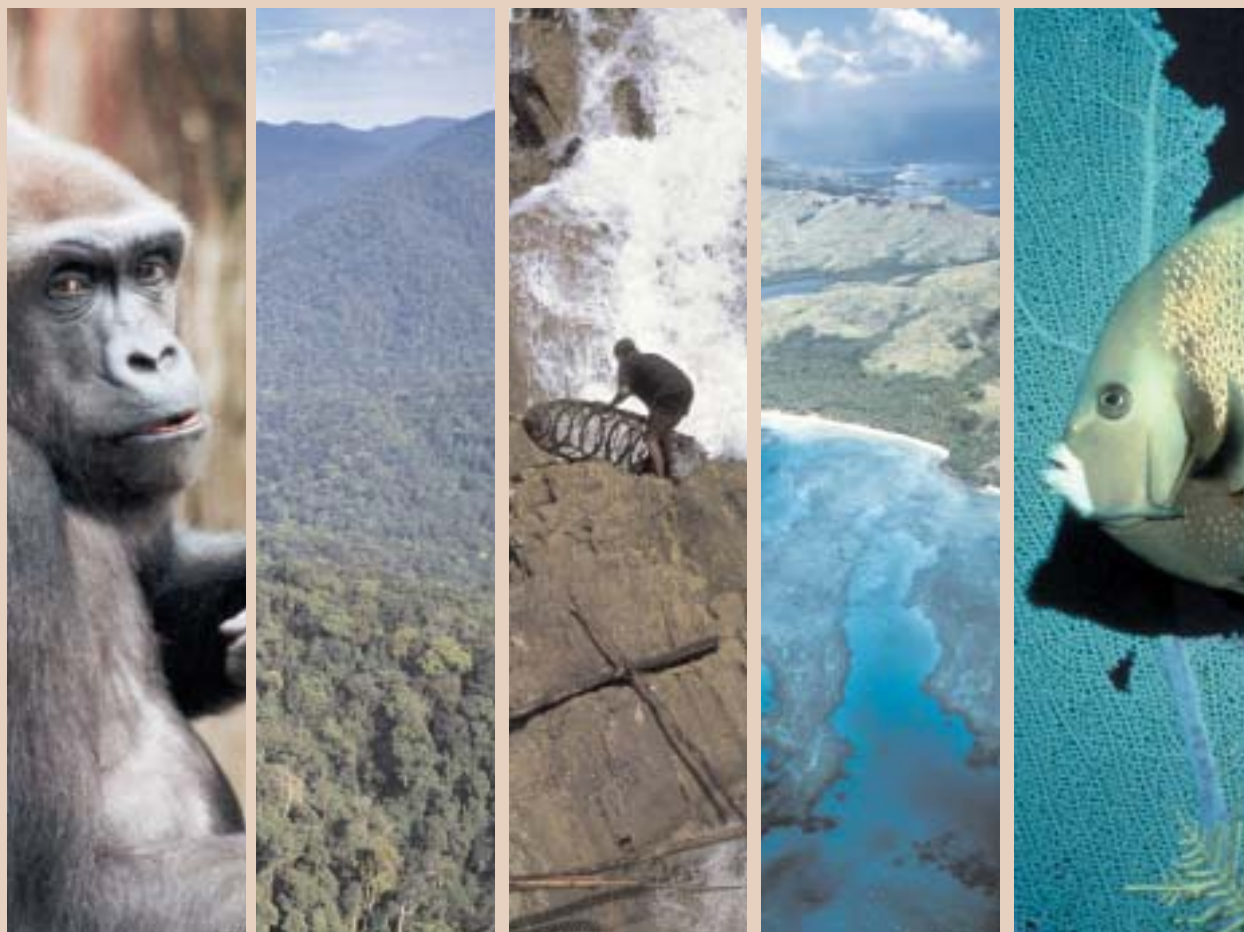


Protected areas and **biodiversity**



An **overview** of **key issues**

Kalemani Jo Mulongoy
and Stuart Chape

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THE CONVENTION ON BIOLOGICAL DIVERSITY

is the first global agreement on the conservation and sustainable use of biological diversity, and the fair and equitable sharing of benefits arising from the use of genetic resources. This pact among the majority of the world's governments is unique for its comprehensive approach that encompasses social, environmental and economic issues. The governing body of the Convention, the Conference of the Parties (COP), has initiated work on six thematic programmes: marine and coastal, agricultural, forest, inland waters, dry and sub-humid lands, and mountain biodiversity. In addition, work has been initiated on cross-cutting issues of relevance to all the thematic programmes including biosafety; access to genetic resources; traditional knowledge, innovations and practices; indicators; taxonomy; public education and awareness; incentives; and invasive alien species. The COP has developed a strategic plan with the target to achieve, by 2010, a significant reduction in the rate of loss of biodiversity. This target has been endorsed by the World Summit on Sustainable Development.

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THE UNEP WORLD CONSERVATION MONITORING CENTRE is the biodiversity assessment and policy implementation arm of the United Nations Environment Programme (UNEP), the world's foremost intergovernmental environmental organization. UNEP-WCMC aims to help decision-makers recognize the value of biodiversity to people everywhere, and to apply this knowledge to all that they do. The Centre's challenge is to transform complex data into policy-relevant information, to build tools and systems for analysis and integration, and to support the needs of nations and the international community as they engage in joint programmes of action.

UNEP-WCMC provides objective, scientifically rigorous products and services that include ecosystem assessments, support for implementation of environmental agreements, regional and global biodiversity information, research on environmental threats and impacts, and development of future scenarios for the living world.

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The way ahead: consolidating international support

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Foreword

Protected areas lie at the heart of global commitments intended to preserve for the benefit of present and future generations a range of goods and services essential for life on Earth: they are homes for human communities, natural buffers against climate change, sources of pure water and other vital ecosystem services, genetic storehouses, protection for sacred sites, and places for recreation and spiritual and physical renewal. Protected areas cover almost 12 per cent of the Earth's land surface and constitute one of the largest conscious changes of land use in history.

While they represent our best chance of effective *in situ* conservation of biological diversity, protected areas have many other demands upon them. Comprehensive and effectively managed protected area networks at national, regional and consequently at global levels are therefore critical elements in the implementation of the Convention on Biological Diversity (CBD).

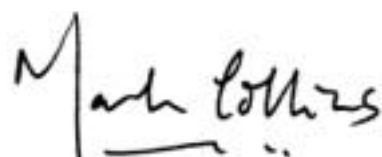
However, while we have clearly made significant progress in conserving representative terrestrial ecosystems, recent assessments indicate that conservation of marine and coastal biodiversity is woefully inadequate, with less than 1 per cent of the Earth's marine ecosystems protected. Other biomes, including major freshwater systems and grasslands, are also poorly represented. In addition, protected areas have to compete for limited financial resources in the allocation of national budgets; this is a difficult task, when many governments are faced

with major developmental issues such as health, poverty alleviation and the provision of essential infrastructure. Nevertheless, the key environmental services that are provided by protected areas underpin many aspects of sustainable development, and this role is increasingly recognized as we deal with a period of global environmental change unprecedented in human history.

This publication has been compiled by the Secretariat of the Convention on Biological Diversity and the United Nations Environment Programme (UNEP) World Conservation Monitoring Centre, with support from the Swedish Scientific Council on Biological Diversity, IUCN-The World Conservation Union, the International Council on Mining and Metals, and Shell International Limited. It provides a synthesis of key issues relating to protected areas and biodiversity for CBD Parties and decision makers at their meeting in February 2004 in Kuala Lumpur, Malaysia, as well as to other stakeholders in planning, establishing and managing protected areas. The Seventh Meeting of the Conference of the Parties presents a window of opportunity to further strengthen global action on protected areas in the endeavour to significantly reduce the rate of loss of biological diversity by 2010. At the same time, such actions will support a range of linked initiatives, including the World Summit on Sustainable Development (WSSD) Plan of Implementation, the Millennium Development Goals and the Durban Accord and Action Plan arising from the Vth World Parks Congress held in 2003.



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Keystones of biodiversity

CONSERVATION: AN OLD BUT EVOLVING CONCEPT

The idea of setting aside areas of natural or semi-natural land stretches back thousands of years. Many early 'protected areas' were actually hunting reserves, for example in northern India more than 2 000 years ago and in Indonesia almost 1 500 years ago. Other places were protected because they were considered sacred: homes of the gods, resting places for the dead, or places for spiritual reflection. That protection might be for nature without hunting, or for aesthetic appeal, was only generally recognized in the latter half of the 19th century.

The establishment of Yellowstone National Park in the United States in 1872 is usually seen as the start of the modern protected area movement, being the first time the term 'national park' had been used. In the following decades, many other countries started protecting sites, such as Banff in Canada, El Chico in Mexico, Tongariro in New Zealand and the Swiss National Park. In the decades that followed, what had started as a trickle rapidly became a flood as new protected areas were created in virtually every country in the world.

Hunting reserves were chosen by and for the elite, and early national parks often followed a similar pattern, with local people sometimes being displaced from their traditional lands as a result. In tropical areas the choices were usually made by colonial powers. The 130 or so years since the founding of Yellowstone have seen a gradual dem-

ocratization of protected areas, although some would argue that this process has still not gone far enough.

The new areas needed funds, organization and expertise. In 1948, the International Union for the Conservation of Nature (IUCN) was established to promote conservation. IUCN (now The World Conservation Union) has a unique structure, which includes government and non-government members, and several expert commissions such as the World Commission on Protected Areas. In 1961, the World Wildlife Fund (WWF) was established, initially as a funding body and then later, as the World Wide Fund for Nature, as an active conservation organization. Then, in 1962, the first World Conference on National Parks was held in Seattle, United States, providing a new opportunity for professionals in the emerging protected area business to meet, exchange views and plan for the future.

In 1962 there were 10 000 protected areas around the world, which already seemed a huge figure, yet by the Vth World Parks Congress in Durban, South Africa, in September 2003 the number had increased tenfold to 100 000. What had begun as a small movement has become a worldwide approach to land use and nature conservation; protected areas now cover almost a twelfth of the world's land surface as well as a small but increasing proportion of marine area.

What was not apparent at the time of the First World Conference on National Parks was the evolution of the protected area concept and the 'repackaging' of conservation

concerns under the umbrellas of sustainable development and biological diversity, which occurred from the 1970s to the 1990s. The change was initiated by a worldwide growth in interest in environment and development, punctuated by a series of key events and publications, including the United Nations (UN) Conference on Environment in Stockholm and the adoption of the World Heritage Convention, both in 1972, the 1980 World Conservation Strategy and the 1992 UN Conference on Environment and Development (the 'Earth Summit'), which included adoption of the Convention on Biological Diversity (CBD). Another critical factor has been the expansion of the World Commission on Protected Areas (WCPA, originally the Commission on National Parks).

These changes have created greater understanding about the nature of protection and the mainstreaming of conservation concerns into development agendas. There has also been a broadening of the aims of protected areas

in the wider landscape or seascape. Protected areas should be assets for local communities while, at the other end of the spectrum, their global values are increasingly recognized. Managers need multiple skills to handle these broader roles and responsibilities. At the same time, financial, logistical and popular support for the protected area comes from a far broader array of sources.

GLOBAL DEFINITIONS

The Convention on Biological Diversity defines a protected area as: 'a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives'. The CBD has now been adopted by 187 countries and its definition thus clearly has great importance.

As our understanding of the importance and role of protected areas broadened, it became clear that many 'cultural landscapes' are also in need of protection.

S. Chape



to include more emphasis on sustainable human use, cultural values, environmental benefits and the active participation of local communities in management decisions. The traditional model of a protected area was of a place set aside for conservation, wilderness and scenic values, owned and financially supported by governments as national assets, with management decisions taken by scientists with little regard to the opinions of local people. Management was reactive and tended to treat the protected area as an island, isolated from the rest of the land or sea.

The new model is more diverse, including management for social and cultural reasons, with local people involved in taking and implementing decisions. Management involves more partners, and new models have now emerged including indigenous reserves and private reserves. Management decisions are longer term and larger scale, looking beyond the park's borders to its place

Nature protection is only part of a more complex management system that allows for different types of access and use. This realization led to the adoption of the present IUCN definition of a protected area, developed at the IVth World Congress on National Parks and Protected Areas in 1992: 'An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means'.

At the global level, the IUCN definition provides the basis for the work of IUCN and WCPA and the inclusion of sites on the periodic *UN List of Protected Areas*. The IUCN definition is not in conflict with the CBD definition, although the CBD definition does not refer to the cultural aspects of protected areas. Several other international and regional conventions and agreements have definitions of specific types of protected areas.

DEFINING A COMMON LANGUAGE: MANAGEMENT OBJECTIVES

The more than 100 000 protected areas that now exist worldwide do not reflect a single approach to conservation, but instead show an extraordinary variety of management objectives. They range from strictly controlled reserves, where only a handful of scientists are allowed to enter, to cultural landscapes with thousands of human inhabitants, where biodiversity conservation is integrated with many other activities. Their common names do not necessarily help to distinguish them – for example in most places a 'national park' is a fairly strictly protected reserve, while in Europe the term is used for an inhabited landscape or seascape with more general planning and environmental controls. In fact, there are more than 1 000 terms used globally to designate protected areas.

