and Simien fox *Canis simensis*. Species with a restricted distribution also received attention through the establishment of suitable areas for their protection (e.g. African wild ass *Equus africanus*, elephant *Loxodonta africana*). The additional established protected areas in Ethiopia are situated in the arid lowlands where the greatest concentrations of game occurred. Generally these parks and sanctuaries were selected in areas where there was little or no permanent settlement; today effective management of some of these conservation areas is seriously hampered by civil and/or tribal unrest, traditional seasonal use by nomadic pastoralists, and human encroachment as the demands for timber, other natural resources and arable land escalate at an unsustainable rate. In terms of a traditional approach to protected area management, some of the ecological problems facing the country seem almost insurmountable, and they probably are without an unrealistically high financial input. Moreover, no amount of hard work, dedication and enthusiasm from EWCO can overcome the problems of preventing human encroachment into ungazetted wildlife areas which are both underfinanced and



understaffed, particularly when this human encroachment comes from people who lack the basic minimum resources for human survival. The days when areas were specifically set aside for the protection of one or two key species are long gone, and now conservation must be seen as a rational and integrated form of land use in order to have any chance of success. A more systematic approach, hand in hand with sustainable rural development, is considered the best way of achieving this.

Currently, Ethiopia's development activities are primarily focused on humanitarian aid and immediate urgent foreign currency requirements. However, conservation and long-term disaster prevention projects are receiving wider attention and, in addressing the conservation problems within the country, EWCO has identified the major immediate need as the formulation and implementation of management plans for those regions considered to be of high priority. The ranking of existing conservation areas is no easy task, partly because information is lacking and the few surveys that have been conducted are rather dated, and partly because management objectives have not been clearly defined or have failed and need urgent revision. Two notable

exceptions are the Simien Mountains and Bale Mountains National Parks; both have comprehensive management plans (Hurni, 1986 and Hillman, 1986) but the Simien has been inaccessible for several years due to security reasons and the proposed concept of the park and surrounding areas as protection, buffer, development, recovery and multiple-use zones has yet to be implemented. In contrast, Bale Mountains National Park is one of the best managed conservation areas in this country. Bale protects one of the most extensive high-altitude plateaus and mountain massif areas in Africa (Yalden, 1983) and is a major centre of faunal and floral endemism. In addition, the headwaters of four major rivers arise in this region and thus the conservation of the watershed forests serves to protect and maintain essential ecological processes on which many members of the rural population depend. As a consequence, Bale has the full support of the local administration and community, and consequently has a very promising future through integrated planning and co-ordinated management.

In terms of conservation of endemic animal species, the Simien Mountains and Bale Mountains National Parks are undoubtedly the



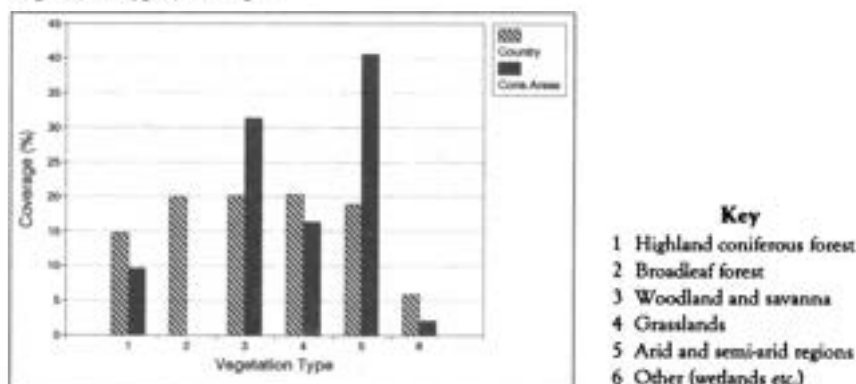
Swayne's hartebeest  
*Acellaphus buselaphus swaynei*, (Ethiopian endemic)  
in Senkele Reserve.  
Photo: WWF/John Hanks

most important protected areas in Ethiopia and throughout the Sahel (IUCN, 1989). Since their establishment, studies have demonstrated the enormous reservoir of wild genetic material that also exists elsewhere in the country. Ethiopia has an extremely high rate of endemism; 11% of the 255 mammals, 3% of the 846 bird species, 4% of the reptiles, 31% of the amphibians, 4% of the freshwater fish and at least 20% of the plants are endemic. Many of these are not adequately protected in the present conservation network. Endemism, however, is only one of many criteria that can be used to determine the relative importance of an area. A recent evaluation of the Ethiopian conservation network in relation to broad vegetation types (EWCO, 1989) revealed a serious imbalance; a high proportion of the current protected areas consists of woodlands, savanna and semi-arid/arid regions, while none of the existing broadleaved forests are protected at present and highland coniferous forests and other key habitats such as wetlands are under-represented (Fig. 1). There are several other important gaps in the ecosystems represented in these protected areas (Ashine, 1990; Wood and Stahl, 1990) and although numerous recommendations, both broad and specific, have been made to improve the situation (Beals, 1968; MacKinnon and MacKinnon, 1986; Friis, 1987; Roos, 1987; IUCN, 1987, 1989; EWCO, 1989; WCMC, 1989; Tedla *et al.*, 1991), these have yet

to be implemented. Reasons for this inactivity include inadequate manpower and resources, insufficient support and conflicting sectoral interests, no clearly defined policies (e.g. wildlife, forestry and land ownership), poor legislation, unequal distribution of costs and benefits, and lack of awareness, planning and integration.

The very same problems limit the degree of effective management in the current conservation areas, and as a result some exist only on paper. The total "protected" network constitutes 2.7% of the total land area, which is a long way short of the UNEP recommended figure of 10% necessary to stem the trend towards species depletion (IUCN, 1989). If improvements are to occur at the decision-making level with respect to support for conservation in the near future, this is an opportune time to assess existing and potential assets. Ideally, a protected area should be established within each subdivision of a biogeographical unit; definitions of these units and subdivisions for this exercise are based on the Unesco/AETFAT/UNSO Vegetation Map of Africa (White 1983) to facilitate analysis and action on a regional basis. Of the 80 vegetation types in Africa, 15 (19%) are present in Ethiopia (Table 1) but only five of these are included in the protected areas as the predominant vegetation (Fig. 2). Most of the vegetation types that each constitute at least 5% of the total land area are protected to some extent, ranging from the most

**Figure 1. National and protected area coverage of vegetation types, Ethiopia**



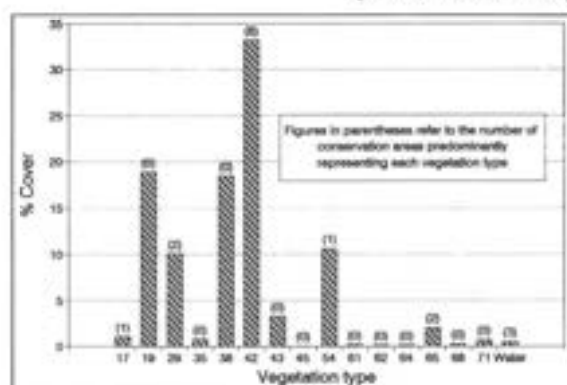
**Table 1. Coverage of vegetation types in Ethiopia**

Phytocoria		Vegetation type		Area (sq. km)
No.	Name	No.	Name	
VIII	Afromontane	17	Cultivation/secondary grassland	12,342
VIII	Afromontane	19	Afro-montane vegetation	230,836
III	Sudanian	29	Ethiopian woodland	123,178
III	Sudanian	35	Woodland/Acacia bushland/wooded grassland	8,921
VIII	Afromontane	38	East African evergreen/semi-evergreen bushland/thicket	226,070
IV	Somalia-Masai	42	Somalia-Masai Acacia-Commiphora deciduous bushland	405,704
XVI	Sahel Transition	43	Sahel Acacia wooded grassland/deciduous bushland	39,593
IV	Somalia-Masai	45	East African evergreen bushland/Acacia wooded grassland	611
XVI	Sahel Transition	54	Somalia-Masai semi-desert grassland/shrubland	129,532
III	Sudanian	61	Upper Nile edaphic grassland	1,833
III/XVI	Sudanian/Sahel	62	Edaphic grassland/Acacia wooded grassland	978
III/XVI	Sudanian/Sahel	64	Edaphic grassland/semi-aquatic vegetation	855
VIII/IX	Afromontane/Afroalpine	65	Altimontane vegetation	24,684
XVII	Sahara Transition	68	Red Sea coastal desert	2,688
XVII	Sahara Transition	71	Regs/hamadas/wadis	8,432
			Water	5,743
			Total	1,222,000

Sources: White, 1983; MacKinnon and MacKinnon, 1986; IUCN 1989

widespread vegetation (bushland, type 42) protected in eight areas to semi-desert grassland/shrubland (type 54) represented in Yangudi-Rasa National Park (Fig. 2 and Table 2). Inadequate protection is afforded to Afromontane vegetation (19) which covers small areas of Bale and Simien Mountains National Parks and evergreen/semi-evergreen bushland and thicket (38) which, although present in Harer Elephant Sanctuary and Yabelo Sanctuary, is not the predominate vegetation (Table 2). Each of these two vegetation

types constitute almost 20% of the total land area (Fig. 2). Priorities for the conservation of vegetation types not covered by the existing protected areas could be determined on an area basis, in which case additional types of bushland (43, 35) should be considered (Fig. 2). However, it is worth considering what proportion of these vegetation types occur mainly within Ethiopia when compared to the rest of the Sahelian region and to the Afrotropical realm. Ethiopia features at least 80% of five of the Sahel's vegetation types,

**Figure 2. Coverage of vegetation types in Ethiopia**  
(Source: White 1983)

(See Table 1 for key to vegetation types)

Table 2. Existing conservation areas in Ethiopia

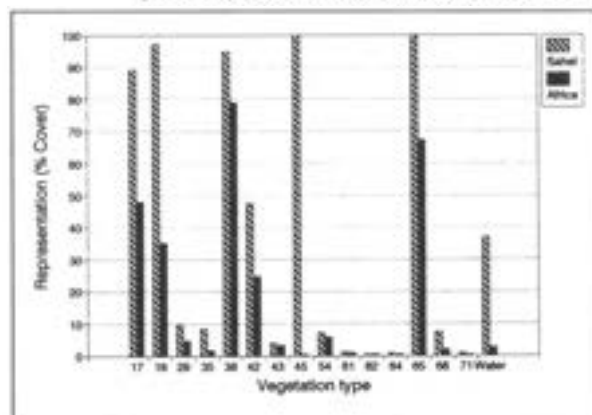
Conservation Area	Area (sq. km)	No. of species		No. of endemics		Vegetation Types
		Mammals	Birds	Mammals	Birds	
Abijata-Shalla Lakes NP	887	31	299	0	6	<b>42</b>
Awash NP	756	46	392	0	5	38 <b>42</b>
Bale Mountains NP	2,471	64	220	11	16	19 <b>65</b>
Dahlak Marine NP	-2,000	2	62	0	0	Marine
Gambella NP	5,061	41	154	0	0	<b>29</b> 35
Mago NP	2,162	56	153	0	0	29 <b>42</b>
Nechisar NP	514	37	188	0	2	<b>42</b>
Omo NP	4,068	57	306	0	1	<b>17</b> 29 <b>42</b>
Simien Mountains NP*	179	21	63	3	7	19 <b>65</b>
Yangudi Rassa NP	4,731	36	136	0	0	<b>54</b>
Harar Elephant Sanctuary	6,982	N/A	N/A	N/A	N/A	38 <b>42</b>
Senkelle Swayne's Hartebeest Sanctuary	36	13	91	0	0	<b>42</b>
Yabelo Sanctuary	2,496	N/A	N/A	N/A	2	38 <b>42</b>
Total	32,343					

\* World Heritage Site.

Figures in bold represent predominant vegetation type (see Table 1)

Bale Mountains National Park, Ethiopia.  
Photo: WWF/E. Coppola/Panda Photo

Figure 3. Ethiopian coverage of vegetation types as percentage of total cover in Sahel and Africa



(See Table 1 for key to vegetation types)

namely cultivation/secondary grassland (17), Afromontane (19), two types of bushland (38 and 45) and Altimontane (65). On a regional basis these are therefore of greatest importance, particularly types 45 and 65 which are restricted to Ethiopia (Fig. 3). At the geographical realm level however, vegetation type 45 is well represented in other parts of Africa and Ethiopia's contribution is a mere 0.4%; attention is better directed at protecting the Altimontane vegetation since 67% is to be found in Ethiopia. Other vegetation types well represented (<25% of the total area of the Afrotropical realm) in Ethiopia include cultivation/secondary grassland, Afromontane, and two types of bushland/thicket (types 38 and 42, Fig. 3).

Thus, from the floristic aspect, certain habitats are either under-represented or unrepresented within the nation's protected area network. The importance of these depends on which level the assessment is made, but several key types, including Afromontane (19), evergreen/semi-evergreen bushland/thicket (38), Somalia-Masai deciduous bushland (42) and Altimontane vegetation (62) all rank highly as requiring protection at the national, regional and realm levels. Further justification for the protection of Afromontane and Altimontane vegetation types is provided by the very diverse

flora and fauna they contain and their exceptionally high levels of endemism (Table 2).

In summary, most of the important Ethiopian ecosystems are protected to some extent by the existing network, but there is much room for improvement and expansion. Conservation measures require real commitment from the government in order to co-ordinate and integrate activities, and priorities need to be clearly defined so that financial resources are put to the best use if efforts to gain support and recognition at the national and international levels are to be successful.

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Simien fox *Canis simensis*,  
(Ethiopian endemic) in Bale  
Mountains National Park  
Photo: WWF/Tim Allen-  
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# CONVENTIONS UPDATE

## International Tropical Timber Agreement



### The International Tropical Timber Agreement

was adopted in 1984, after 20 years of informal and 10 years of formal UN negotiations.

The ITTA is unique for several reasons:

- it is the only commodity agreement designed to deal with the rational use and conservation of tropical forests;
- it is supported by both trade and environmental organisations;
- it allows consuming and producing countries to participate on equal terms;
- its voting system does not penalise countries which do not attempt to maximise trade.

However, the ITTA has a number of potentially conflicting objectives. On the one hand, it aims to promote the expansion and diversification of the international trade in tropical timber and on the other to encourage the development of national policies aimed at sustainable utilisation and conservation of tropical forests and their genetic resources.

It was believed that the International Tropical Timber Organisation (ITTO), the body charged with the implementation of the ITTA, together with the newly established Tropical Forestry Action Plan (TFAP) had a unique opportunity to promote the conservation and sustainable utilisation of the resource on which the trade depends, tropical forests, and get to grips with the scourge of tropical deforestation. To many, ITTO's progress has been slow and frustrating; many believe that it will be unable to implement much of the Agreement before its renegotiation, which must take place by 1993.

ITTO is made up of 48 member nations which send delegations to the main six-monthly

ITTO meetings. Delegations are composed of Government officials from Departments of foreign affairs, overseas cooperation, trade and forestry and many invite trade representatives and environmental NGOs as advisers. NGOs may formally apply for observer status. This unique arrangement brings together the groups with the collective power to solve the problems of the international trade in tropical timber.

In 1988, ITTO commissioned a study to determine how much of the international trade of tropical timber was derived from sustainable sources. This showed that only a tiny proportion of the international trade was under a satisfactory long term management regime and alerted member states to the crisis of tropical forest management (IEED, 1988; Poore, 1989).

Both the timber trade and NGOs have lobbied the ITTO. NGOs have been concerned at the slow progress in controlling the continuing unsustainable trade, implementing an adequate Code of Conduct and taking account of the needs and rights of forest dwelling people. The trade has also been critical of the lack of progress on issues such as trade diversification and improved market access.

Early attempts to establish an internationally agreed Code of Conduct for producing and consuming nations, to ensure sustainable tropical forest management, were blocked by nations wishing to maintain their existing trade.

In 1990, the *ITTO Guidelines for the Sustainable Management of Natural Tropical Forests* were completed, with contributions from representatives of producer and consumer nations, trade and NGOs. They are intended as an international standard from which national guidelines for natural forest management can be developed, but no producer country has yet firmly stated its intention to develop national guidelines; the crucial next step towards sustainability.

A project to identify incentives to promote the sustainable management of natural tropical forests is underway. The "Incentives" report will provide vital leads for achieving sustainability. A high priority will be to establish a monitoring system for tracing the origin of tropical timber in the international trade, to help importers decide which source to use and authenticate the claims of sustainability passed on to the consumer.

From the ITTA, it is clear that ITTO's unique and highest priority role should be to encourage policy change at the international level. In practice, a disproportionate amount of time has been spent on projects submitted for funding. Although these are of vital importance, there is a danger that the organisation will soon become little more than a clearing house for projects.

ITTO's biggest opportunity to promote policy change on the ground has been the "Mission to Sarawak". The team represented consuming and producing nations, the trade and NGOs, and was invited to assess the sustainability of logging operations in Sarawak, East Malaysia. Their report suggested policy changes and outlined management options to encourage the shift towards sustainable use of Sarawak's forest resources. An ITTO resolution went some way towards addressing the main recommendations, but failed to mention several key issues, including the reduction of annual harvest to the suggested levels, the suspension of logging in disputed areas, the establishment of strict regulations to protect watersheds and the creation of a means of monitoring progress in implementing the recommendations. The failure to reach a meaningful consensus to promote the sustainable utilisation of Sarawak's forests is worrying to both the trade and the conservation NGOs. Recent reports show that log exports from Sarawak are considerably higher than expected and little has been done to solve the conflict with forest dwelling communities. It is important for ITTO to follow up on the commitments made by the Malaysian delegation and establish whether these are being implemented.

In 1990, ITTO undertook to work towards sustainable management of tropical forests by the year 2000. "Target 2000" was initiated by the producer nations and finally agreed in an ITTO resolution. If this is to become a reality, there is an urgent need to take action now and focus on the steps to reaching the target date; the changes necessary to realign the trade to sustainable management will take several years to implement. Following consumer pressure at home, the Dutch government has taken a lead by considering restricting imports of tropical timber to sustainable supplies only, by 1995. This proposal will effectively accelerate the shift to sustainability ahead of the ITTO's target date.

It is now time for an independent review of ITTO's activities, to assess its implementation of the ITTA. The results will assist the process of renegotiation and provide a much needed opportunity for ITTO to increase its effectiveness. It may possibly be affiliated to the new Global Forest Convention or Charter and its objectives could fit into a framework which includes forests and timber trading world-wide.