Such variation in terminology and in management approaches has led to some confusion. To bring some order, WCPA developed a set of categories for protected areas. These are defined by management objective and are not a judgement on how well this objective has been achieved. The first aims of the categories were to reduce confusion about terminology and to provide an agreed, international set of standards, but also more generally to publicize the importance and range of protected areas.

After testing a system with 10 categories, IUCN simplified this to six categories in 1994, and these have more or less come to represent the international consensus about management types in protected areas. The six can all cover both land and sea:

❑ **Category Ia:** Strict nature reserve: protected area managed mainly for science. Area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring. For example, the 328-hectare Snares Island Nature Reserve in New Zealand contains 6 million breeding seabirds, no introduced mammals and virtually unmodified vegetation. Access to this highly sensitive area is by permit only for scientific research, and tourism is prohibited.

❑ **Category Ib:** Wilderness area: protected area managed mainly for wilderness protection. Large area of unmodified or slightly modified land and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition. The Tasman Wilderness Area, also in New Zealand, shows the difference between the two category I designations: the 87 000-hectare area is set aside for nature protection but here tourism is



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also a major feature and the social values of the 'wilderness' are recognized in the management plan.

❑ **Category II:** National park: protected area managed mainly for ecosystem protection and recreation. Natural area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible. Kruger National Park in South Africa covers almost 20 000 km² and is protected to preserve wildlife and ecology, but also supports a huge tourism trade (with associated accommodation and a system of roads) and a large research programme, in zoned areas.

❑ **Category III:** Natural monument: protected area managed mainly for conservation of specific natural features. Area containing one, or more, specific natural or natural/cultural feature which is of outstanding or unique value because of its inherent rarity, representative or aesthetic qualities or cultural significance. The Devil's Tower Natural Monument in the United States is only just over 500 hectares but contains the tallest igneous rock formation in the country and has been protected since 1906. The Victoria Falls in Zimbabwe is also a category III protected area.

❑ **Category IV:** Habitat/species management area: protected area managed mainly for conservation through management intervention. Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species. Category IV reserves can include cultural landscapes that have developed important biodiversity or other sites where long-term management is essential because of previous degradation or invasive species. Examples include the Haleji Lake Wildlife Sanctuary in Pakistan, which is important for waterfowl but needs active management to keep water channels clear, and the Lüneburger Heide Nature Reserve in Germany where heath is maintained by controlled grazing.

❑ **Category V:** Protected landscape/seascape: protected area managed mainly for landscape/seascape conservation or recreation. Area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant

aesthetic, ecological and/or cultural value, and often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance and evolution of such an area. Many European national parks fall into this category, such as the Dartmoor National Park in the United Kingdom, which covers more than 900 km² and is mainly in private ownership, with public access available legally or by agreement over around half of this.

❑ **Category VI:** Managed resource protected area: protected area managed mainly for the sustainable use of natural resources. Area containing predominantly unmodified natural systems, managed to ensure long-term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs. The Tamshiyacu-Tahuayo Communal Reserve in Peru, for instance, is managed by local people both to preserve biodiversity and to provide sustainable supplies of non-timber forest products like seeds, fruits and medicinal plants. Similarly, the entire national protected area system in the Lao People's Democratic Republic, covering more than 30 000 km², is designated category VI.

The categories have been successful in helping to classify protected areas. However, in the decade since their agreement several other uses have evolved, including their being a basis for national law and a means to influence changes in land use (for example a recommendation at the 2000 World Conservation Congress called on governments to ban mining in category I-IV protected areas), to help sort out governance questions particularly as they relate to indigenous peoples' territories, to improve and assess management effectiveness and to help broad-scale conservation planning. The implications of these 'new' uses are currently being assessed by the Speaking a Common Language project based at Cardiff University in the UK.

The Vth World Parks Congress recognized the importance of the IUCN categories and recommended that IUCN prepare new guidance on their application to reflect changing uses and new demands on protected areas. It also urged the Seventh Meeting of the Conference of the Parties (COP 7) to the CBD to use the IUCN system of categorizing protected areas as the framework for data collection and reporting, for assessing the management of protected areas, and to raise management standards. This was supported by the final statement from the Ninth Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA).



International commitments

PROTECTED AREAS AND THE CONVENTION ON BIOLOGICAL DIVERSITY

The Convention on Biological Diversity is the most important international legal instrument addressing and supporting protected areas, with 187 Parties (signatory States). Article 8 specifically calls for establishment of protected area systems (see over), and the importance of protected areas has been repeatedly emphasized (see Box 1). The Convention recognizes protected areas as a tool for *in situ* conservation that should be used in conjunction with other relevant provisions of the Convention.

Protected areas is one of the three main themes for the Seventh Meeting of the Conference of the Parties (COP 7) to the CBD, which is the first direct opportunity to address the Convention provisions on protected areas. In preparation, the Conference of the Parties established an Ad Hoc Technical Expert Group (AHTEG) on protected areas, to review methods and approaches for protected area planning and management, including options for appropriate policies, strategies and practices.

At a meeting in Tjärno, Sweden, it reviewed approaches to planning and management, ecosystem and bioregional approaches, stakeholder involvement and transboundary protected areas, and drew up a draft programme of work. Other preparatory work focused on marine and coastal protected areas and on developing thematic national reports. A roundtable on protected areas

and ecological networks was also held in June 2003 in the Hague, Netherlands.

The IUCN Vth World Parks Congress (WPC) developed many recommendations relevant to the CBD and called on the Conference of the Parties to adopt a work programme on protected areas including specific targets and timetables. An international workshop was also held on protected forest areas as a measure to conserve and sustainably use forest biodiversity. The Ninth Meeting of the SBSTTA, held in November 2003 in Montreal, Canada, revised the work programme, including outputs from the WPC.

The proposed work programme aims to be cross-cutting and complementary with the CBD's other work. It is intended to reduce significantly the loss of biodiversity at international, national and regional levels by implementing the Convention's three main objectives, and to contribute to poverty alleviation and sustainable development, in line with the CBD Strategic Plan, the World Summit on Sustainable Development (WSSD) Plan of Implementation and the Millennium Development Goals. The Convention's work on protected areas will be undertaken in the context of the ecosystem approach, to relate protected areas to the wider landscape and seascape and to ensure proper valuation of their goods and services.

The ultimate aim is the establishment and maintenance of an effectively managed, ecologically representative global system of protected area networks,

Box 1: Decisions of the Conference of the Parties to the Convention on Biological Diversity on protected areas

- ❑ The Second and Third Meetings of the Conference of the Parties emphasized regional and international cooperation on protected areas and requested that the Convention on Biological Diversity suggest ways to enhance collection and sharing of information and experience (decisions II/7 and III/9). The COP also instructed the financial mechanism to support Parties' efforts to implement Article 8 (decisions I/4 and II/6).
- ❑ Programme element 3 of the marine and coastal biodiversity work programme is dedicated to marine and coastal protected areas, to facilitate research and monitoring and to develop criteria for their establishment and management (IV/5, annex).
- ❑ The work programme on biodiversity of inland water ecosystems recommends sharing relevant information and experience on protected areas. The COP encouraged a joint work plan with the Convention on Wetlands (IV/4, annex 1).
- ❑ The use and establishment of additional protected areas is identified as a target for the work programme on dry and sub-humid lands (V/23, annex 1, part B, activity 7(a)).
- ❑ The work programme on Article 8(j) includes a component on protected areas.
- ❑ The expanded forest work programme (decision VI/22) contains several activities related to the role and effectiveness of protected areas.
- ❑ The Ninth Meeting of the Subsidiary Body on Scientific, Technical and Technological Advice calls for identification and protection of unique, fragile mountain ecosystems and biodiversity hot-spots, emphasizing strict protection whenever feasible (recommendation IX/12).
- ❑ The value of taxonomic data in assisting site selection is recognized in the Global Taxonomic Initiative work programme (decision VI/8). Protected areas are mentioned in connection with identification, monitoring, indicators and assessments (decision VI/7) and the Addis Ababa principles and guidelines for sustainable biodiversity use.
- ❑ In the Global Strategy for Plant Conservation (annex to decision VI/9), the COP specified that by 2010 at least 10 per cent of each of the world's ecological regions should be effectively conserved, implying increasing the ecological representation and effectiveness of protected areas; and that protection of 50 per cent of the most important areas for plant diversity should be assured through effective conservation measures, including protected areas.

where human activities are managed to maintain the structure and functioning of the full range of ecosystems, in order to provide benefits to both present and future generations and achieve a significant reduction in the rate of biological diversity loss.

Relevant articles of the Convention on Biological Diversity. Paragraphs (a), (b), (c) and (e) of Article 8 contain specific references to protected areas and provide that Parties should:

- (a) Establish a system of protected areas or areas where special measures are taken to conserve biodiversity;
- (b) Develop guidelines for the selection, establishment and management of protected areas;
- (c) Regulate or manage biological resources important for biodiversity conservation whether within or outside protected areas; and
- (e) Promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of these areas.

In addition, several other articles are relevant:

- ❑ Provisions on sustainable use in Articles 6 and 10, given the fact that protected areas are increasingly managed for multiple purposes.
- ❑ Provisions on *ex situ* conservation (Article 9) and restoration/rehabilitation (Articles 8f and 14.2) to complement on-site efforts.
- ❑ Provisions on tools important for protected area management and planning such as biodiversity monitoring (Article 7) and impact assessment (Article 14).
- ❑ Other provisions such as 8(j) on traditional knowledge, Article 11 on incentive measures, Article 12 on research and training and Article 13 on public education and awareness.

PROTECTED AREAS AND THE GLOBAL ENVIRONMENT FACILITY

The Global Environment Facility (GEF) is the major source of funding for conservation and sustainable use of the Earth's biodiversity. As the financial mechanism for the Convention

on Biological Diversity, GEF receives guidance from the Conference of Parties on policy, strategy, programme priorities and eligibility criteria related to the use of resources. Projects generally deal with one or more of four critical ecosystem types and the human communities found there: arid and semi-arid zones; coastal, marine and fresh-water resources; forests; and mountains.

In its first decade of operation, the GEF provided nearly \$1.1 billion for approximately 200 biodiversity projects involving parks and other types of protected areas. This portfolio supports more than 1 000 sites covering more than 2.26 million km². The \$1.1 billion for protected areas directly contributed by the GEF helped leverage almost \$2.5 billion in co-financing from project partners. Performance against investment has also been high. The Second Overall Performance Study of the GEF, an independent review completed in early 2002, found that 'GEF's biodiversity program has made significant advances in demonstrating community-based conservation within protected areas' and that 'GEF has steadily improved standards of management of protected areas through participatory approaches'.

In many corners of the globe – Africa, the Asia-Pacific region, central and eastern Europe, central and western Asia, and Latin America and the Caribbean – individuals and institutions are working to extend and sustain protected area systems through results-driven GEF projects. They are assisted by GEF's three implementing agencies: the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP) and the World Bank (WB). Other GEF initiatives such as the Small Grants Programme, administered by UNDP, and the Critical Ecosystem Partnership Fund led by Conservation International, are also contributing to this growing mosaic of community-based, high-priority protected areas.

GEF projects are also implemented through seven executing agencies: the United Nations Food and Agriculture Organization (FAO), the United Nations Industrial Development Organization (UNIDO), the African Development Bank (AfDB), the Asian Development Bank (ADB), the European Bank for Reconstruction and Development (EBRD), the Inter-American Development Bank (IADB), and the International Fund for Agricultural Development (IFAD).

In 2002 the GEF received commitments of \$3 billion for its third replenishment. To effectively programme and disburse these funds, the GEF has developed a series of strategic priorities for biodiversity conservation.

Bolstering the sustainability of protected area systems is one of four main directions in which the GEF will seek to develop its portfolio. This priority targets not just ecological sustainability, but also institutional, social, political and financial sustainability in the context of national

Table 1: The GEF's Protected Areas Portfolio – linking natural landscapes

	GEF projects	Protected areas
Buffer zones	44	209
Corridors	32	207
Cultural linkages	8	24
Transboundary protected areas	5	29
Integrated coastal zone management	7	15

protected area systems. Support for individual conservation areas will be grounded in the long-term vision countries have for their protected area systems.

Objectives include expanded engagement of the private sector, further development of innovative financial mechanisms, intensified capacity-building and comprehensive stakeholder participation, and an emphasis on *in situ* conservation through the conservation of globally important and threatened sites and ecosystems.