ITTO's importance as part of the overall battle to halt the erosion of the world's forest resources should not be over-emphasised. It is similar to the TFAP in that, despite the hard work of many individuals, the political compromise of the organisation dictates that progress will undoubtedly be slow. The message emerging is that ITTO will only be able to do the job it was intended to do if the political imperative is heightened. Even then, alternative mechanisms of forest conservation must be pursued in the overall struggle to halt tropical deforestation.

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*Taken from presentation at the UK Tropical Forest Forum meeting in London, February 1991, by Francis Sullivan, Forest Conservation Officer, WWF(UK), Panda House, Weyside Park, Godalming, Surrey GU7 1XR, England.*



## The World's Threatened Spaces

Jim Thorsell

IUCN Senior Advisor - Natural Heritage

The latest update of CNPPA's threatened parks register now lists a total of 107 parks in 64 different countries, following the addition of the sixteen new sites noted in PARKS Vol. 2:1.

The Kaziranga National Park in India is threatened by plans to build an oil refinery upstream. If this goes ahead, air pollutants and effluents such as phenolic compounds, oil and suspended solids would have a serious effect. In the longer term, the area is also at risk from increasing flood levels along the Brahmaputra River. An increase in human activity in the watershed is believed to have exacerbated the problem.

In Nepal, a section of the Royal Chitwan National Park could be flooded if plans for an irrigation project go ahead which would use 75% of the base flow of the East Rapti River. There are also plans to build a dam which would flood part of the park. This 30 million dollar project, financed by the Asian Development Bank, was initiated in 1976 when Environmental Impact Assessments were not required and the Bank still supported this kind of development. The Nepal Government and the Bank are now reconsidering the project after an intervention from the World Heritage Committee.

In the Philippines, the Tubbataha National Marine Park has been stripped of half its coral reef cover over the past five years, because of destructive and illegal fishing methods. The use of explosives to stun fish has reduced many coral areas to rubble. The coral reefs have also been damaged by the use of sodium cyanide poison to catch ornamental fish for the aquarium trade.

The Doi Inthanon National Park in Thailand is facing a variety of threats - mainly because of an increase in its hill tribe populations. Fifteen per cent of the park area has been cleared to grow opium poppies and other crops. Heavy doses of DDT and other pesticides are used by farmers, and extensive slashing and burning has caused

degradation of the watershed. Many of the park's large animals have been killed by hunters.

In Poland, the Ojców National Park near Krakow is most threatened, where more than a third of species are now endangered. Over the past 90 years, 43 plant species alone have disappeared. Pollution from industry, farming and construction for a burgeoning tourist industry are major problems. In neighbouring Czechoslovakia, the Low Tatra National Park is threatened by plans to increase ski facilities and by a cellulose plant which is causing serious air pollution. In Bulgaria, the Pirin National Park is affected by plans to divert water from the Mesta River.

In Latin America, many parks are used by illegal coca producers. The Tingo Maria National Park has been literally invaded by growers and traffickers. Large tracts of forest have been cleared, and toxic chemicals used in making cocaine are discarded at random.

The other listed parks include: The Himchari National Park in Bangladesh - because of illegal removal of timber, the Gulf Kutch Marine National Park in India - depleted by harmful fishing techniques and affected by industrial pollution, the now over-populated Kirthar National Park in Pakistan; the Khao Sam Roi Yot National Park in Thailand - threatened by aquaculture, tourism and poaching; the Ras Mohammed Marine National Park in Egypt - damaged by tourism, waste dumping and oil pollution; the Pembrokeshire Coast National Park in Britain which could become the site of a military installation; the Montez Azules Biosphere Reserve in Mexico - where both the remaining rainforest cover and local Indian culture are fast disappearing; and the St Lucia Game Reserve in South Africa - threatened by plans to dredge-mine titanium and other heavy metals along the sand dunes.

Jeremy Harrison  
Head of the Protected Areas Data Unit

## **Protected Areas Review**

During the lead up to the 1992 World Parks Congress, each CNPPA Vice-Chair is preparing a review of protected areas and protected area issues within his region. This is being done in collaboration with the World Conservation Monitoring Centre, who are simultaneously preparing a World Directory of Protected Area Systems (see PADU News in PARKS Volume 1, Part 2) which will provide standard-format descriptions of the protected area systems in each country.

Each CNPPA Vice-Chair has been sent the outline of what the regional review paper should contain, and briefing material from PADU on the protected areas of the region, and the work we are currently doing. Each Vice-Chair is then using the most appropriate method available to them to draw together material needed for drafting the review.

For example, the Vice-Chair for the Caribbean meeting was able to organise a CNPPA Working Session which took place in the Dominican Republic in April/May. Participants were sent draft material to review, and were asked to bring further information to the meeting. This significantly improved the information available to both the CNPPA Vice-Chair and PADU. The meeting also provided the Vice-Chair with ideas for a range of issues to be discussed in his review.

Further information on the regional review process can be obtained from the CNPPA Vice-Chair for the region, Jeff McNeely at IUCN, Jeremy Harrison at WCMC or Paul Dingwall at the Department of Conservation, New Zealand.

## **Travel**

During the lead up to the 1992 World Parks Congress, PADU staff are travelling more

frequently, participating in regional meetings, and ensuring the adequacy of the information available. The primary reason for travel is usually attendance at a meeting, but wherever possible schedules are arranged so that appropriate offices in as many countries as possible can be visited. During May, staff have attended meetings in the Dominican Republic and Hungary (and one staff member is currently working in Sri Lanka). During June, staff are travelling to Hawaii, Japan, Thailand, Malaysia, Germany, Romania and possibly East Africa.

## **Oceania**

During May the *IUCN Directory of Protected Areas in Oceania* was published, in time for release at the Pacific Science Congress taking place in Hawaii (May/June 1991). The directory, which covers protected area systems of all Pacific island nations and territories, and some islands of countries on the Pacific rim, has been compiled by the WCMC Protected Areas Data Unit, in collaboration with IUCN and the South Pacific Regional Environment Programme (SPREP). The East-West Centre in Hawaii has supported the production of the directory, through a grant to the Centre from the MacArthur Foundation.

## **Email**

For those with a computer that speaks to the outside world, PADU is now contactable by EMail. Individual staff can be contacted, but if you contact Jeremy Harrison first, he can put you on to them. His EMail address is: [jerryh@wcmc.uucp](mailto:jerryh@wcmc.uucp)

For further information, contact: Protected Areas Data Unit, WCMC, 219c Huntingdon Road, Cambridge CB3 0DL, United Kingdom. Tel: (44) 223 277314; Fax: (44) 223 277136

# BOOK REVIEWS

## Asian Tropical Forests and Protected Areas

### **IUCN Directory of South Asian Protected Areas.**

Michael J.B. Green (Compiler) 1990. *World Conservation Monitoring Centre, IUCN Commission on National Parks and Protected Areas, Cambridge, UK. 294pp. £15.00.*

The IUCN Directory of South Asian Protected Areas is a compilation of information on protected area systems and individual protected areas of four South Asian countries. The Directory provides: i) a descriptive analysis of protected area systems and summaries of protected areas of Bangladesh, India, Pakistan and Sri Lanka, and ii) information sheets for more than 100 individual protected areas from Bangladesh, Pakistan and Sri Lanka.

The countries which are the focus of this Directory of Protected Areas share several common features; their territories were under colonial rule and administration until the late 1940s and currently support dense, growing populations with low income levels. A comparative reading of the information on protected area systems of the countries thus reveals interesting trends. For example, Sri Lanka, which has the highest protected area coverage (12.2%) also had the highest *per capita* GNP (US\$400, in 1987) and the lowest rate of natural increase of the population (1.6% per annum). In Sri Lanka, wildlife conservation was also administratively separated from forestry soon after the island became independent in 1948. In Bangladesh, India and Pakistan, wildlife and protected area management have continued to remain administratively linked to Forestry Departments and Directorates.

Despite difficulties posed by growing populations and increasing demand for land for

alternative uses, efforts are underway to improve protected area coverage in all countries. In India, such efforts appear to have contributed to increasing protected area coverage from 3.3% of the total land area in 1987 to more than 4% in 1990. In Pakistan, protected areas covered 9% of the country and a comprehensive systems review has been recommended to plan the development of the network. Protected areas in Bangladesh, even when proposed areas were included, covered less than 1% of the country's area, far below the target of 5% recommended by a Ministry of Agriculture Task Force in 1985. Bangladesh is the youngest of the four nations. It is also the most densely populated country with the lowest *per capita* GNP (US\$160 in 1987). Improving protected area coverage of Bangladesh and planning the development of its protected area network would be urgent tasks for the 1990s.

The Directory includes clear guidelines to the contents of information sheets on protected area systems and protected areas, and annexes describing categories and management objectives of protected areas and IUCN threatened species categories. These guidelines and annexes precede information sheets on individual countries. Descriptive information on individual Indian sites could have been a useful addition but their large number (426 in 1987) justify their omission from the Directory. The Government of India is currently supporting the production of a series of similar directories for different states of India.

Dr Green has done a commendable job in presenting a precise and jargon-free text and in producing a compilation that is likely to be a major source of reference among protected area managers in South Asia and elsewhere.

N. Ishwaran, *Unesco*

### **The Conservation Atlas of Tropical Forests: Asia and the Pacific.**

Collins, N.M., Sayer, J.A., Whitmore, T.C., (Eds). 1991. MacMillan, UK, 256pp, hbk only. (£65.00 plus £2.50 postage UK, £6.00 elsewhere, from Globe Book Services, 1 Melbourne Place, London WC2B 4LF. In Australia order from MacMillan Australia, 107 Moray Street, South Melbourne, Victoria 3205).

Many debates on tropical forests have their foundations in weak, unreliable facts. This atlas aims to build a picture of the status of tropical forests in Asia and the Pacific using the most trustworthy information currently available. It succeeds admirably, offering a combination of new maps, statistics, descriptions of forests and their use; and discussions of impacts, issues and conservation initiatives. Produced by IUCN and the World Conservation Monitoring Centre, it has relied heavily on the two organisations' local contacts for "ground truthing".

The maps were prepared from a variety of material available up to 1989: satellite, radar and air photo imagery, government and NGO maps and reports. Presented on a country-by-country basis, the maps show major forest types: lowland, montane, inland swamp and mangrove "rain forest", and lowland and montane "monsoon forest". Open forests are not covered. Superimposed are existing and proposed protected areas – producing a colour gradation that can be hard to pick out. The editors are clear on their sources, and generally honest about the drawbacks: areas mapped as forest might often include mosaics of forest with plantation and shifting cultivation; monsoon forest is not always mapped; only protected areas over 50 km<sup>2</sup> are included; and official information available from some countries was old – 1971 in Cambodia and 1975 in Papua New Guinea. Much editorial discretion has clearly had to be used in the choice of data from different sources and dates. Here, the editors were wise to audit the information in-

country with respected individuals. The separation of maps by nation is a good compromise but not universally helpful; the reader has to examine three separate maps (of Kalimantan, Sarawak and Brunei) to get a complete picture of Borneo, the pull-out regional map providing only a basic regional overview.

Illustrated country papers (ranging from 5 pages for Singapore to 25 pages for Indonesia) are an excellent source of information. The atlas is worth purchasing for these alone. There is much analysis of the local forces leading to change in the forest, and of conservation initiatives. There are also regional papers of a more discursive nature – on forest wildlife, people, shifting cultivation, settlement schemes, natural forest management, timber trade, policy and the protected area system. These provide useful background commentary for conservationists on the social factors and economic/policy signals fundamental to the state of the forests.

The atlas covers countries which together make up half of the world's population, and many of its fastest-growing economies. Its editors conclude that "the once abundant and majestic moist forests have been reduced to half their original extent", the underlying cause being that "people need land to grow food". They propose a future where 10% of the forests are protected, surrounded by buffer zones managed for "luxury" timber and extractives, with most wood products being derived from plantations. Not surprisingly for a conservation atlas, they accord the highest priority to "unfashionable" total protection. In principle the atlas will be a useful tool in forging the necessary changes. In practice, a way must be found to use the (non-photocopiable) maps and information from the atlas in government offices (perhaps through access to WCMC's original GIS data) in order to take up the challenge of acting upon this wealth of material.

Stephen M J Bass, *International Institute for Environment and Development*

# RECENT PUBLICATIONS

Notices of protected area publications received

**Estrategia para la Conservación de la Reserva de la Biosfera Sierra de Manantlán.** E.J. Jardel (Compiler). Laboratorio Natural Las Joyas, Universidad de Guadalajara. 1990. 278pp.

This book reviews biological, physical and human aspects of the biosphere reserve, its conservation and its problems. It also discusses concepts central to biosphere reserve management, such as integrated management, ecological restoration, and local participation. All of this material is supporting documentation for the main part of the book, which establishes and prioritizes the goals and actions for management and development of the Sierra de Manantlán Biosphere Reserve. Extensive bibliography.

**Ecotourism: the Potentials and the Pitfalls** (Volumes 1 and 2). Elizabeth Boo. World Wildlife Fund. 1990. ISBN: Vol.1 0-942635-14-0, \$10.50; Vol.2 0-942635-15-9, \$12.50.

Ecotourism is a rapidly expanding field, but there are as yet few studies available on the economic and environmental impacts of ecotourism. This study seeks to encourage efforts to promote ecologically sound tourism by documenting the status and impacts of nature tourism in five countries. Volume 1 provides an overview, drawing together conclusions and recommendation, while volume 2 contains country case studies from Belize, Costa Rica, Dominica, Ecuador and Mexico.

**IUCN Directory of Protected Areas in Oceania.** Prepared by the World Conservation Monitoring Centre. IUCN. 1991. ISBN: 2-8317-0069-8.

This directory covers protected area systems of all Pacific island nations and territories, and some islands of countries on the Pacific rim. Each country section comprises a standard format description of the national protected area system, accompanied by a list of protected areas, and a map depicting their location. This is followed by descriptions of individual protected areas where sufficient information is available. Geographical and taxonomic indexes are provided.

**Economics of Protected Areas: a New Look at Benefits and Costs.** John A. Dixon and Paul B. Sherman. Island Press. 1990. 234pp. ISBN: Clothbound, 1-55963-033-7, US\$34.95; Paperback, 1-55963-032-9, US\$19.95.

A comprehensive overview of the field of economic valuation of protected areas. By examining the costs and benefits associated with maintaining protected areas, the book aims to help governments make more informed decisions about land use. In the first part, a methodology is devised and the techniques described for assigning monetary values to nature. The second part of the book applies these principles to case studies in Asia, Latin America, the Caribbean and Africa.



Ecotourism in the Sian Ka'an Biosphere Reserve, Quintana Roo, Mexico. Photo: Sarah Fowler.

**Investing in Biological Diversity: U.S. Research and Conservation Efforts in Developing Countries.** Janet M. Abramovitz. World Resources Institute. 1991. 95pp. ISBN: 0-915825-63-5.

A detailed analysis of US funded efforts to research and conserve biodiversity in 127 developing countries in 1989. Topics covered include: how much the US spends, who supports these activities, where the money goes and what types of activity are funded. Comparisons are made with similar data from 1987.

**Multilateral Treaties in the Field of the Environment (Volume 2).** United Nations Environment Programme and Grotius Publications Limited. 1991. 540pp. ISBN: 92-807-1212-8, £65.

This volume includes a summary of the provisions of each of 50 conventions in this area concluded during the period 1979-1989, and also provides the full text of the convention and its related protocols. Volume 1 (published in 1983) covered the 78 conventions concluded during the period 1933-1979 (ISBN: 92-807-1025-6, £40). The two volumes can be purchased together at the reduced price of £90.

**Conservation des écosystèmes méditerranéens: enjeux et perspectives.** Principal author François Ramade. Economica, Paris. 1990. 144pp. ISBN: 2-7178-2025-6, 100FF.

This is the third of a series of study reports produced under the umbrella of the UNEP sponsored Mediterranean Action Plan (other study reports cover forests, and fishing and aquaculture). The report briefly describes the current activity to conserve the Mediterranean environment and its species, and suggests future courses of action.

**"1992" The Environmental Dimension.** Task Force on the Environment and the Internal Market. Economica Verlag, Bonn. 1990. 289pp. ISBN 3-87081-050-5.

This book presents the conclusions of a Task Force set up to identify and consider the implications of the environmental issues arising from the completion of the Internal Market and other developments in the European Community, up to 1992 and beyond. The report is detailed and wide ranging, covering the environmental impact of the single market, the need for a fundamental review of existing environmental policies at EC and national level, and priorities for the future. The inadequate protection of natural areas throughout peripheral regions is noted, particularly with regard to transport, agriculture and industry sectors.

**Nature Reserves: Island Theory and Conservation Practice.** Craig L. Shafer. Smithsonian Institution. 1991. 208pp. ISBN: 0874748054, £31.25; 0874743842, £12.50.

Shafer considers the implications for species survival and diversity of saving and protecting isolated fragments of land. He reviews the literature on island biogeography and related subjects, pulling data from a wide variety of disciplines, and produces basic guidelines for the conservation of fragmented habitats.

**The Scientific Management of Temperate Communities for Conservation.** I.F. Spellerberg, F.B. Goldsmith, and M.G. Morris (Editors). Blackwell Scientific Publications. 1991. 566pp. ISBN: 0-632-03186-7, £26.50.

The proceedings of a British Ecological Society symposium held in 1989, containing 21 papers from a wide range of disciplines, and a number of different countries. Between them the papers provide a fairly thorough review of the relationships between scientific research and conservation management.

#### **Aquatic Conservation:**

##### **Marine and Freshwater Ecosystems**

This is a new quarterly international journal dedicated to freshwater, brackish and marine habitats. It will provide a forum in which all aspects of the conservation of aquatic biological resources can be presented and discussed, including both practical studies in conservation and theoretical considerations of the underlying principles. Contributions will be accepted from as wide a geographical range as possible, to ensure a broad representation of conservation issues in both developed and developing countries. The journal also publishes short communications, review articles, discussions and book reviews. *Aquatic Conservation* will serve as a focus for scientists, habitat and resource managers and policy makers, whether in research institutes, governments or conservation organisations. Subjects covered will include protected area issues such as habitat management, conservation strategies and legislation. Volume 1/1 will be published towards the end of the year.