GEF projects work to link protected areas and their surroundings through, for example, buffer zones, corridors, cultural linkages, integrated ecosystem management, integrated coastal zone management and transboundary protected areas. Forty-four GEF-financed biodiversity projects have incorporated buffer zones. Ecological corridors multiply the conservation benefits of protected areas by linking them within the larger context of surrounding ecosystems, and 32 GEF-funded biodiversity projects include corridor components. An outstanding example is the Programme for the Consolidation of the Meso-American Biological Corridor, coordinated by the



G. Mintjens/UNEP/Topham

Table 2: Major international initiatives recognizing or designating specific sites

Initiative	Geographical coverage	Thematic coverage
World Heritage Convention	Global	
Ramsar Convention	Global	Wetlands
UNESCO Man and Biosphere Programme biosphere reserves	Global	
Helsinki Convention	Baltic	Marine and coastal
Barcelona Convention and Specially Protected Areas Protocol	Mediterranean	Marine and coastal
Cartagena Convention and Specially Protected Areas and Wildlife Protocol	Caribbean	Marine and coastal
Antarctic Treaty and Madrid Protocol	Antarctic	
Bern Convention	Europe	Listed species/habitats
EU Birds Directive	European Union	Listed species
EU Habitats Directive	European Union	Listed species/habitats
Council of Europe Biogenetic Reserves	Europe	
Council of Europe European Diploma	Europe	
ASEAN (Association of Southeast Asian Nations) Declaration on Heritage Parks and Reserves	Southeast Asia	

Commission for Environment and Development in Central America and Mexico's National Commission for Knowledge and Use of Biodiversity (CONABIO).

OTHER INTERNATIONAL AND REGIONAL AGREEMENTS

International agreements, such as conventions or treaties, that highlight or designate specific protected areas are relatively recent. During the first part of the last century at least two such agreements recognized the importance of protected areas in general terms and encouraged their establishment. Both the 1933 Convention Relative to the Preservation of Fauna and Flora in their Natural State (London Convention, later replaced by the 1968 African

Convention on the Conservation of Nature and Natural Resources, or African Convention) and the 1940 Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere (Western Hemisphere Convention) included clauses which called on Party nations to establish protected areas. However neither referred to specific sites.

More recently a range of international agreements and programmes which designate or recognize specific protected areas has emerged. For example, the Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention) and the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention) have

Table 3: Examples of conventions and programmes with a commitment to establishing protected areas

Initiative	Geographical coverage
Article 8a of the Convention on Biological Diversity	Global
Article X of the African Convention	Africa
Article II of the Western Hemisphere Convention	Americas
Convention for the Conservation of Biodiversity and Protection of Wilderness Areas in Central America	Central America
Article 13 of the ASEAN (Association of Southeast Asian Nations) Declaration	Southeast Asia
Article 14 of the Convention for the Protection of the Natural Resources and Environment of the South Pacific Region	South Pacific
Convention on Conservation of Nature in the South Pacific	South Pacific
Other regional seas agreements, including southeast Pacific and eastern Africa	Various
Pan-European Biological and Landscape Diversity Strategy	European

both developed lists of specific sites where governments have made commitments to protection under the convention, adding an important international dimension to protected areas. A range of other global and regional agreements and programmes also designate specific protected areas. These are summarized in Table 2.

Although the legal standing of such international agreements is often ambiguous or non-binding, the fact that governments have made an international commitment has in practice proved an extra incentive for the site's good management. With many of these agreements there is also a considerable element of prestige associated with the acceptance of international recognition which may provide a powerful factor in strengthening protection.

Information on each of these agreements and programmes, and on the sites that they recognize, is readily available. However, there is currently no single source of information on all of them, and no global comparative analysis, although information is available on the relationship between specific instruments (for example, Ramsar sites and biosphere reserves).

While each of the different conventions and programmes serves a different purpose, there are numerous cases where individual sites have designations under several international and/or regional agreements.

Collaborative programmes exist at both national and international levels between and amongst a range of agreements and programmes, and there are in many cases signed agreements. A good example is the agreed programme of joint work between Ramsar sites and biosphere reserves. However both joint programmes and the signed agreements are almost exclusively bilateral. Each of the different conventions and programmes discussed has a different nomination form and process, and monitoring and reporting requirements vary widely. Aside from these bilateral efforts, the synergies involved in multiple designations, and the potential problems or opportunities these may present, would benefit from further consideration.

A number of other international agreements also recognize and promote the importance of protected areas without necessarily identifying or designating individual sites. These can be important because of the influence that they have on the development of national protected area systems. For example, the African Convention, and its precursor the London Convention, have clearly had a major impact on the development of protected areas in Africa, as evidenced by the extent to which the definitions of protected areas used in the Convention text have been incorporated into national protected area systems.

Such initiatives can give a tremendous boost to national systems of protected areas (for example, through increased funding from national or multilateral sources),

and in particular to those sites which additionally receive international recognition for whatever reason. However, the plethora of initiatives recognizing individual sites can potentially cause confusion and increase the burden on site and system managers.

Three approaches to increasing coordination might be considered and could be stimulated or coordinated by the CBD:

- ❑ A multi-stakeholder review of the relationships between different international initiatives that relate to protected areas, as a potential means to promote their integrated application at the national level.
- ❑ A review of the nomination and reporting mechanisms for those initiatives that designate or recognize specific sites, so as to seek harmonization and streamlining and so reduce the burden on site and system managers.
- ❑ Development of the UN List and associated data-holding and dissemination facilities as key tools for reporting to a range of international initiatives on national efforts to comply with international calls for improved protected area networks.



S. Chape



Protected areas and sustainable development

VALUES AND BENEFITS OF PROTECTED AREAS

Protected areas are the cornerstones of all national and regional biodiversity conservation strategies. Now that they also represent one of the largest land allocations, governments and other stakeholders are increasingly demanding accurate reports of both their material and non-material values.

Biodiversity itself carries a high socio-economic value. We benefit directly from the genetic potential in plant and animal species, a significant proportion of which are now reliant on protected areas. But protected areas play a number of other key social and economic roles. They give many indigenous and local peoples vital protection and space where they can continue traditional lifestyles that are now often impossible elsewhere. A disproportionate amount of the world's drinking water comes from forest protected areas (for instance a third of the world's hundred largest cities draw a substantial proportion of their drinking water from protected areas). Marine protected areas provide fish breeding grounds and thus maintain fisheries: in consequence they are often supported by local fishing communities. Parks and reserves are important 'green lungs', providing space for people to enjoy recreation. They help to protect cultural and spiritual values. They are also increasingly recognized

for their role in mitigating climate change by sequestering carbon and by buffering countries against impacts such as sea-level rise and extreme weather events. The values of a national protected area network are thus more than the traditional issues of wildlife conservation and extend, spatially, far beyond the boundaries of the sites.

IUCN suggests that the main purposes of protected areas can be summarized as:

- ☐ scientific research
- ☐ wilderness protection
- ☐ preservation of species and genetic diversity
- ☐ maintenance of environmental services
- ☐ protection of specific natural and cultural features
- ☐ tourism and recreation
- ☐ education
- ☐ sustainable use of resources from natural ecosystems
- ☐ maintenance of cultural and traditional attributes.

Attempts to place a value on protected areas must therefore consider many of the activities associated with human existence. Consideration of ecosystem 'goods and services' has been the rationale behind a number of recent reviews of ecosystems and forms the basis for the Integrated

Ecosystem Assessment underpinning the Millennium Ecosystem Assessment. Quantitative values of protected areas are increasingly used to justify and support the development of protected area networks. Information on the value of protected areas to different user groups is also important in avoiding threats or conflicts. The most powerful arguments in many circles are economic.

At present ecosystem services are seldom recognized or 'captured' in commercial markets and are thus often given too little weight in policy decisions. However, this may be changing. Efforts to include natural resource accounting into national income accounts, taking into consideration the use and depletion of natural resources, have moved from the fringes towards the mainstream of economics. The concept of total economic value (TEV) has been widely used to attempt to convert all values and benefits into economic terms (see Box 2).

Great advances have been made in assigning economic values to protection, particularly in the case of more easily measurable benefits. For example, we now

Box 2: Total economic value

Total economic value (TEV) assessments attempt to find economic values for both present and future uses of protected areas, and divide these into a number of different categories

Use values

- Direct use values such as grazing, harvesting, tourism and research.
- Indirect use values like carbon sequestration and replenishment of water supplies.
- Option values, assigned to future direct and indirect uses, for example genetic resources and protection of climate change refugia.

Non-use values

- Existence values including aesthetic, spiritual and cultural.
- Bequest values (use and non-use) as a legacy to future generations.

know that national parks protecting Jakarta's watersheds supply the city with water worth \$1.5 billion. Protected area tourism in Canada and the United States was estimated to be worth between \$237 billion and \$370 billion in 1996. Such calculations have helped to develop payment for environmental services (PES) schemes where, for example, water companies pay a proportion of protected area

management costs to protect the quality of their water supply. PES schemes are helping to support protected areas in Quito, Ecuador, and in Guatemala, for example.

However, many protected area values are notoriously difficult to capture in economic terms. Certain natural features can be of irreplaceable spiritual value to particular communities, or even to major faiths, but these are hard to quantify. On the other hand, the general public tends to place considerable importance on the intangible values of protected areas, even when these are not considered at political and economic levels. Such values may be perceived in personal, cultural, or societal terms. In these cases there may be less urgency to devise a monetary value, provided such values are still given due consideration. The wider arguments for protected areas are increasingly being recognized: this is an essential step in mainstreaming protected areas into wider sustainable development strategies.

ROLE OF PROTECTED AREAS IN POVERTY ALLEVIATION AND SUSTAINABLE DEVELOPMENT

Many protected areas occur in parts of a country farthest removed from mainstream developments. Not surprisingly, these remote but nature-rich areas also support some of the least economically prosperous segments of the human population, making the linkage between nature conservation and poverty alleviation especially challenging. Recently, a strong consensus has developed that protected areas need to make a solid contribution to poverty alleviation, going far beyond simply doing no harm.

People living in rural areas have long depended on natural resources. Local communities are likely to support protected areas to the extent that such areas continue to provide benefits to them, especially in the form of continued availability of resources. Commodities such as animal skins, bamboo, construction materials, firewood, fish, game meat, honey, medicinal plants, resins and timber have been harvested for thousands of years. Local people have often developed mechanisms for managing these resources sustainably and allocating benefits.

Properly managed tourism in protected areas can also bring considerable income without threatening the natural resource base. More important still are the ecological services protected areas can provide. Particularly important services at the community level include soil regeneration, nutrient cycling, pollination, recreation, pure water and maintenance of harvestable resources. Such benefits are difficult to quantify and even local people may take them for granted.

Increasing population levels, more sophisticated technology, and changing social, economic and political structures have removed many traditional controls on

resources management. If sustainable benefits are to be provided to local communities (a primary objective of development), more effective controls may be required to ensure that populations of plants and animals are maintained at viable and productive levels: the means to do so will vary, but management for sustainable development should be based on four main principles:

- ❑ The major functions of protected areas deliver different benefits at different scales: many public goods benefits of protected areas provide significant advantages for the global community, but capturing appropriate compensation at the national or local level remains a challenge.
- ❑ Many stakeholders have interests in protected areas and important roles to play in their management: however, different stakeholders tend to have different motivations, so that the way the resources of a protected area are used is the result of accommodation among conflicting interests.
- ❑ The major problems facing protected areas need to be addressed by institutions at the appropriate scale, with appropriate roles: in general, local people possessing secure tenure can deal with most day-to-day threats better than governments, while governments can resist major abuses better than local people (providing they have the resources and political will).
- ❑ Protected areas are best conceived as parts of a national system of land use: some sites are designed to provide primarily national benefits, which may range from watershed protection to generating international tourist arrivals, while some are designed primarily to meet the needs of local people, ranging from food supply to recreation to employment, and others designed primarily to conserve biological diversity.

GOVERNANCE AND CRITICAL LINKS BETWEEN PEOPLE AND PROTECTED AREAS

Governance is about power, relationships, responsibility and accountability. Some define it as 'the interactions among structures, processes and traditions that determine how power is exercised, how decisions are taken on issues of public concern, and how citizens or other stakeholders have their say'. In a protected area context, a basic understanding of governance refers to 'who holds management authority and responsibility and can be held accountable according to legal, customary or otherwise legitimate rights'. In this sense, governance is crucial for the achievement of protected area objectives (management effectiveness), determines the sharing of relevant cost and benefits (management equity), is key to preventing or

solving social conflicts, and affects the generation and sustenance of community, political and financial support. The management of protected areas (PAs) has often been based on models that exclude the local resident populations and perceive their concerns as incompatible with conservation. While the IUCN PA categories V and VI are conceived to be more inclusive of human communities, virtually all IUCN categories can be compatible with resident or user communities.

Four main PA governance 'types' can be identified:

- ❑ government-managed protected areas
- ❑ co-managed protected areas
- ❑ private protected areas
- ❑ community-conserved areas.



Law Cheng Tean/UNEP/Topham

The Vth World Parks Congress issued a declaration that squarely put indigenous peoples and local communities at the centre of conservation planning and emphasized the need to see protected areas in a wider context, addressing issues of poverty and development, governance and empowerment, benefit- and cost-sharing. It is instructive that the CBD Parties are also considering the endorsement of such a participatory approach in the proposed programme of work on protected areas.

Participatory conservation has become an imperative element in conservation planning because of the negative impacts that protected areas have had on many local communities (for example when they have had to be relocated, losing access to resources and sites of cultural value, and through human rights violations), leading to hostility and loss of public support. In most situations, communities have customary and traditional rights to land and resources, and the denial of these rights is unjust and violates basic human rights. Local people

often have long-standing traditions of conservation and restrained resource use, which traditional models of protected areas tend to ignore, thus losing the opportunity to use this knowledge and to convert conservation into a truly mass movement.

Evidence from around the world suggests that these issues can be tackled effectively by involving indigenous peoples and local communities in the conceptualization and management of protected areas.