Potential contributors should contact the Chief Editors, Dr P.J. Boon or Dr R. Mitchell, Joint Nature Conservation Committee, Monkstone House, Peterborough PE1 1JY, UK. Subscription details from Subscriptions Department, John Wiley and Sons, Baffins Lane, Chichester, West Sussex, PO19 1UD, UK or 605 Third Avenue, New York, NY 10158, USA.

## Roundup of world news compiled by PADU

### International

#### *Wetland Conservation Fund*

The Fourth Conference of the Contracting Parties to the Ramsar Convention established a "Wetland Conservation Fund", to provide any developing country which is a contracting party with financial support for wetland conservation activities in a number of defined fields. The Ramsar Bureau has now developed operational guidelines for the fund, and is circulating requests for project proposals to Contracting Parties (to be reviewed by the August meeting of the Standing Committee).

#### *New Ramsar sites*

The Redgrave and Lopham Fens, in the United Kingdom, have recently been designated a Ramsar site, and seven new sites in France have also been added to the list: Etangs de la Champagne Humide; Etangs de la Petite Woëvre; Marais du Cotentin et du Bessin, Baie des Veys; Le Golfe du Morbihan; La Brenne; Les Rives du Lac Léman; Etang de Biguglia. This brings the total number of sites to 525, in 61 countries, covering a total of over 300,000 square kilometres.

#### *Biosphere Reserves*

There are 300 Biosphere Reserves in 75 countries following the addition of seven sites approved by the MAB Bureau in January 1991. The new sites are: Vale do Ribeira-Serra do Graciosa and Tijuca-Tingua-Orgãos in Brazil; Spreewald, Rügen and Rhön in the Federal Republic of Germany; Amboseli in Kenya, and the "Land Between the Lakes" in the USA. The two Brazilian sites are the first approved for that country.

#### *IV World Congress on National Parks & Protected Areas*

By the time this issue of *Parks* has been released, the framework for the congress programme will have been finalized, and a draft list of participants will have been agreed. Both items are on the agenda of the congress steering committee meeting in London in June.

### Europe and USSR

#### *Loss of waterfowl and wetlands in the Mediterranean*

The International Waterfowl and Wetlands Research Bureau has produced a study indicating a fall of some 46% in the number of waterfowl in Mediterranean countries over the past 15-20 years. While hunting is a problem, the most important cause is loss of habitat. Some 60% of Spain's wetlands have been destroyed and 94% of Italy's marshlands have been drained. In Greece 63% of the wetlands have been destroyed this century - even the sites listed under the Ramsar Convention have lost 46% of their original area. A list

of 18 threatened Ramsar sites from six Mediterranean countries was reviewed by the Conference of the Contracting Parties to the Ramsar Convention, which requested that the governments responsible to take action to prevent or remedy ecological damage at these sites. *From: Managing Mediterranean Wetlands and their Birds for the year 2000 and Beyond, IWRB Symposium, Grado, Italy, 3-10 February 1991.*

#### *New National Parks Act for England and Wales*

A review of the national parks of England and Wales has been submitted to the Government. Major recommendations include creation of a new National Parks Act, redefining the purposes of national parks, and creation of National Park Boards independent of local authorities. The report also suggests that: nature conservation be given a higher priority; areas open to public access be increased (with greater investment in some existing areas); tourism policies be incorporated into national park plans; resources be allocated to solving traffic problems; increased support be provided to maintain farm incomes. Other suggestions include a reduction in grazing levels in some areas, a complete halt to farming activities in others, and a halt to coniferous afforestation. The Ministry of Defence uses substantial areas of national parks for training, but this is considered "discordant, incongruous and inconsistent with national park purposes", and it is suggested that this use of the land be reduced and eventually cease. *From: Fit for the Future, Report of the National Parks Panel. Countryside Commission, UK. 151 pp.*

#### *National parks in Scotland?*

The Countryside Commission for Scotland's Mountain Areas Report was published September 1990; a further document was published February 1991, following public consultation. The initial report made recommendations concerning conservation, planning and management issues in mountain areas, and strongly advocated that four areas of special importance be given legislative definition as national parks, with administrative/management systems similar to the English and Welsh national parks. During consultation, concern was expressed over use of the term national park, which, it was felt, might increase visitor pressure and lead to changes in land use in the parks and surrounding areas: some of the consultants were against proposals for any new designation. The government reaction to these documents has been to shelve the idea of national parks for Scotland for the time being, although a working party is to consider the special action needed for the Cairngorms. *From: The Mountain Areas of Scotland. Original report, September 1990; Report on public consultation, February 1991.*

### Road through the Pyrenees

A major road across the Pyrenees, including a five-mile long tunnel under the Somport Pass, has been proposed by French and Spanish ministers. The road (especially the construction work), will greatly disturb France's last colony of bears, as well as rare birds of prey. The tunnel entrance will be inside the French Pyrenees National Park, despite laws protecting the park. From: *The Guardian*, 19 April 1991.

### Nature Policy Plan for the Netherlands

The Dutch Ministry of Agriculture, Nature Management and Fisheries has produced a new Nature Policy Plan, dealing with species protection, public involvement in environmental problems, and integrating nature conservation policy with other policy areas. Certain characteristic ecosystems are highlighted for special attention, while overall the plan calls for the creation of a sustainable structure for nature conservation through a "national ecological network", the development of new areas of high ecological value, the stimulation of social support for the Dutch nature conservation policy, and the reinforcement of landscape conservation. The national ecological network consists of a network of core areas, nature development areas and ecological corridors (nature development areas are sites with potential for habitat creation and restoration; ecological corridors are zones designed to enable the movement of wildlife between areas in the network). The Dutch government intends to provide a legal basis for this plan in the Nature Conservation Act. From: *Nature Policy Plan of the Netherlands*, Ministry of Agriculture, Nature Management and Fisheries, the Hague, 1990.

### Loire success

The controversial scheme to dam the upper waters of the Loire, in France, has been stopped following a vigorous campaign at local, national and international levels. The Loire is the last unaltered, free-flowing, large river in western Europe. The river itself is reported to be very important for wildlife, and there are a number of important sites along the length of the river, both protected and unprotected, which would be adversely affected. Thousands of people were involved in the campaign to stop the project which had approval from the regional government: the building was eventually stopped following a legal tribunal in which it was decided that only the central government had the power to approve the dam. From: *BBC Wildlife*, April 1991; *The Guardian*, 22 February 1991.

### New Forests in England and Wales

The British government is planning to establish nine "community forests" covering more than 400,000ha of land adjacent to cities in England and Wales. This is in addition to the three such forests announced in 1989. These forests will have multiple aims, the most important being recreation, landscape enhancement,



French Pyrenees National Park. Photo: Sarah Fowler

wildlife conservation and timber production. Forests will be planted on both agricultural and derelict land, and a large proportion will comprise native deciduous tree species. It is hoped that in some areas, tree cover will be able to develop through a natural succession from self sown seed. The programme costing an estimated £70 million, has commenced with the Countryside Commission obtaining £600,000 to finance coordinating committees for each forest. From: *The Nature Conservancy Council, Topical issues*, January 1990; *The Guardian*, 2 February 1991.

### European Diploma for Ecrins National Park

France's largest national park has been awarded the 34th Council of Europe "Nature" Diploma, which is made to natural areas of international value and of acknowledged scientific, cultural, aesthetic and recreational significance. It was awarded by Catherine Lalumière, Secretary General of the Council of Europe, on 14 December 1990. The central area of the park covers 91,740 ha and is almost uninhabited. It is located at 800m-4,102m in the Alps, and contains a wide variety of plant and animal species. From: *Naturopa newsletter*, Council of Europe, No. 90-2.

### Spanish threat

The Spanish Regional Development Plan is a five-year plan with a budget of £50 billion. Projects include the construction of four high-speed rail lines, a £10 billion dual-carriageway project, the building of 92 new reservoirs, and the expansion of the tourist industry into new areas. The rail links are likely to go through many ecologically sensitive areas. New dams and reservoirs are also likely to seriously impact some ecologically sensitive areas. One of the reservoir schemes is, according to some sources, likely to lead to severe damage to the wetland national park of the Tablas de Damián: the three rivers which provide the



surface water in this park are all due to be dammed to supply new irrigation projects (funded by the EC despite agricultural surpluses). Large tourist developments are planned for several areas, notably the Isla Canela on the south Atlantic coast. Part of this site is protected, but most of the rest, consisting of saltmarshes, abandoned saltings and dunes, has no formal protection despite its high ecological value. *From: BBC Wildlife, January 1991.*

#### *Civil unrest in Yugoslavia*

The civil unrest in Yugoslavia has led to concern over conditions in protected areas. Already the Plitvice National Park (a World Heritage Site) has been widely mentioned in the news, as being occupied by military forces. The Director of the park and some of his staff left the area at the end of last year, and the remainder of the staff were forced to leave in April. Prior to the troubles, the park was regarded as being well established, with an efficient administration, and a healthy income from entrance fees and the two hotels within the park. The local community are now reported to have declared ownership of the park, and have reopened it to visitors. The level of disruption to site management and to tourism in this and other sites is not clear, but may be severe. *From: World Conservation Monitoring Centre; Federation of Nature and National Parks of Europe.*

#### **Sub-saharan Africa**

##### *Mozambique's Bazaruto Archipelago*

The Bazaruto archipelago is a string of five offshore islands, some 250km south of the City of Beira. Rising sea levels and violent storms separated the islands from the mainland, isolating representatives of 14 mammal species. Some 148 species of birds have also been recorded, five species of marine turtle are found, humpback whales pass through local waters on their migration to Madagascar, and the last viable population of dugongs in Mozambique is found in these waters. A masterplan for the management of the islands has been drawn up. This has been enthusiastically received by the Minister of Agriculture, who has already ordered the implementation of some of the more urgent recommendations in the report, including the establishment of the entire archipelago as a national park. The masterplan encourages the establishment of research facilities and the development of tourism in confined nodes, leaving the majority of the island's ecosystems intact. The plan also proposes protection of the artisanal fishery, which is long established and apparently easily sustainable. *From: Endangered Wildlife, 4, 1990.*

##### *Okavango reprieve*

The latest threat to Botswana's Okavango Delta, which, despite its ecological importance, is only partly protected in the Moremi Wildlife Reserve, has come from a scheme to dredge a major section of the Boro

River, Okavango's main channel. The proposal, which is supported by the British Overseas Development Administration (ODA), aims to fulfil an increasing demand for water, for domestic use, to irrigate land for agriculture, and to ensure a supply for the Orapa diamond mine in south-eastern Kalahari. The government has heard protests from national and international organisations, and a strong and influential protest from the local tribesmen in Ngamiland. As a result, the Minister for Water Affairs has announced a temporary suspension of the plans, and a review of the scheme (although proponents are pressing for dredging to continue). Another threat to Okavango comes from a second ODA sponsored scheme to build a cattle fence which will cut across migration routes: this fence is intended to facilitate beef producers to meet EC health requirements. Further expansion of cattle into wildlife habitat is also likely to lead to overgrazing and habitat degradation. *From: EIA News, Spring 1991; BBC Wildlife, March 1991.*

##### *Guerrillas threaten gorillas*

Rebels attacking government forces in Rwanda last October passed through the Akagera National Park on the Tanzania and Uganda borders, an area of grassland and savannah forest with gallery forest. In January they passed through the Parc des Volcans, in the Virunga mountains on the border with Uganda and Zaïre. In this incursion they reportedly ransacked the veterinary centre just outside the park, and took over the park headquarters. The mountain gorillas, for which the park is famous, are being used as a propaganda tool by both sides in this conflict. The government claims that the rebels are killing gorillas, destroying the work of the international conservation organisations, and undermining Rwanda's tourist industry. The rebels denounce this, claiming that the government is shelling the Virungas, and that it conducted a scorched-earth policy in the Akagera skirmishes. What is clear is that the conflict is threatening the gorilla population, and consequently threatening both ecotourism and the country's economy. *From: BBC Wildlife, April 1991.*

##### *Lions on the Skeleton Coast*

The lion populations of the Skeleton Coast Park in Namibia are under severe threat and there may be no more than 10 coastal lions remaining in the area according to staff of the Ministry of Wildlife, Conservation and Tourism. The lions, which are unique in their habit of scavenging food washed up on the shore and occasionally taking live adult seals, are threatened when they wander into villages outside the park. Recommendation has been made that the park boundaries be extended to incorporate some of these farming areas - areas which receive less than 100mm of rainfall and are extremely marginal. This would further protect other endangered animals such as the desert-adapted elephant populations and the hook-lipped rhino. *From: Cat News, No. 14, January 1991.*

### New Park in Mauritania

Following several years of development, the government of Mauritania has created the Diawling National Park to protect an important wetland on the Senegal Delta. The Senegal Delta is one of the major wetlands of Sahelian Africa, and provides a staging point and wintering area for many birds that breed in Eurasia. The Senegal River forms the border between Mauritania and Senegal, and the new park is close to the Djoudj World Heritage site in Senegal. IUCN is working with the Ministry of Rural Development to draw up a management plan for the new park. From: CNPPA Newsletter, No. 53, October 1990-March 1991.

### Selous wildlife threatened by cattle drive

The Tanzanian Ministry of Agriculture and Livestock Development has produced a plan to drive 20,000 cattle per year through the Selous Game Reserve as the least expensive method of transferring cattle to the protein deficient regions south of the reserve. Conservationists and veterinarians are alarmed at the prospects of spreading viral diseases such as rinderpest and foot-and-mouth both to the wildlife within the park and to domestic stocks towards southern Africa, which has been free of rinderpest since the turn of the century. There is a further worry that diseases such as distemper may be passed from the herdsmen's dogs to the wild dog population which inhabits the park. Holding pens for the cattle have already been constructed near the Selous. From: Gnasletter 10(1), 1991.

### North Africa and the Middle East

#### Oil clean-up on the Saudi coast

Conflicting information has been received concerning the situation in Saudi Arabia. The five offshore coral islands of Jurayd, Jana, Kurayn, Karan and Harqus have, at the time of going to press, been unaffected by the oil-spill, according to an ICBP survey team, as had many other sites previously thought ruined. However, clean-up operations elsewhere are reported to be heavily depleting the resources available to the National Commission for Wildlife Conservation and Development, and the Meteorological and Environmental Protection Administration. This could limit the effectiveness of these bodies in dealing with other national conservation issues. From: Various sources compiled by WCMC.

#### Assessing the effects of military conflict on Kuwait's environment

Information received from the UN Secretary General's mission to Kuwait has indicated widespread superficial damage to proposed protected areas in Kuwait. The Jal az Zhor National Park was an important strategic site for the military; the nearby area around the Jahra Nature Reserve was heavily mined; and the Al-Khiran Desert Park, although largely missed by the tank battles, was crossed by a swathe of land-mines. In



Coast under threat from Gulf oil spills. Photo: Paul Goriup.

contrast, the coastal marshes appear to have been missed by the oil spills. Further information on the environmental situation is being collected, although hampered as a result of damage to the offices of the Kuwait Institute for Scientific Research. It also seems likely that the work of other organisations concerned with the environment will be affected as a result of the conflict and of damage to the infrastructure. From: Various sources compiled by WCMC.

### Palaearctic Asia

#### South China Tiger Survey

WWF is funding a survey of the status of the south China tiger, the rarest of the five surviving tiger subspecies. Gary Koehler, of the University of Idaho Wildlife Research Institute, who is working with a number of Chinese specialists, says that there is potential for the establishment of tiger reserves in Hunan and Fujian Provinces, where there is evidence of reproduction. From: Cat News, No. 14, January 1991.

#### Massive Japanese infrastructure developments

The Japanese government has agreed to spend ¥455 trillion (US\$3.4 trillion) on infrastructure development over the coming decade, the first part of which has been allocated for 1991. Plans include the extension of Japan's 4,000 km expressway system to cover a total of 11,500 km by the turn of the century and, because of the massive land prices in the low-lying areas of Japan, it seems likely that the new routes will take cheaper routes through mountainous areas. There are also plans for 11 new airports and 10 airport extensions. It seems inevitable that at least some of these developments will affect protected areas, a high proportion of which are in mountainous areas. From: The Economist, 5 January 1991; WCMC.

## Indo-Malaya

### *Plan for Tawu Mountain, Taiwan*

The Council of Agriculture has produced a management and conservation strategy for the Tawu Mountain Nature Reserve, a reserve of some 47,000ha established in 1988. Tawu lies in the south of the country on the eastern slopes of the Central Mountain Range and ranges in altitude from 200-3100m. Unlike most protected areas in Taiwan, the habitat is largely intact with extensive broad-leaved, mixed and coniferous forests. The park contains a number of endemic species and subspecies, and may also be a stronghold for the nationally threatened Formosan clouded leopard. The park is also of importance in providing clean water for population centres on the east coast. A five-year plan, which forms the basis of the new strategy, addresses current and potential threats which include hunting, uncontrolled tourism, small-scale mining projects and road construction. Included is a recommendation for the extension of buffer zones to the south and east. *From: A management and conservation strategy for the Tawu Mountain Nature Reserve, Taiwan, R.O.C., COA Forestry Series No. 30, October 1990.*

### *New proposal to avert threat to Kirthar National Park*

The Ministry of Communications in Pakistan plans to build a major highway from Karachi to Peshawar. The southernmost section of the proposed route will pass directly through Kirthar National Park, and work on this section of the highway is scheduled to start immediately. The park, which encompasses 308,733ha of mountain and desert and forms the core of a 447,161ha complex of protected areas, incorporates a nearly intact arid land ecosystem, important archaeological sites, and some 10,000 tribal people dependant on subsistence agriculture. Concern about the impact of the road on the park led the Sindh Wildlife Management Board to invite IUCN to undertake a rapid assessment. Their report suggests that the park would come under increased pressure from hunting, disturbance and ecosystem severance. It recommends re-routing the highway to the east of the park, a route only marginally longer than that originally proposed. The new route is technically and economically feasible, would also provide good access to the Rannikot Fort, an important cultural site, and improve access to the Lakhra coal mines. The park is already on CNPPA's threatened protected areas list, due to the presence of 20,000 refugees and 30,000 cattle within its borders. *From: Indus Highway: Kirthar National Park, an Environmental Review, IUCN, April 1991.*