There are two broad trends in participatory conservation: the increasing role of indigenous peoples and local communities in the management of government-managed protected areas (known as collaborative

elements in success include provision of secure tenure to survival and livelihood resources and an early clarification of roles, including especially the customary/traditional rights of local communities.

Most successful exercises in participatory approaches start with dialogue amongst the various stakeholders and a focus on encouraging ecologically sensitive livelihoods, equitable distribution of costs and benefits (such as human-wildlife conflicts) and the creation of institutions – such as joint management boards or village conservation committees – which are empowered to represent local people in decision-making. Initiatives need clear legal backing, good dispute resolution mechanisms,

Box 3: Collaborative protected area management and community-conserved areas

Gurig National Park (Australia)

In 1981, the establishment of Gurig National Park was agreed to by the Northern Territory Government and the Aboriginal traditional owners to resolve a land claim under the Aboriginal Land Rights Act. The traditional owners consented to the establishment of the National Park in return for regaining title and rights of use and occupation. A Board of Management of traditional land owners and state government representatives prepares management plans, enforces the rights of local owners, determines rights of access to others, and ensures protection of sites important for the Aboriginal population.

Mendha-Lekha and Jardhargaoon (India)

Mendha-Lekha village in central India protects nearly 2 000 hectares of forest containing threatened wildlife species. The forest belongs to the state, but it is the village that has staved off threats including timber logging and submergence by a dam. The inhabitants have declared 'tribal self-rule', and practise a strong form of consensus democracy involving all adult members. Jardhargaoon village in the Himalayan foothills has protected 600 hectares of broadleaved forest for two decades through a self-initiated Forest Protection Committee. These examples represent thousands of community conservation areas across South Asia, mostly outside government protected area systems.

management of protected areas) and recognition of the biodiversity significance of territories managed by such peoples and communities largely on their own (community-conserved areas). Of these two trends, the concept of community-conserved areas is relatively new. It refers to sites of biodiversity significance that are effectively conserved by indigenous peoples or local communities and which may pre-date modern protected areas by hundreds or even thousands of years.

There are probably thousands of such community-conserved areas around the world, yet they are largely neglected by governments and international conservation non-governmental organizations (NGOs). Examples of both are given in Box 3.

Within protected area management, participatory conservation remains a relatively new approach, although many lessons can be learnt by studying the wise use of resources by communities around the world. Important

transparency in information-sharing and usually also a capacity-building element. Management needs to be site-specific, based on traditional knowledge if possible and sensitive to cultural and spiritual values, and needs to be monitored and adapted as necessary, treating conservation as a process rather than a project. It can draw on experience from a range of many models including collaborative management, community control and private reserves.

The CBD could help develop such approaches, perhaps through working with State Parties to document and learn lessons from existing initiatives, including successes and failures, inviting indigenous peoples and local community organizations, NGOs and individual experts to provide evidence and ideas that would help build strong national programmes. State Parties could also be invited to adopt or strengthen policies, laws and programmes of participatory conservation, and to recognize the importance of community conservation areas.



Global action on protected areas

THE LAST 100 YEARS: AN INCREASE IN GLOBAL COMMITMENT

Over the course of a century, interest in protected areas has grown from the dream of a few far-seeing individuals and politicians to a commitment by governments and the international community, and increasingly also by civil society.

Although the London Convention in 1933 and the Western Hemisphere Convention in 1940 proposed definitions of protected areas, in many ways 1959 was the benchmark year in the global recognition of protected areas. A UN Economic and Social Council (ECOSOC) resolution noted that: 'national parks and reserves... contribute to the inspiration, culture and welfare of mankind' and 'national parks are valuable for economic and scientific reasons and also as areas for the future preservation of fauna and flora and geologic structures in their natural state...'. In just over four decades since the ECOSOC resolution, the global protected areas network has been transformed. Box 4 outlines some of the major political steps along the way.

PROTECTED AREAS IN GLOBAL ENVIRONMENTAL AGENDAS

As one of the major natural resource use allocations on the planet, it is not surprising that international commitment to protected areas has become a key indicator for environmental monitoring. In turn, the continuing establishment

of protected areas by governments, communities and the private sector reflects growing concern that the world's ecosystems, and the biodiversity that they contain and the services that they provide, are coming under increasing threat. The adequacy of protected areas coverage and effectiveness is an important barometer of human commitment to conservation and sustainable development and a cornerstone of the CBD ecosystem approach.

Two current global initiatives being implemented by governments through UN processes reflect the increased recognition of the importance of biodiversity conservation and protected areas: the WSSD Plan of Implementation (2010/2012 Targets) and the Millennium Development Goals. Within the framework of significantly reducing 'the current rate of biodiversity loss at global, regional and national levels' the WSSD Plan of Implementation has specific directives and implications for protected areas, including:

- ❑ Establishment of a representative system of marine protected areas by 2012.
- ❑ Support for the key role of the CBD, including its implementation through global, regional and national action programmes.
- ❑ Promotion of international support and partnership for biodiversity, including through World Heritage sites and protection of endangered species.
- ❑ Promotion and implementation of the ecosystem approach.

- ❑ Promotion and support for conservation 'hot spot' initiatives, and ecological networks.
- ❑ Support for developing countries in enhancing indigenous and community-based biodiversity conservation efforts.
- ❑ Involvement of all stakeholders in conservation and sustainable use of biodiversity.
- ❑ Promotion of transboundary conservation areas.

The eight Millennium Development Goals are an ambitious agenda for reducing poverty and improving lives that world leaders agreed on at the Millennium Summit in September 2000. For each goal one or more targets has been set, most for 2015, using 1990 as the benchmark year. Goal 7: Ensuring Environmental Sustainability has direct relevance to protected areas, and includes:

Target 9: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources. Importantly, one of the key indicators for this target is Indicator 26: the ratio of area protected to surface area at national and global levels.

THE DURBAN ACCORD AND ACTION PLAN

The Vth World Parks Congress, which took place in Durban, South Africa, in September 2003, was the largest ever gathering of protected area professionals from both government and private sectors – around 3 000 delegates from

every part of the world for 10 days of workshops, discussions and frequently impassioned debate. The resulting Durban Accord and Action Plan, drafted and agreed at the Congress, are therefore documents with an extremely high level of participation from governments, non-governmental organizations and from the professional cadre of rangers, managers and scientists charged with managing the world's protected areas network on a day-to-day basis.

The Accord called for a 'new paradigm for protected areas' and noted that 'this approach demands the maintenance and enhancement of our core conservation goals, equitably integrating them with the interests of all affected people. In this way the synergy between conservation, the maintenance of life-support systems and sustainable development is forged. We see protected areas as a vital means to achieve this synergy efficiently and cost effectively...'

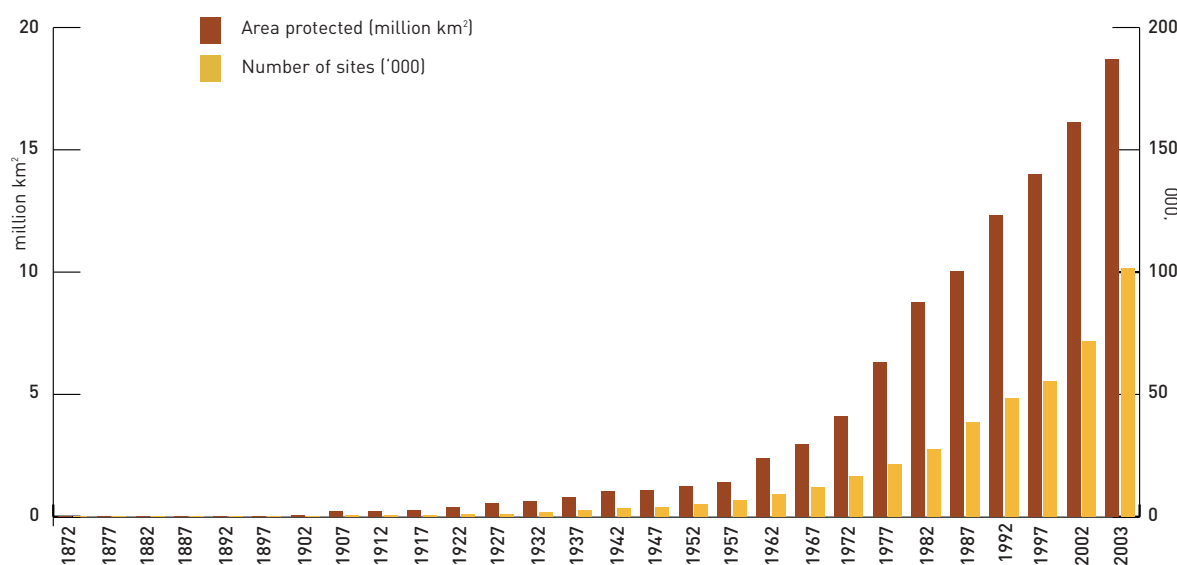
The Durban Action Plan built on the challenges identified in the Accord and agreed 10 desired outcomes, backed up by 14 key targets. These targets to the world have already been noted by the CBD in its preparations for the Seventh Meeting of the Conference of the Parties (COP 7). They will form the framework for the work of the global protected areas community over the next decade and beyond. Outcomes and targets are summarized below.

Outcome 1:

Protected areas' critical role in global biodiversity conservation fulfilled

- ❑ Key Target 1: specific action by the Convention on

Figure 1: Growth of protected areas, 1872-2003



Biological Diversity to improve the role of protected areas in biodiversity conservation.

❑ Key Target 2: specific action by all signatories to the World Heritage Convention to improve the role of World Heritage sites in biodiversity conservation.

Outcome 2:

Protected areas' fundamental role in sustainable development implemented

❑ Key Target 3: action taken to ensure that protected areas strive to alleviate poverty and in no case to exacerbate poverty.

Outcome 3:

A global system of protected areas linked to the surrounding landscapes and seascapes achieved

❑ Key Target 4: system of protected areas representing all the world's ecosystems completed by 2010.

❑ Key Target 5: all protected areas linked into wider ecological/environmental systems on land and at sea by 2015.

Outcome 4:

Improved quality, effectiveness and reporting of protected area management in place

❑ Key Target 6: all protected areas to have effective management in existence by 2015.

❑ Key Target 7: all protected areas to have effective capacity to manage.

Outcome 5:

The rights of indigenous peoples, mobile peoples

Box 4: Milestones in the history of protected areas development

1962: First World Conference on National Parks, Seattle, United States, began a more formal worldwide movement in support of protected areas.

1963: African College of Wildlife Management at Mweka, Tanzania, established. By 2003, over 4 200 Africans had graduated from Mweka.

1967: CAMPFIRE programme began in Zimbabwe, showing how rural people can benefit economically from wildlife in a modern context, even through times of political turmoil; it is still going strong, demonstrating another form of protection.

1968: United Nations Educational, Scientific and Cultural Organization (UNESCO) Man and the Biosphere Programme began; now 440 biosphere reserves have been established in 97 countries, exceeding 2.2 million km².

1970: School for Training of Wildlife Specialists, Garoua, Cameroon, established. Designed for francophone Africa, Garoua has trained well over 3 000 people; they now run many of the protected areas in West and Central Africa and Madagascar.

1971: Ramsar Convention adopted. There are now

138 Contracting Parties to the Convention with 1 328 sites covering more than 1.1 million km².

1972: United Nations (UN) Conference on Environment and Development, Stockholm, Sweden. Endorsed new conventions affecting protected areas, and led to the establishment of the UN Environment Programme (UNEP) based in Nairobi.

1972: World Heritage Convention adopted. By 2003, 149 natural World Heritage sites and 23 mixed natural and cultural sites had been recognized, covering more than 1.5 million km².

1972: Second World Conference on National Parks, Yellowstone and Grand Teton, United States, promoted development assistance for protected areas in the tropics.

1977: Training programme for protected areas personnel established at the Tropical Agricultural Research and Higher Education Center (CATIE), Turrialba, Costa Rica; has continued until present and has provided trained staff for much of Central America.

1978: International Union for the Conservation of Nature (IUCN) system of categories of

and local communities recognized and guaranteed in relation to natural resources and biodiversity conservation

- ❑ Key Target 8: all existing and future protected areas shall be managed and established in full compliance with the rights of indigenous peoples, mobile peoples and local communities.
- ❑ Key Target 9: protected areas shall have representatives chosen by indigenous peoples and local communities in their management proportionate to their rights and interests.
- ❑ Key Target 10: participatory mechanisms for the restitution of indigenous peoples' traditional lands and territories that were incorporated in protected areas without their free and informed consent established and implemented by 2010.

Outcome 6:

Empowerment of younger generations achieved

- ❑ Key Target 11: ensure the greater participation of younger generations in the governance and management of protected areas and take action to strengthen their capacity to contribute to and expand the conservation community as a whole.

Outcome 7:

Significantly greater support for protected areas from other constituencies achieved

- ❑ Key Target 12: support achieved from all major stakeholder constituencies.

Outcome 8:

Improved forms of governance, recognizing both traditional forms and innovative approaches

protected areas published: it set logical framework for worldwide assessment of protected areas coverage; latest revision in 1994, now being promoted for other management applications.