### *Threats to Royal Chitwan National Park*

The Royal Chitwan National Park in Nepal was recently added to the CNPPA's list of threatened protected areas (see last issue). The major cause for concern in this park is the East Rapti Irrigation Project, a US\$ 30 million project which will divert 75% of the base flow of the Rapti River, one of the three main river

systems in the park. The consequences of this project on the park's ecosystems could be drastic: the park is home to many threatened species including rhino, tiger, Ganges dolphin, gharial, turtles and the mugger crocodile. Most severely affected will be the wetland river habitats in the park. The project could also affect the tourism which is an important feature of the park. *From: Wildlife Nepal, January/February 1991.*

### *Logging in Irian Jaya*

Logging concessions totalling 283,000ha have been granted to PT Henrison Irian. One concession abuts the Teluk Cenderawasih Marine Nature Reserve, and it seems likely that the extensive fringing reefs will be affected by siltation caused by the logging. The second concession may include half of the Wandamen Peninsula, and half of the proposed Penunungan Wandamen Strict Nature Reserve, which is home to several important endemic animal species. An environmental impact assessment has been carried out, but this work was reported to have been carried out over a period of only one week, and to have been undertaken by a team of inexperienced graduates without any resource material. *From: WWF Irian Jaya Progress Report, November 1990 - January 1991.*

### *Kanha National Park Project, India*

Kanha National Park of 94,000ha was designated as a tiger reserve under Project Tiger in 1973. Half of the park comprises dry deciduous woodland, and there are also areas of meadows, bamboo thicket and wetlands. The Indian Government has been working in collaboration with the US National Park Service on a long-term project in Kanha to educate the public about the importance of parks, and to improve tourism potential. Last year the first "interpretive" stage of the project was completed, with the development of a visitor centre, trail signs and exhibits, and explanatory pamphlets. *From: The Office of International Affairs Monthly Bulletin, 3(2), 1991, U.S. National Park Service; WCMC.*

## North America

### *Mexican border park with US*

The US and Mexico are currently working on a management agreement for a combined border park of more than 2 million hectares along the Rio Grande. The park would include the already designated Big Bend National Park in the US and equivalent territory on the other side of the river, in Mexico. The area is desert habitat and contains several important bird and mammal species. Administration would remain separate but it is envisaged that there would be an exchange of information, technology and experience. *From: US National Park Service*

### *Oil drilling in U.S. protected areas?*

Demand for new oil sources is threatening several protected areas in the United States. President Bush's

new national energy policy encourages the opening up of new areas for oil drilling, and includes proposals for allowing drilling on the coastal plain of Alaska's 7.7 million hectare Arctic National Wildlife Refuge. In Montana, the National Wildlife Federation has successfully appealed against government approval of oil exploration in the Badger-Two Medicine area, but continued argument seems to be anticipated. Other areas reported to be "at risk" include the entire Yellowstone ecosystem, and the San Juan Mountains in Colorado and New Mexico. From: *The Guardian*, 22 February 1991; *International Wildlife*, March/April 1991; *New Scientist*, 16 February 1991.

#### US rivers under threat

The organisation American Rivers has just published a list of the country's most endangered rivers. According to this report, the most threatened river is the Klamath River in Oregon, where a hydro-electric scheme is threatening to destroy rapids, habitat of several threatened species, and important Native American sites. In contrast, a dam on Colorado's South Platte River has been stopped by the Environmental Protection Agency, as it was thought that the dam would have had adverse effects on fisheries and recreational areas, and would have disrupted the habitat of the endangered whooping cranes downstream. From: *Naturopa Newsletter*, No. 90-9; *National Wildlife*, February-March 1991.

### Central America and the Caribbean

#### Caribbean Island Protected Areas Meeting

The IUCN Commission on National Parks and Protected Areas held a working session in the Dominican Republic in April/May. The meeting was attended by more than 60 people from outside the Dominican Republic, representing most of the islands. Sessions covered a wide range of themes, aimed at developing cooperative activity in the region, building consensus on future priorities, and sharing experience in protected areas management. The meeting also provided a major opportunity for protected area professionals in the Caribbean islands to review the input they could make to the World Parks Congress, and to identify what they wanted from that meeting.

#### Jaguar reserve enlarged

The Cockscomb Basin Wildlife Sanctuary in Belize, which was established in 1986 after a survey by the New York Zoological Society indicated the importance of the area for jaguar, has been enlarged from 1,474ha to 41,472ha. From: *Cat News*, No. 14, January 1991.

### South America

#### Proposed new reserve for the Yanomamis

Venezuela is considering proposals for the designation of a Yanomami Indian reserve, based on the principle of total exclusion of outsiders. The reserve would lie on

the Siapa River in the extreme south of the country, a highly inaccessible region protected by unnavigable rapids and two mountain ranges. The project would effectively seal off an 80km x 200km valley, leaving the inhabitants to continue their traditional existence. The Yanomami have suffered terribly from their interactions with outsiders, particularly in Brazil, where gold miners are illegally moving into their land, introducing disease and polluting their rivers. There is no doubt that the major threat to the Indians in this reserve would come from these same miners illegally entering Venezuela. From: *BBC Wildlife*, March 1991.

#### Reserve recommendation for the golden-backed uacari

A preliminary survey of the golden-backed uacari *Cacajao melanocephalus ouakari* has been carried out in the São Gabriel da Cachoeira region of Brazil, on the Upper Rio Negro close to the borders with Colombia and Venezuela. Results show that while the species is still common in the vicinity of subsistence communities it is susceptible to hunting pressure. The political and social situation in the region, which has a strong military presence, a large and politically aware Indian population, illegal miners, and possibly also cocaine producers, makes formulation of a conservation plan extremely difficult. The report suggests that consideration be given to the creation of a reserve on the Rio Uaupés, possibly within the National Forest Reserve in the Açaí region. One of the two other protected areas known to contain the golden-backed uacari is the Pico de Neblinas National Park, reported to be one of the most threatened protected areas in the Brazilian Amazon, with missions, roads and at least 1000 illegal miners operating within park boundaries. From: *Oryx*, April 1991.

### Pacific

#### Protected areas systems review for Western Samoa

A project was begun in 1987 to map the native terrestrial ecosystems of Western Samoa, to decide which of these ecosystems were most important for conservation, and to develop a national plan for conservation of sites within these ecosystems. A report on this project has just been presented to the Government, which lists 26 sites recommended for conservation. A method for conservation is proposed that establishes partnerships between conservation organizations and local owners of customary lands through the use of protective agreements and the establishment of local conservation trusts. From: *Pearsall and Whistler (1991). Terrestrial Ecosystem Mapping for Western Samoa: Summary, Project Report, and Proposed National Parks and Reserves Plan.*

Compiled by the WCMC Protected Areas Data Unit. Items for inclusion (or newsletters and reports from which such items can be extracted) should be sent to: Protected Areas Data Unit, World Conservation Monitoring Centre, 219c Huntingdon Road, Cambridge CB3 0DL, United Kingdom.

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# DIARY

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## 1991

- 3-10 August Workshop for the development of approaches to undergraduate training in resource management. *Contact: Dr LaVerne Ragster, Consortium Co-ordinator, Easter Caribbean Centre, University of the Virgin Islands, St. Thomas, USVI 00802, USA. Tel. (809) 776 9200.*
- 29-31 August Regional symposium on public and private cooperation in national park development. *Contact: National Parks Trust, PO Box 860, Road Town, Tortola, British Virgin Islands.*
- 8-21 September Second European training seminar for managers of protected areas. *Contact: Seminar Secretariat, Dept. of Environment, Wye College, Ashford, Kent, TN25 5AH, UK.*
- 17-26 September 10th World Forestry Congress "Forests, a heritage for the future", Paris. *Contact: Organisation Committee for the World Forestry Congress, Centre technique forestier tropical, 45 Bis, Avenue de la Belle Gabrielle, 94736 Nogent-sur-Marne Cedex, France.*
- 28 October to 1 November Peaks, parks and people: An international consultation on protected areas in mountain environments, Hawaii. *Contact: Lawrence S. Hamilton, Environment and Policy Institute, East-West Centre, 1777 East-West Road, Honolulu, Hawaii 96848.*
- 3-8 November 3rd Global Congress of Heritage Interpretation, Hawaii. *Contact: Dr G. Cherem, EMU Dept of Geography, Michigan University, Ypsilanti, Michigan 48197, USA. Tel. (313) 487 0218.*
- 9-12 November Parkways, greenways, riverways: Partnerships for beauty and progress. Charlottesville, Virginia, USA. *Contact: Linear Parks Conference, Appalachian Consortium University Hall, Boone, North Carolina 28608, USA. Tel. (704) 262 2064; Fax. (704) 262 2553.*
- 11-16 November Fifth International Festival of Documentary Films on Parks. *Contact: Gianfranco Cucchi, Assessorato alla Cultura del Comune di Sondrio, Villa Quadrio, Via IV Novembre, I- 23100, Sondrio, Italy. Tel. (342) 213305; Fax. (342) 513001.*
- 19-21 November First International Meeting on Legal Protection of the Environment. *Contact Mr Miguel A. Garcia Alzugaray, International Relations Department, Fiscalia General, San Rafael No. 3, Habana 2, La Habana, Cuba. Tel. (53) 62 0681/9506/0866.*

## 1992

- 10-21 February The IVth World Congress on National Parks and Protected Areas, Caracas, Venezuela. *Contact: Jeff McNeely, IUCN, 1196 Gland, Switzerland. Tel. (22) 649114; Fax. (22) 642926.*
- 12-14 February Ente Colombo '92: Mediterranean and Caribbean Countries for the Preservation of their Seas. *Contact Prof. Giuliano Fierro, Ente Colombo '92, Via Soutoropia 5, Palazzo Serra Gerace, Genoa, Italy. Tel. (10) 284111; Fax. (10) 292693.*

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**Correction to Volume 2 No 1:** on page 5, 'Canna National Park' should read 'Kanha National Park', and 'Mackintosh' should read 'Mackinnon'; on page 8 (References), 'Mackintosh, J., Mackintosh, K.' should read 'Mackinnon, J., Mackinnon, K.'