1980: World Conservation Strategy published by IUCN, World Wildlife Fund and UNEP; popularized the concept of sustainable development and a partnership between conservation and development.

1981: Protected Areas Data Unit established by IUCN and its Commission on National Parks and Protected Areas. The World Conservation Monitoring Centre, today part of UNEP, provides first worldwide database on protected areas.

1982: Third World Congress on National Parks, Bali, Indonesia.

1987: *Our Common Future* published, the report of the UN Commission on Sustainable Development (commonly known as the Brundtland Report); it called for 12 per cent of the land to be given protected area status and advocated global action to conserve biodiversity.

1991: Global Environment Facility created by World Bank, UN Development Programme and

UNEP, providing a major new intergovernmental funding mechanism for protected areas, especially through the Convention on Biological Diversity then under negotiation.

1992: IVth World Congress on National Parks and Protected Areas, Caracas, Venezuela.

1992: The Earth Summit, Rio de Janeiro, Brazil, produced Agenda 21, and approved Convention on Biological Diversity (CBD) and Framework Convention on Climate Change, both highly relevant to protected areas.

2000: UN General Assembly approves Millennium Development Goals, with Goal 7 calling for environmental sustainability.

2002: Sixth Meeting of the Conference of the Parties to CBD adopted a Global Strategy for Plant Conservation and the Strategic Plan which commits Parties to significantly reduce the rate of biodiversity loss by 2010.

2002: World Summit on Sustainable Development, Johannesburg, South Africa, endorsed these targets and called for a system of marine protected areas to be established by 2012.

2003: Vth World Parks Congress adopts Durban Accord and Action Plan.

of great potential value for conservation, implemented

❑ Key Target 13: effective systems of governance to be implemented by all countries.

Outcome 9:

Greatly increased resources for protected areas, commensurate with their values and needs, secured

❑ Key Target 14: secure sufficient resources to identify, establish and meet the recurrent operating costs of a globally representative system of protected areas by 2010.

Outcome 10:

Improved communication and education on the role and benefits of protected areas

The Ninth Meeting of SBSTTA took these outcomes and targets into account in its recommendations to COP 7 on the proposed programme of work on protected areas.

INTERNATIONAL COLLABORATION IN MONITORING PROTECTED AREAS

The ECOSOC resolution referred to above led to the development of a list of protected areas with brief descriptions of the sites. This list was highlighted as part of a wider analysis of 'measures proposed for the conservation and amelioration of natural environments' by the 17th Session of the UN General Assembly in 1962, which initiated the formal, periodic *UN List* process.

The early United Nations recognition of protected areas, through the publication of the *List*, provided impetus to the growing momentum for governments to create them. Protected areas increased from almost 10 000 in 1962 to

more than 100 000 40 years later – only some 1 000 were initially listed as early versions of the *UN List* considered only sites larger than 10 km². Today, the resulting World Database on Protected Areas (WDPA) is the largest repository of global information on protected areas. Continuously revised, the database now contains information as two components: current spatial extent and historical details designed to support changing requirements and to facilitate more detailed analyses of the information. Online access has been provided in the last few years, creating a living List and allowing more constant updating and correcting of information.

In 2001, the World Commission on Protected Areas carried out a review of the WDPA, which resulted in the adoption of a vision and goals, outlined in Box 5.

The review also led, in June 2002, to the establishment of a consortium of cooperative WDPA stakeholders to work together to maintain and improve the database. Current members of the WDPA Consortium are:

- ❑ American Museum of Natural History
- ❑ BirdLife International
- ❑ Conservation Biology Institute
- ❑ Conservation International
- ❑ Convention on Biological Diversity Secretariat
- ❑ Fauna and Flora International
- ❑ IUCN-The World Conservation Union
- ❑ Ramsar Convention Secretariat
- ❑ The Nature Conservancy
- ❑ UNEP World Conservation Monitoring Centre
- ❑ Wildlife Conservation Society
- ❑ World Heritage Centre
- ❑ World Resources Institute
- ❑ World Wildlife Fund – WWF-US
- ❑ World Wide Fund for Nature – WWF International.

Box 5: The World Database on Protected Areas

Vision:

A widely available, accurate and up-to-date World Database on Protected Areas that is accepted as a world standard by all stakeholders (governmental, intergovernmental and non-governmental), providing the essential link to information from multiple sources on protected areas and contributing to effective resolution of protected areas planning and management issues at global, regional and national levels.

Goals:

- ❑ Readily available information on protected areas to support assessment, monitoring, decision-making and development of policy at national and international levels.
- ❑ A core database on protected areas that is internationally recognized, current and managed to international standards.
- ❑ Improved access to information on protected areas that is already available on the internet and gradual increases in the information available.
- ❑ Improved use of information and sharing of experience by protected area professionals.



The extent of the world's protected areas

Over the last few years, many governments have matched words with action and have created impressive protected area networks. The following section presents general statistics on the extent, distribution and habitat coverage of the global protected areas estate. The data are derived from the World Database on Protected Areas and are identical to data provided for the World Parks Congress in Durban in September 2003.

In all the statistics presented in this section it is important to bear in mind the following qualifications, which mainly relate to data gaps. Size is unknown for 23 per cent of protected areas in the list – this will have some impact on global and regional totals; however, most of these sites are thought to have small areas. IUCN management categories have not been assigned to 34 036 protected areas, and geographic coordinates have not been assigned to 20 634 sites. The WDPA is for the first time incorporating privately owned protected areas within the database, although coverage here is still limited.

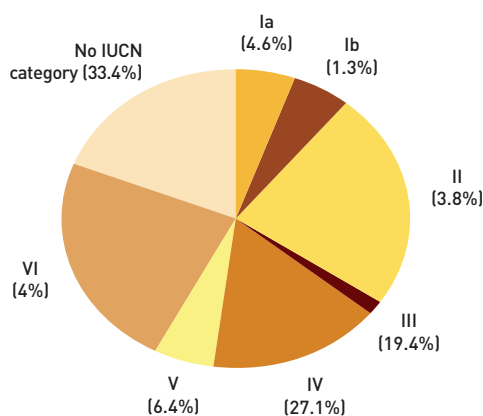
It should also be noted that maintenance of the WDPA by UNEP-WCMC and the WDPA Consortium is a dynamic process requiring continuous updating to record changes to the world's protected areas estate. Already, global

numbers in the WDPA have changed and more changes are expected, especially when countries follow through with commitments made at the Vth World Parks Congress which will result in an extra 158 000 km² under protection at the global level. The next comprehensive review of global protected areas will be released later in 2004 by UNEP-WCMC and IUCN for the World Conservation Congress through the publication *State of the World's Protected Areas*.

GLOBAL STATISTICS FROM THE WORLD DATABASE ON PROTECTED AREAS

Based on the 2003 statistics, globally there are 102 102 protected areas. This figure includes all nationally designated sites, and covers a broad range of types of protection: for instance it includes forest reserves, private reserves, strict nature reserves and national parks. The total global surface covered by these sites is some 18 764 958 km², a truly vast extent (more than five times the area of India, or greater than the area of Brazil and Canada combined) but still only representing 3.4 per cent of the planet's surface. In reality most of these areas are on land and the total terrestrial surface covered by protected areas is some 17 125 893 km², or 11.57 per cent of the total.

Figure 2: Protected areas by IUCN category, 2003
Proportions of total protected area
[% of all sites]

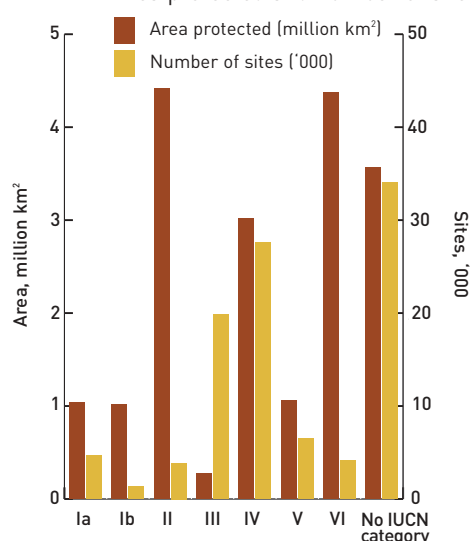


However, high numbers and large area figures do not necessarily reflect achievement of conservation objectives. Many of the world's largest protected areas lie over relatively remote and low-diversity landscapes, including ice-caps and sand deserts. These sites have a tendency to greatly skew statistics and other, highly important, habitats remain poorly protected. The figures include a broad range of levels of protection and provide no basis for assessing management effectiveness, and many sites may still be undergoing degradation or loss.

The marine environment is worthy of particular attention. The data gathered from the WDPA in 2003 enabled the first ever statistical assessment of the extent of marine areas protected. This first analysis indicates that some 1 639 065 km² of the world's ocean surface falls within protected areas. This represents 0.45 per cent of the ocean, which is a tiny figure particularly when it is noted that more than one third of the protected area is made up of two very large sites (the Great Barrier Reef and the Northwestern Hawaiian Islands). Even where they exist, regulations within marine protected areas are often inadequate for preventing damaging activities such as overfishing, while external threats are rapidly carried across site boundaries in the liquid environment.

About two thirds of the sites in the WDPA have an assigned IUCN management category (Figures 2 and 3). Of these sites the most numerous are category III natural monuments and category IV habitat/species management areas. In terms of area occupied, category II national parks (average area 1 138 km²) and category VI managed

Figure 3: Protected areas by IUCN category, 2003
Area protected and number of sites



resource protected areas (average area 1 062 km²) are the dominant categories, making up almost 47 per cent of all protected areas. The categories offering the strictest protection from outside influence (categories Ia and Ib) make up a much smaller proportion of both the number and area of the sites.

There is considerable variation in protection provided in different parts of the world (Figure 4). The Pacific region is the least protected of all regions, with only a very small part of its land surface covered by protected areas. Levels of protection are also low in a sweep across the 'Old World' from North Africa and the Middle East, across South Asia and into East Asia. By contrast levels of protection, at least on paper, are very high indeed for Central and South America. The figure for North America, though large, is somewhat skewed by the influence of the world's largest protected area, the Northeast Greenland National Park. Under the terms of protection provided under the Antarctic Treaty it could be argued that the whole of Antarctica be considered a protected area, although currently only a small number of sites are listed in the WDPA: mostly marine and small island locations away from the main continental area.

From the origins of the first modern protected areas in the latter half of the 19th century the growth towards today's global network was at first quite slow. By 1915, some 250 000 km² had been set aside for protection (for comparison, the Great Barrier Reef Marine Park is some 345 000 km²). Just over 1 million km² had been set aside by 1940. By 1970 this figure was over 3.5 million, but

by 2003 it had grown to 18 million: there was approximately a ten-fold increase in protection between the First World Conference on National Parks in 1962 and the Vth World Parks Congress in 2003.

GLOBAL PROTECTION BASED ON HABITAT ANALYSES

The fact that global coverage of protected areas exceeds 11 per cent of land cover is an historic achievement and should be a justifiable source of pride to both national governments and to the international community. When IUCN first proposed 10 per cent coverage as the minimum level of conservation for each biome, it was widely regarded as an impossible dream. But does this mean that the world's protected areas network is 'finished'? Unfortunately, as noted above, protection is not proportionately representative and some ecosystems and some species remain largely outside the protected areas network. Indeed, it has generally proved easier to protect low-biodiversity areas, such as deserts, tundra and ice-caps, than, for example, economically productive forests or lowland plains. There are also wider questions about the effectiveness of the system, which are discussed later.

As part of its 2003 assessment, UNEP-WCMC analysed protected areas data as far as possible by habitat type to give a first assessment of how evenly distributed protection was in different regions and different ecosystems. Initial comparisons were made using the framework developed by Miklos Udvardy for UNESCO/IUCN

in 1975 which classifies the world into eight biogeographic realms, 203 biogeographic provinces and 14 biomes.

The use of terrestrial biomes in particular provides a valuable indicator, and is also an important measure of progress as the same system has been used for many years by a number of protected area analyses. In the latest assessment it has been shown that nine of the 14 terrestrial biomes in the Udvardy system have now met or exceeded the target of 10 per cent representativeness. By contrast, the biomes falling well behind the global average include temperate grasslands and lake systems, while temperate needleleaf forests and temperate broadleaf forests are also both below 10 per cent coverage using the Udvardy system. It is important to realise, however, that biomes provide only a crude measure of 'potential' natural vegetation or habitat at a coarse level. They do not reflect the vast areas of land now altered by human activities, and they do not provide sufficiently detailed resolution to pick up fine-scale variation in habitat.

Increasingly, new, global-level land-cover maps are enabling a more detailed analysis of the actual habitats protected. UNEP-WCMC therefore carried out a second analysis using these new maps which appears to show similar, but perhaps slightly higher, levels of protection for the same biomes or habitats. This was a draft analysis and work is currently under way to rework this study using a more recent and reliable land-cover map.

However, these findings are still of considerable

Figure 4: Protected areas by WCPA region, 2003

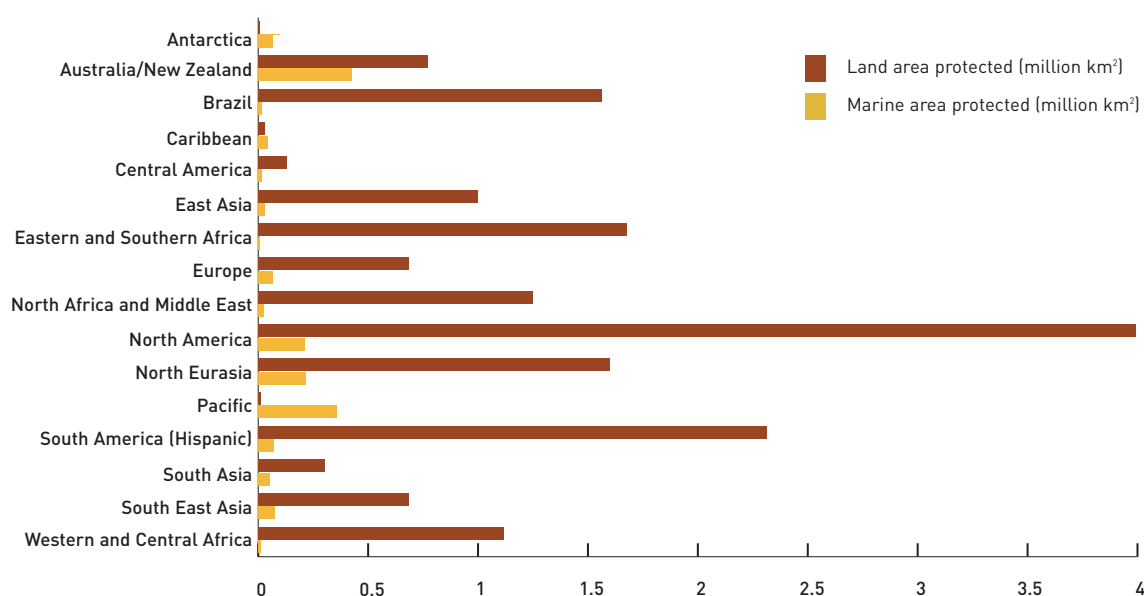


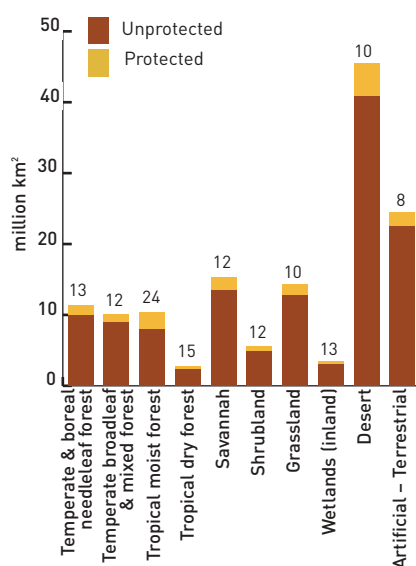
Table 4: Major habitat types, their global coverage and the areas protected (in all sites including IUCN categories I-VI and unassigned)

Habitat type	Total habitat area (km ²)	Protected area (km ²)	Percentage protected
Temperate and boreal needleleaf forest	11 425 000	1 514 000	13.3
Temperate broadleaf and mixed forest	10 180 000	1 240 000	12.2
Tropical moist forest	10 392 000	2 471 000	23.8
Tropical dry forest	2 716 000	399 000	14.7
Savannah	15 368 000	1 878 000	12.2
Shrubland	5 611 000	692 000	12.3
Grassland	14 284 000	1 478 000	10.3
Wetlands (inland)	3 429 000	434 000	12.7
Desert	45 474 000	4 589 000	10.1
Caspian Sea	375 000	4 000	1.1
Marine	361 800 000	1 637 000	0.5
Artificial – terrestrial	24 421 000	1 880 000	7.7
Artificial – aquatic	3 167 000	170 000	5.4

For this analysis the global land-cover characterization (GLCC) was used. This classification is based primarily on unsupervised 1-km AVHRR (advanced very high resolution radiometer) 10-day NDVI (normalized difference vegetation index) composites. The source imagery dates from the early 1990s, and there have also been some problems with the classification. In a series of new assessments, UNEP-WCMC will redo this analysis with updates to the World Database on Protected Areas undertaken after the Vth World Parks Congress and using data from the Global Land Cover 2000 Project, which also gives ca. 1-km resolution coverage taken from SPOT imagery, but based on images from the year 2000.

interest, and are presented in Table 4 and Figure 5. It is important to point out that the two datasets are not strictly comparable and that the actual land-cover data should not

Figure 5: Terrestrial habitat protection, 2003
(% protected)



be used for target-setting. The global protected areas estate is being established over a series of habitats which are all diminishing in total area through time. Even with no further increases in the total protected area, the removal of surrounding habitat will mean that the proportion of remaining habitat that they represent will continue to increase over time. This explains, at least in part, the discrepancies between the Udvardy biome analysis and an actual land-cover analysis. Most of the biomes listed, including the poorly protected temperate grasslands and forests, have been subject to considerable modification and loss, and so the apparently high levels of protection shown up in the land-cover analysis are based on a much-reduced baseline.

In some cases it may be impossible to reach the original targets for protection due to the fact that development has proceeded further, and natural or semi-natural habitat is no longer available, but this problem might be offset by the greater amount of resources available for conservation. The issue of restoration will become increasingly important in some of these areas.

MARINE PROTECTED AREAS

Some 71 per cent of the Earth's surface is marine water, and yet marine waters are the least protected parts of the planet. IUCN defines a marine protected area as 'any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural



features, which has been reserved by law or other effective means to protect part or all of the enclosed environment’.

The first marine protected areas (MPAs) were almost certainly designated by traditional cultures as a form of fisheries regulation. Many such systems still operate in the Pacific and some have now been given legal recognition. Adopting a more modern concept, the first marine protected area was the Royal National Park in Australia, declared in 1879 (a terrestrial site, but with some marine elements and related regulations). Despite these early beginnings, the designation of marine protected areas more widely has been very slow, with the first records of marine protected areas in many other regions dating from the 1970s or later.

Most efforts to protect the marine environment have focused on coastal and continental shelf waters. Although these areas are highly productive and are important both to people and to biodiversity, the biodiversity, productivity and endemism values of other areas – notably areas of regular upwelling, deep ocean systems, hydrothermal vent communities (first discovered in 1977) and seamounts – is increasingly being recognized.

Globally there are now an estimated 4 116 MPAs and, in the first ever assessment of its kind, UNEP-WCMC has estimated that these sites cover some 1 639 065 km² of ocean surface. Table 5 gives a breakdown of these MPAs by IUCN category. In terms of area covered, the predominant management category is category VI, although this figure is clearly skewed by two very large sites. The Great Barrier Reef Marine Park (GBRMP) and the Northwest Hawaiian Islands Coral Reef Ecosystem Reserve together make up over 680 000 km², or 41 per cent of the entire marine protected areas estate (0.2 per cent of the global ocean surface). However, the total area of the GBRMP has been subdivided into categories Ia (0.1 per cent), II (4.6 per cent),

IV (0.7 per cent) and VI (94.6 per cent), based on the management objectives and legally defined zones. Such large sites are a major feature of the global MPA list; however, many offer only low levels of protection, although an increasing number are zoned with some areas at least offering more comprehensive protection.

There remains considerable variation in the application of MPAs in different regions. Australia/New Zealand has the greatest extent of MPAs, amounting to over 3 per cent of the economic exclusion zone (EEZ) of this region. Although heavily weighted by the influence of the Great Barrier Reef, there are a large number of other sites, some quite big, throughout this region. While Europe has

Table 5: Marine protected areas by IUCN category

IUCN category	Number of sites	Total marine area (km²)	Proportion of global ocean area (%)
I-VI		1 577 883	0.44
Ia	419	189 439	0.05
Ib	49	5 916	0.00
II	666	279 654	0.08
III	133	3 819	0.00
IV	1 494	305 329	0.08
V	571	73 279	0.02
VI	159	809 354	0.22
No category	625	66 400	0.02
Total	4 116	1 639 065	0.45

These numbers have been corrected to avoid the problem of double counting where designations overlap, hence the sum of the individual categories gives a slightly higher total than the actual total figures provided here.

Table 6: Marine protected areas by WCPA region

WCPA region	Number of sites	Marine area protected (km ²)	Approximate marine area in WCPA region (km ²)	Marine area protected [%]
Antarctic	59	65 093		
Australia/New Zealand	437	423 350	12 398 000	3.4
Brazil	83	14 190	3 661 000	0.4
Caribbean	357	42 037	3 976 000	1.1
Central America	104	16 018	1 501 000	1.1
East Asia	283	31 389	5 523 000	0.6
Eastern and Southern Africa	139	5 317	8 339 000	0.1
Europe	848	67 490	9 548 000	0.7
North Africa and Middle East	134	23 542	3 459 000	0.7
North America	695	212 125	17 740 000	1.2
North Eurasia	82	217 839	7 719 000	2.8
Pacific	168	357 203	32 372 000	1.1
South America	115	72 209	8 432 000	0.9
South Asia	184	5 160	4 692 000	0.1
South East Asia	387	75 934	8 652 000	0.9
Western and Central Africa	41	10 169	3 606 000	0.3

the largest number of sites, the average marine area covered by them remains small. The Indian Ocean represents perhaps the least protected region in the world, with both Southern and Eastern Africa and the South Asia region recording only 0.1 per cent of their EEZ areas protected (see Table 6).

Despite the poor coverage, there is now strong recognition of the values of marine protected areas to a broad range of stakeholders. The establishment of no-take areas (where all fishing is excluded), has now been shown to pay dividends in examples around the world, particularly in areas of overfishing. Fish stocks quickly recover not only within the protected area but in the surrounding region, due to both the export of larvae and the spillover of adults from the MPA, providing a considerable boost to overall catch statistics. These increases in total fish catch have been shown to continue until about 30 per cent of the total fishing area is taken out of production, giving a watertight argument for MPA establishment, with massive socio-economic benefits irrespective of biodiversity concerns. Similarly, protection of key nursery areas can be of great value to offshore fisheries, while greater protection efforts are also leading to a growth in economically valuable recreational uses including scuba-diving, whale-watching and sport fishing. As the broad societal benefits of such protection are increasingly recognized it is hoped that efforts to protect the marine environment may be given a considerable boost in the coming years.

Of course fisheries controls are just one concern of MPAs, and many sites are threatened by other factors, including those widespread in all protected areas: paper parks and failures in design. External threats are a particular problem in a liquid environment, where toxic pollutants, nutrients, diseases and physical contaminants (from solid waste to sediment) are rapidly carried into protected areas. These threats may be ameliorated in sites that incorporate substantial land areas adjacent to the sea.

A further concern is the failure to protect international waters. From a political perspective about 63 per cent of the world's ocean area (44 per cent of the surface of the planet) lies beyond 200 nautical miles of any coastline and hence beyond claims of national jurisdiction. Existing MPAs, by contrast, largely lie within the 3-12 nautical mile territorial waters of a nation's coastline, while a few, typically the very largest sites, extend into the 200 nm zone. There are no MPAs in truly international waters and indeed the approaches required to set up such international waters MPAs have yet to be established. Possible approaches to such action may be within the framework of the UN Convention on the Law of the Sea, or the Convention on Biological Diversity, or perhaps through regional agreements such as fisheries conventions.

INLAND AQUATIC ECOSYSTEMS

Inland waters are currently in a very poor condition. Future extinction rates are expected to be five times higher for

freshwater animals than for terrestrial species. With population growth, industrialization and the expansion of irrigated agriculture, water availability will be one of the major challenges facing human society in the 21st century, and lack of water will be one of the key factors limiting development, significantly increasing pressures on inland water ecosystems. Inland water ecosystems are also greatly vulnerable to the impacts of climate change.

Lack of protection is exacerbated by lack of information. Inventories of inland aquatic ecosystems are incomplete, inconsistent in coverage and difficult to undertake. The status and trends of biodiversity in inland water ecosystems has recently been reviewed for the CBD. This review concluded that, based on existing information, it is not possible to estimate reliably the total extent of wetlands at a global scale. A rough global estimate, including coastal wetlands in some countries, is about 12.8 million km² for the total extent of aquatic ecosystems.

Global figures for different inland wetland types are also not generally available, mainly due to problems with standardizing terminology and the lack of inventory data. Of 206 countries or territories for which the state of inventory was assessed, only 7 per cent had adequate or good national inventory coverage. Of the remainder, 69 per cent had only partial coverage, and 24 per cent had little or no national wetland inventory. Vegetated wetlands cover perhaps 6.6 per cent of the global land area (excluding Antarctica and Greenland), and lakes and reservoirs cover 2.1 per cent. There is very poor data availability for the extent of river habitats which, if small tributaries and streams were to be included, would be significant, but the extent of degradation is generally high.

The most systematic registry of protected areas for wetland ecosystems, including inland waters, is the list of Wetlands of International Importance under the Convention on Wetlands (Ramsar Convention). There are presently 138 Contracting Parties to the Convention, with 1 328 wetland sites, totalling 1.12 million km². Of course these sites include non-wetland areas and marine areas, and so this figure cannot be directly compared with wetland area estimates.