## RESÚMENES

### **Guías para la preparación de planes para sistemas de áreas protegidas.**

Jeff McNeely y Jim Thorsell

Actualmente las áreas protegidas motean el globo, pero el proceso para establecerlas ha sido poco sistemático. Importantes áreas quedan sin protección y muchas de ellas son muy pequeñas para satisfacer sus esperados papeles. Es esencial que cada nación evalúe la suficiencia de su sistema de áreas protegidas, como una base para justificar nuevas áreas y para obtener mayor apoyo para las existentes.

### **La planeación de un sistema de áreas protegidas en Arabia Saudita.**

Abdulaziz Abuzinada, John Grainger y Graham Child  
Este reporte define la metodología usada para planear un sistema de 103 áreas protegidas para representar la extraordinaria diversidad biofísica de Arabia Saudita. La tradición cultural de áreas de conservación de recursos (himas) se incorporó dentro de un sistema moderno de áreas protegidas de fácil creación para mantener el rico patrimonio cultural del Reino y sus espectaculares desarrollos recientes. La implementación del modelo podría proporcionar una demostración regional significativa de los lazos vitales entre la conservación y el continuo bienestar humano.

### **Zonas amortiguadoras en las selvas tropicales: hecho ó fantasía?**

Jeff Sayer

Actualmente el concepto de zona amortiguadora es ampliamente usado para extender los beneficios de las áreas protegidas para la conservación de sus floras y faunas y para satisfacer las necesidades de las poblaciones locales. No todos los proyectos de zonas amortiguadoras han tenido éxito y el autor propone algunos principios que asegurarán que iniciativas futuras alcancen sus objetivos. Este artículo se basa en una revisión sobre proyectos de zonas amortiguadoras en parques y reservas en la selva tropical publicado por la UICN.

### **Preparando un plan para un sistema de parques nacionales y áreas protegidas: un ejemplo de Grandada.**

Arthur M Heyman

Este reporte describe el proceso por el cual la OEA proporcionó asistencia técnica al Gobierno de Grenada en la producción de un programa y un plan para un sistema nacional de parques y áreas protegidas.

Se describe la secuencia de eventos requeridos y se proporcionan un número de principios generalizados de la experiencia de la OEA en el campo como una conclusión. Estos principios cubren la función de un sistema nacional dentro de una política integrada del uso de la tierra, las guías para el desarrollo y la operación del sistema y la importancia de evaluar e integrar costos económicos y beneficios a través de ésta.

### **Reservas de la biodiversidad: estableciendo nuevas prioridades para la conservación de la vida silvestre.**

Chris Humphries, Dick Vane-Wright y Paul Williams  
Este reporte se refiere a tres preguntas acerca de la biodiversidad: qué es, donde está, y cómo debemos establecer las prioridades para su protección. Biodiversidad, la variedad misma de la vida, está a punto de sufrir una reducción drástica por extinción masiva. Enfrentados a ésta realidad, los conservacionistas han hecho un llamado para una Convención Internacional para establecer prioridades para la protección de la biodiversidad. Para hacer esto efectivamente se necesitará del desarrollo rápido de nuevos medios de evaluación para ésta tarea específica. Se identificaron tres prioridades fundamentales de la fauna y la flora: riqueza de especies, complementación y distinción taxonómica. Estos parámetros pueden ser medidos e identificados usando el programa WORLDMAP, para identificar áreas prioritarias para la conservación de la biodiversidad dentro de un grupo taxonómico. Se discute el potencial de éste método a desarrollar como un sistema de evaluación de la conservación de la biodiversidad global.

### **Un enfoque sistemático para la conservación de la vida silvestre en Etiopía.**

Tim Allen-Rowlandson

Los principales problemas a los cuales se enfrentan los esfuerzos de conservación en las áreas protegidas de Etiopía son los conflictos sobre el uso de la tierra y la falta de prestigio, integración y finanzas. Como resultado, deben existir algunas inquietudes fundamentales acerca de la viabilidad de éstas áreas silvestres a largo plazo bajo el presente sistema de designación, manejo y medidas presupuestales. Esta es una oportunidad para evaluar las áreas protegidas existentes y potenciales en términos de su capacidad para proteger muestras representativas de los mayores hábitats en el país si han de ocurrir mejoramientos en el futuro cercano.

## RESUMES

### **Lignes directrices pour la planification d'un système d'aires protégées.**

Jeff McNeely et Jim Thorsell

Les aires protégées parsèment maintenant le globe, mais leur création s'est effectuée par étapes. Des aires importantes restent encore sans protection et de nombreuses aires sont trop petites pour assumer leur rôle. Il est indispensable que chaque nation évalue la valeur de son système d'aires protégées, ce qui permettrait ainsi de justifier la création de nouvelles aires et d'obtenir un plus grand appui pour les aires déjà établies.

### **Planification d'un système d'aires protégées en Arabie Saoudite.**

Abdulaziz Abuzinada, John Grainger et Graham Child  
Cet article expose les grandes lignes de la méthodologie utilisée pour organiser un système de 103 aires protégées représentant la diversité biologique remarquable de l'Arabie Saoudite. Le concept traditionnel d'aires de conservation des ressources naturelles (himas) a été intégré à un système moderne d'aires protégées, faciles à établir, afin d'entretenir la richesse du patrimoine culturel du Royaume et les développements spectaculaires récents. La mise en oeuvre du modèle pourrait faire la démonstration, au niveau régional, de l'importance des liens fondamentaux qui lient la conservation au bien-être durable de l'humanité.

### **Zones tampon des forêts tropicales humides: fait ou fiction?**

Jeff Sayer

Le concept de zone tampon est maintenant communément utilisé dans le but d'augmenter les avantages des zones protégées pour la conservation de leur flore et de leur faune et de satisfaire aux besoins des populations locales. Les projets de zones tampons n'ont pas tous rencontré le même succès et l'auteur propose certains principes qui devraient permettre aux projets futurs d'atteindre leurs objectifs. Cet article s'appuie sur une revue, publiée par l'UICN, des projets de zones tampons dans les parcs et les réserves des forêts tropicales humides.

### **Planification d'un système de parcs nationaux et d'aires protégées: une étude de cas à Grenade.**

Arthur M Heyman

Cet article décrit comment l'OAS a prêté son assistance technique au gouvernement de Grenade pour l'élaboration de la stratégie et du plan de création d'un système national de parcs et d'aires protégées.

L'article décrit la suite des événements et présente en conclusion un certain nombre de principes tirés de l'expérience de l'OAS dans ce domaine. Ces principes comprennent le rôle d'un système national au sein d'une politique d'exploitation du sol intégrée, les lignes directrices pour le développement et le fonctionnement du système et l'importance de l'évaluation et de l'intégration des charges économiques et des bénéfices durant l'opération.

### **Réserves de diversité biologique: l'établissement de nouvelles priorités pour la conservation de la vie sauvage.**

Chris Humphries, Dick Vane-Wright et Paul Williams

Cet article aborde trois questions relatives à la diversité biologique: comment la définir, où la rencontrer et comment établir les actions prioritaires pour sa protection? La diversité biologique, diversité de la vie au sens absolu, va subir une réduction drastique en raison d'une menace d'extinction généralisée. Face à cette réalité, les conservationnistes ont demandé qu'une Convention Internationale soit instituée afin de décider des actions prioritaires pour la protection de la diversité biologique. Le succès de cet objectif dépendra du développement rapide de nouveaux moyens d'évaluation voués à cette tâche particulière. Trois caractères fondamentaux des faunes et des flores sont identifiés: la richesse en espèces et la complémentarité et diversité taxonomiques. Il est possible de mesurer et d'intégrer ces paramètres grâce au programme WORLDMAP et d'identifier ainsi les aires de conservation prioritaires au sein d'un groupe taxonomique. Les possibilités de développement de cette méthode en tant que système d'évaluation de la conservation de la diversité biologique globale sont examinées brièvement.

### **Une approche systématique des problèmes de la conservation de la vie sauvage en Ethiopie**

Tim Allen-Rowlandson

Les conflits de l'exploitation des sols et le défaut de statut, de politique d'intégration et de moyens financiers sont les principaux problèmes auxquels font face les efforts de conservation des aires protégées existantes en Ethiopie. Il est donc primordial de s'inquiéter de la viabilité, à long terme, de ces aires de vie sauvage sous le régime actuel de création, de gestion et d'allocation de fonds. Le moment opportun est venu d'évaluer la capacité des aires protégées actuelles et futures à sauvegarder les échantillons représentatifs des principaux types d'habitat du pays si l'on souhaite une amélioration dans un proche avenir.

# PARKS



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