The proportion of freshwater area protected (as opposed to total area) is certainly higher than for marine ecosystems, but it is noteworthy that inland waters are under even greater threat. There are problems relating to inconsistencies in regional coverage, and variations in the level of protection afforded. External threats, arising from activities outside the protected areas, are a particular problem as inland waters are often highly dynamic and all activities within the catchment can have an impact on a site. For example, water pollution or abstraction upstream will

result in downstream impacts upon 'protected areas' in rivers. Likewise, soil erosion in the catchment of a lake will undermine the effectiveness of lake protection.

The ecosystem approach is therefore particularly essential to the effectiveness of freshwater protected areas. With larger catchments, significant transboundary considerations are also often involved. Transboundary cooperation remains a significant challenge in many regions. Inland water ecosystems are also characterized by a high proportion of migratory species. This makes protected area networks very important.

Human dependency on the biological diversity of inland water ecosystems is seriously underestimated worldwide. In developed countries, *in situ* uses of inland waters include sport and recreation, and especially recreational fisheries. Here, powerful interest groups have emerged that have already stimulated public demand for the rehabilitation of inland waters in many areas, including the establishment of protected areas at the local level. However, the direct dependency of people on freshwater biodiversity is most significant in rural areas of developing countries. It is particularly marked, for example, on the floodplains of the world's major river systems, such as the lower Ganges River.

The most comprehensive guidelines for the design, location, establishment and management of protected areas for inland water ecosystems are provided under the Convention on Wetlands. The Convention on Biological Diversity and the Convention on Wetlands work closely together through a joint work programme.



S. Chape



Key issues

Despite the apparent growth in the number of protected areas worldwide, we know that species are still becoming extinct and habitat lost at an alarming rate, and that the integrity and viability of many conservation areas is under threat from numerous interventions. A study produced for the 2003 World Parks Congress in Durban by Conservation International overlaid maps of species distribution with those of the global protected areas network. With range maps of some 11 171 species, including 1 183 globally threatened birds, 4 734 mammals and 5 254 amphibian species, they showed that more than 1 300 of these species (12 per cent of the total) were not protected in any part of their range. Taking just the threatened species from this selection, they showed that 831 (23 per cent of the threatened subset) were not protected. Clearly, there are many issues masked by the simple statistics of number and extent of protected areas.

This section looks at a range of critical issues that the Convention on Biological Diversity needs to address, starting with the threats that many protected areas face and how these might be tackled through issues of design, current and future partners and the vexed question of funding.

THREATS TO PROTECTED AREAS

The strategy of setting aside areas of land, water and sea in protected areas is rooted in the assumption that these areas are permanent: that the biological, cultural and aesthetic

values that they contain will be protected for the foreseeable future. Unfortunately, this is not necessarily true. Protected areas that appear in government statistics and on maps are not always in place on the ground: they are so-called 'paper parks'. Others have been badly designed or located so that they cannot function properly.

Even many of the well-designed and properly implemented protected areas face a disheartening array of threats, ranging from the immediate impacts of poaching to subtle effects of air pollution or climate change. The quality of protected areas and associated biodiversity can suffer in many ways, ranging from the removal of key species (for example by poaching), through more general ecological damage to, in extreme cases, almost total destruction. Even if protected areas themselves remain relatively intact, they can suffer from isolation and fragmentation if surrounding land use changes or intensifies. Far from safeguarding the world's biological diversity, many protected areas are badly in need of protection themselves.

Paper parks. The first threat is simply that the protected area never gets properly implemented. Governments often announce their intention of setting up a protected area long before the legal structure is in place, and this essential element is sometimes delayed indefinitely, so that while the park exists in name it has no legal status, no staff,

no infrastructure and may not even be very clearly defined. While this 'halfway' existence may have some benefits – for example it often persuades companies to avoid the area for commercial purposes – it has nothing like the strength or effectiveness of a properly constituted park.

Shortcomings in design. More fundamentally, protected area systems need to be carefully designed to be effective at conserving biodiversity. Many of the protected areas in existence today have been poorly planned or have had their size and location constrained by political considerations, resulting in reserves that are isolated from other suitable habitat, too small, missing key components, or simply in the wrong place. Thus, the world's protected areas contain a biased and incomplete sample of biodiversity.

Bias in selection of protected areas results in an understandable tendency to select areas that are remote, unsuitable for commercial development and without a politically powerful opposition to protection. The world has many huge national parks and reserves in deserts, ice-caps, mountains and tundra. While these areas are important for their wilderness and cultural values and for some wildlife species, they can give a false impression of the adequacy of protected areas. It is far more difficult to establish protected areas in productive locations, such as timber-rich forests or fertile plains. Badly sited protected areas can also miss most biodiversity. When Hawaii's system of nature reserves was established, a prime motivation was to protect rare and endemic birds. But research has shown that many of the most threatened birds actually live outside the protected areas.

Even if they are in the right place, protected areas only work if they are also designed correctly: that is if they are large enough, the right shape and contain all necessary habitats. Small, isolated reserves are of only limited value, because the populations of many of their species will themselves be too small to survive indefinitely. In Java, the Bogor Botanical Gardens were isolated when surrounding forests were destroyed in 1936. The forest inside the gardens was maintained but the diversity of birds declined rapidly; between 1932 and 1952, 62 species of birds were recorded, but by the 1980s 20 had disappeared, four were close to extinction and five more had declined substantially.

Threats inside protected areas. The most important impact on many protected areas is major habitat change caused by infringement, often including human settlement and such factors as agricultural conversion, the impacts of fire and large-scale drainage. A critical contributory factor comes from the development of access, through transport links. Impacts from legal or illegal resource extraction are often less obvious but can be just as important, in extreme cases resulting in the disappearance of the species for which the protected area was created, whilst leaving the overall habitat intact.

Critical issues here include hunting, fishing and the wildlife trade, along with fuelwood and fodder collection, and logging, mining, and oil and gas extraction. Resource extraction can be divided between that practised by local people or park dwellers and that emerging from outside interests; sometimes the two overlap as in hunting for the commercial bushmeat trade.

In a recent analysis of threats to protected areas carried out by WWF and the World Bank, which looked at almost 200 forest protected areas around the world, the three most critical immediate threats identified by managers were poaching, encroachment and logging:

- ❑ Incursion and settlement can occur where land is scarce due to population growth or unequal land ownership.
- ❑ Incursion by nomadic people can conflict with wild animal populations.



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- ❑ Commercial plants may be cultivated illegally.
- ❑ Many of the large forest fires that affect Latin America and Southeast Asia are created to establish plantations or ranches and many in turn spread to protected areas.
- ❑ Irrigation can have serious impacts, especially on wetlands, changing water flow and salinity.
- ❑ Agricultural pollution also affects protected areas through eutrophication and pollution by pesticides and heavy metals.
- ❑ Many aquatic protected areas face problems of overfishing because of incursion by neighbouring communities or illegal fishing by larger operations, which are particularly damaging because they are carried out hurriedly by people with little interest in maintaining long-term supplies.
- ❑ Illegal or semi-legal felling of timber – for local use, local sale or for export to the international trade – threatens many forests in protected areas.

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Most illegal logging targets a few valuable species, although more wholesale clearance sometimes takes place in poorly managed protected areas or where the reserve is weakly protected by law.

- ❑ Another widespread threat is that of alien invasive species which may be released, deliberately or accidentally, within a protected area, or may move in from surrounding areas.

External threats. Problems occurring inside a park can at least theoretically be addressed by managers. However some threats come from further away and are thus beyond the direct influence of management.

Freshwater protected areas are vulnerable to threats that occur in other parts of the watershed and even in different countries. Large dams have affected several important protected areas, sometimes creating dramatic changes in ecology. By flooding existing wetlands, dams can dramatically reduce environmental richness. Pollution events can destroy many plants and animals in a short time and chronic pollution can more gradually degrade and impoverish biodiversity. Concentrated nutrients in sewage, soluble fertilizers and pulp effluent cause excessive algal growth and – when the algae die and decay – shortages of oxygen: a process known as eutrophication.

The marine environment is similarly threatened by the aquatic transport of nutrients and pollution. Coral reefs in particular appear to be highly sensitive to raised levels of nutrients in the surrounding waters, while many intertidal

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communities can be severely impacted by oil spills as well as by solid waste.

Atmospheric pollution is an important threat to both terrestrial and marine protected areas, particularly in the more developed countries. A survey in Europe identified effects on 1 300 species, including 11 mammals, 29 birds, 10 amphibians, 398 higher plants, 305 fungi, 238 lichens and 65 invertebrates. Protected areas have tended to be established on land that is less suitable for agriculture or other commercial uses and thus often on acidic or base-poor soils, where effects of acidification are generally more acute.

GLOBAL CLIMATE CHANGE

Climate change presents perhaps the greatest single challenge to protected areas and to global biodiversity. Over the coming decades its influence will reach all the globe.

Over the course of the 20th century the average surface temperature increased by 0.6°C and the rate of change is accelerating. Since the 1960s there has been an estimated 10 per cent decrease in snow cover extent and a two-week decrease in the average duration of snow and ice in the northern hemisphere. The extent of Arctic sea ice has declined 10-15 per cent since the 1950s, with a 40 per cent decline in sea-ice thickness during the late summer. Sea levels have risen during this period by between 10 and 20 cm, with a best estimate of 18 cm. Such changes have already occurred, and have been accurately measured. They tally closely with expected changes predicted from the observations of atmospheric change. Most notable has been a 31 per cent increase in atmospheric carbon dioxide since

and 88 cm. Other changes are predicted, but with lower reliability: higher precipitation in northern latitudes and the Antarctic over winter and changes in the extent, strength and distribution of droughts, forest fires, floods and storms.

The impacts of climate change on biodiversity have already been widely observed. Among the most dramatic ecosystem-level impacts seen to date are those on cloud forests where, for instance, species of frogs have declined alarmingly, and on coral reefs, many of which have suffered disastrous bleaching episodes. Of a sample of 35 butterfly species in Europe, about two thirds were found to have shifted their ranges northwards by 35-340 km during the 20th century. In the Arctic, decreases in the extent and thickness of sea ice have reduced the period polar bears can spend on the ice, a major feeding ground. Declines have already been observed in some polar bear populations.

These changes create particular challenges for protected areas management. Protected areas are static and often hemmed in by human land uses, like islands.



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the start of the industrial revolution (1750). This is largely linked to the burning of fossil fuels, with a further 25 per cent coming largely from land-use change and especially from deforestation. Other greenhouse gases have also increased, including methane and nitrous oxide. There is good evidence that these gases are now at their highest atmospheric concentrations for at least 420 000 years, and probably for 20 million years.

The best available computer models predict average temperature rises of 1.4 to 5.8°C between 1990 and 2100. Rises will be much higher over larger land areas than over the ocean and at higher latitudes in the northern hemisphere. Over the same period sea levels will rise between 9



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Such islands are to varying degrees closed off from the sorts of dynamic responses that may be required for ecosystem survival in the face of changing climates.

At the broadest level it is urgent that climate change be slowed, then halted. Although this may seem a distant goal, the fact that we have the capacity for such a task has to some degree been shown by the success of the Montreal Protocol concerning the manufacture and release of ozone-depleting substances. Efforts to slow and halt climate change are addressed by the Framework Convention on Climate Change. Although currently still undermined by a minority of major powers and large business, these efforts are at least on the international agenda.

R.Sasyniuk/UNEP/Topham



At the same time there is an urgent need to consider practical responses to the problem. Climate change will not cease immediately, even if greenhouse gas emissions can be halted. Against this background three broad responses are being considered:

Avoidance: Certain aspects of climate change may be prevented through direct physical intervention, such as building barriers to prevent flooding by sea-level rise and diverting rivers to maintain stable conditions in wetland areas. Other forms of impact avoidance might include removal of invasive species, or control of pests that benefit from climate change.

Alleviation: In other cases direct measures may allow for the amelioration of impacts. One of the most important measures, now being addressed by a number of protected area systems plans, is the concept of biological corridors. By ensuring connectivity between protected areas, the natural migration of species may be supported such that, even if a species is threatened by change in one site, changing conditions may favour its survival at another site. There is quite good evidence that certain species, notably long-lived sedentary species such as trees, may not be able to migrate as fast as the changing climatic conditions. Under certain circumstances it may be necessary to enhance natural migration to accommodate this, by transporting species to new locations where climatic conditions permit. It is only a small step from this to consider the creation of new

habitats where natural migration might not occur sufficiently quickly (e.g. islands). Conservationists are also becoming engaged in the current dialogues relating to carbon sequestration. There are a number of schemes which are proposing to create or to restore forest ecosystems as a means of offsetting carbon dioxide production. With proper planning such new habitats could provide a critical benefit for biodiversity conservation.

Adjustment: Linked to the processes of alleviation are more fundamental processes of adjusting to change. It may be necessary to 'let go' of some species or habitats from protected areas under changing conditions, allowing for drying out, flooding, emigration or immigration processes, and changing management regimes appropriately. With sea-level rise it may be appropriate to allow flooding of coastal habitats, but where possible efforts should be made to support migration rather than a squeezing of the coastal habitat zonation. These responses to climate change may appear drastic. In many cases they will not be needed for many years, perhaps decades, perhaps never. It will be necessary, in all cases, to proceed with caution: interference with natural processes can lead to even greater problems.

SYSTEM AND NETWORK DESIGN

Protected areas should not be selected at random, for political expediency or at the whims of individuals, although something rather like this has occasionally happened in practice. Today, the theory and practice of



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protected area design are becoming increasingly sophisticated, due both to a better understanding of the role of protection and to increasing pressure to justify further set-asides of land and water.

The most comprehensive planning exercises do not start by looking at protected areas at all, but instead at the conservation needs of whole, ecologically distinct regions, known as ecoregions or bioregions, which cover large areas and often extend across national borders. Governments and NGOs have collaborated on ecoregion conservation planning exercises in many parts of the world, drawing on information about biodiversity, threats and pressures and socio-economic data to propose comprehensive conservation strategies that include, but are not limited to, comprehensive networks of protected areas. The aim of such networks is usually to include representative samples of all major ecosystem types and species, in large enough quantities to be viable in the long term: 'ecologically representative protected area networks' are now recognized as a foundation of national and regional conservation strategies.

The design of protected area networks therefore needs to take into account the needs of many different species and ecosystems. It also needs to look beyond the borders of individual protected areas to questions of whether it is important that these areas be linked by other suitable forms of habitat and how this might be achieved, and also at how protected areas can themselves be protected from outside pressures.

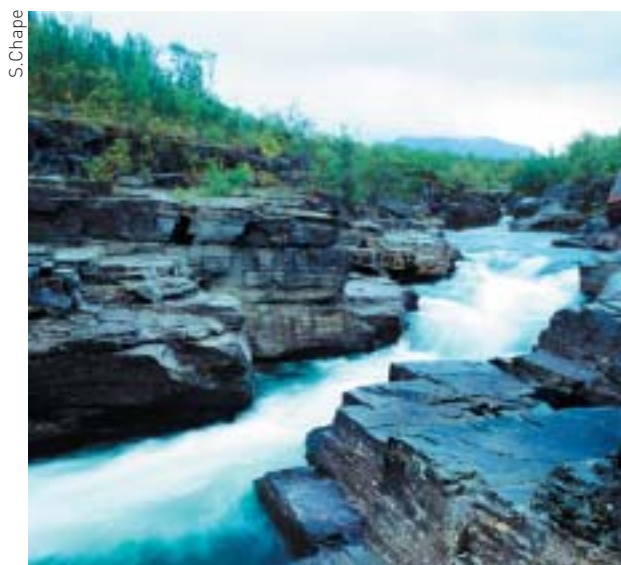
The importance of connectivity is increasingly being recognized. Protected areas that are surrounded by urban development or agricultural land are more like islands than parts of a broader landscape or seascape and can



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easily lose species through natural processes or as a result of human pressure. Protected area networks therefore usually include corridors linking protected areas, buffer zones around protected areas and sometimes 'stepping stones', which are geographically isolated from protected areas but serve as staging posts for migratory species such as birds.

Protected area networks therefore consist of much more than collections of identically managed reserves. To start with, there are many different ways of managing protected areas, as illustrated by the IUCN categories of protected areas, which range from strict protection and exclusion of most people (category Ia) to the management of living landscapes and seascapes that contain hundreds or thousands of human inhabitants carrying on their everyday lives (category VI). Beyond the network of protected areas, land and water in corridors and buffer zones will not usually be strictly protected but managed through a series of voluntary or statutory agreements that ensure forms of use that are also suitable for biodiversity (such as controlled hunting, low-intensity agriculture, sustainable forestry, managed fisheries or recreational areas). Within the wider landscape or seascape there may also be *de facto* protected areas – places that are effectively serving as a protected area, although they may not be formally recognized as such. These may include remote and unpopulated areas, but also other uses of land and water that also help protect biodiversity, such as fishery no-take zones, forests preserved to maintain drinking water supplies or to prevent erosion, some areas set aside for military purposes and so on. The protected areas network therefore sits within a broader mosaic of land and



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Box 6: Ecological networks

An ecological network is a coherent system of natural and/or semi-natural landscape elements that are configured and managed with the objective of maintaining or restoring ecological functions as a means to conserve biodiversity, while also providing appropriate opportunities for the sustainable use of natural resources.

The concept of ecological networks has been strongly developed in Europe and the approach is being readily adapted to less-developed regions. A number of different frameworks have evolved, including: ecological networks, wildlands networks, ecoregion-based conservation, bioregional planning and biodiversity conservation corridors. All are designed to contribute to a similar set of goals – the conservation and long-term survival of threatened species, habitats, ecosystems, ecological processes, as well as ecosystem services, environmental stability and sustainable development. The different frameworks share a common structure of core areas, connecting linkages, and buffer zones or areas of compatible land/resource use. Common elements of these approaches include:

- ❑ A focus on conserving biodiversity at the ecosystem, landscape or regional scale.
- ❑ An emphasis on maintaining or strengthening ecological coherence, primarily through providing for ecological interconnectivity.
- ❑ Ensuring that critical areas are buffered from the efforts of potentially damaging external activities.
- ❑ Restoring degraded ecosystems where appropriate.
- ❑ Promoting complementarity between land uses and biodiversity conservation objectives, particularly by exploiting the potential biodiversity value of associated semi-natural landscapes.

water use; designers, far from seeing a protected area as an isolated element, are trying to integrate the system much more closely with other users.

Within the network, individual protected areas are also designed to maximize their effectiveness. Location, size and shape are all critical. A protected area should usually be positioned to include the maximum biodiversity possible, and should be central not peripheral to the range of wide-ranging species. Wherever possible its borders should follow established natural features such as

mountain ridges, lake shores or catchment boundaries so that there is no ambiguity about location. Marine protected areas may be less vulnerable to land-based threats if they can extend inland from the coastline. In general, the larger the protected area the better: a bigger site is likely to protect larger populations of species or a greater fraction of the range of highly mobile or migratory species and will also include more habitats. Compact sites are more likely to retain their biodiversity than elongated or disjointed sites, because of various 'edge effects', including micro-climatic impacts, threats from invasive species and greater risks of human disturbance such as poaching. Even seemingly trivial features such as roads can dramatically increase such edge effects in what otherwise appear to be pristine habitats. In protected areas with a high perimeter to area ratio, edge effects may extend through most or all the site leaving little habitat free of their influences.

Individual protected areas, particularly larger sites, often have a varied management regime within their boundaries. Zoning allows the use of differing levels of protection around a core zone. For example, the legislation creating the Sanctuaire des Addax in Niger (a strict nature reserve, IUCN category Ia) simultaneously designated a large surrounding region as the Air and Ténéré Natural Reserves (IUCN category IV).

An ongoing debate among conservation planners is the trade-off between having a single large or several small sites. The best solution in a particular case depends on the management objective. In order to maintain representative ecosystems it may be necessary to have several small reserves in each of several different ecosystem types, but other objectives may be best served by having a single, strategically placed large site.

It should also be noted that such deliberations do not take place in isolation. Most areas of land and water have multiple demands on them and protected area networks have to be negotiated with many other stakeholders, including local communities and other users based further away, such as mining and logging companies, tourist operations and farmers. Protected areas that are formed with a high level of support are in far more secure a situation than those created in opposition to the wishes of the majority.

TRANSBOUNDARY PROTECTED AREAS

Once protected area networks are designed from a larger scale ecological perspective, they are likely to extend across two or more different countries. International borders are often among the least populated and least developed regions, with large areas of natural or semi-natural habitat. Species ranges and ecosystem boundaries are also rarely contained by international borders. Joint, 'transboundary'

protected area initiatives attempt to enable coordination and cooperation in the management and preservation of biodiversity that extends across one or more national or state borders. From small beginnings, transboundary protected areas have become an important part of regional responses to biodiversity losses. In 2001, it was estimated that there were 169 transboundary protected area complexes involving at least 666 individual protected areas.

IUCN defines a transboundary protected area as: 'an area of land and/or sea that straddles one or more borders between states, sub-national units such as provinces and regions, autonomous areas and/or areas beyond the limit of national sovereignty or jurisdiction, whose constituent parts are especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed cooperatively through legal or other effective means'.

Transboundary conservation can include many different approaches. The nature of the relationship between protected areas can vary from formal recognition of the transboundary protected areas as working entities, with a legal definition in the two or more countries involved and with support from the highest political level, to a much simpler and less formal arrangement of cooperation and sharing of information, skills and resources. At a workshop organized jointly by IUCN and the International Tropical Timber Organization in Thailand in February 2003, participants categorized five different types of transboundary protected area:

- ☐ two or more contiguous protected areas across a national boundary
- ☐ a cluster of protected areas and the intervening land
- ☐ a cluster of separated protected areas without intervening land
- ☐ a trans-border area including proposed protected areas
- ☐ a protected area in one country aided by sympathetic land use over the border.

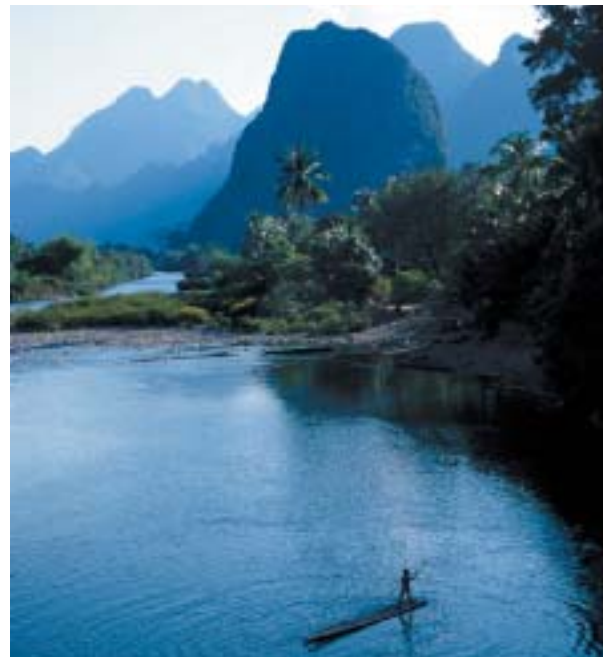
As we learn more about conserving across borders, the range of different approaches to creating and managing transboundary protected areas continues to expand. Some of these protected areas perform an important political function across borders that have recently been subject to political disturbance or armed conflict. Cooperation on issues of biodiversity and environmental conservation sometimes provides a neutral opportunity to start building trust and cooperation between people in two countries, and 'peace parks' have become recognized as a distinct and important category of protected area.

IUCN defines Parks for Peace as: 'transboundary

protected areas that are formally dedicated to the protection and maintenance of biological diversity and of natural and associated cultural resources, and to the promotion of peace and cooperation'. For example the mountainous Cordillera del Condor region between Peru and Ecuador has been an area in dispute for decades and the concept of using a peace park to help reduce conflict and build cooperation has been discussed since the 1980s. It resulted in the formation of the Cordillera del Condor Transboundary Protected Area Project consisting of various protected areas and other protection zones along the border.

EVALUATING MANAGEMENT EFFECTIVENESS

As we have seen, all over the world huge investments of money, land and human effort are being put into protected



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areas acquisition and management, and into specific intervention projects. However, in most cases we have little idea of whether management of individual protected areas, or of whole systems, is effective. And, more importantly, what little we do know suggests that many protected areas are being seriously degraded. In response, many individuals and institutions have been developing ways to monitor and evaluate the effectiveness of protected areas: an approach that is increasingly seen as being at the core of good management. Essentially, evaluation enables managers to reflect on experience, allocate resources efficiently, and assess and plan for potential threats and opportunities.

Management effectiveness evaluation measures the degree to which a protected area is protecting its

values and achieving its goals and objectives. Its primary aim is to help better management, but it can also help guide project planning and resource allocation, provide accountability and transparency, and increase community awareness, involvement and support. Evaluation will also enable managers to anticipate future threats and opportunities. Three main components can be evaluated:

- ❑ design of individual protected area, or protected area systems
- ❑ adequacy and appropriateness of management
- ❑ delivery of protected area objectives.

Monitoring and evaluation can provide concrete evidence of successes and failures in managing pressures and thus help to identify necessary changes in management, including early warning of serious problems. It can identify more intractable impacts, such as those connected with climate change, which may in turn help managers to develop buffers and test hypotheses to cope with such changes. Good evaluation looks beyond park borders at the performance of buffer zones, corridors and transboundary parks and at the economic and other benefits that protected areas provide. It also gives a voice to indigenous and local communities, both to express their opinions and also to become more involved in the management of the area and thus feel greater ownership and support for the park. Assessment should look beyond whether management actions are being implemented, to whether they are really delivering the desired conservation benefits. Practitioners get a chance to share experiences and incorporate both scientific and traditional knowledge into manag-

ement. Assessment also helps governments, funding agencies and communities to measure how well their project or area is doing.

The IUCN World Commission on Protected Areas Framework for Assessing Management Effectiveness of Protected Areas: Following a recommendation at the IVth World Congress on National Parks and Protected Areas in 1992, IUCN convened an international task force to address the issue. One result was the development of a framework and principles for evaluation of management effectiveness, which aims to help in the design of assessment systems, provide a checklist of issues that need to be measured, suggest some useful indicators and encourage basic standards for assessment and reporting.

The WCPA framework (Figure 6) is based

Figure 6: The WCPA framework

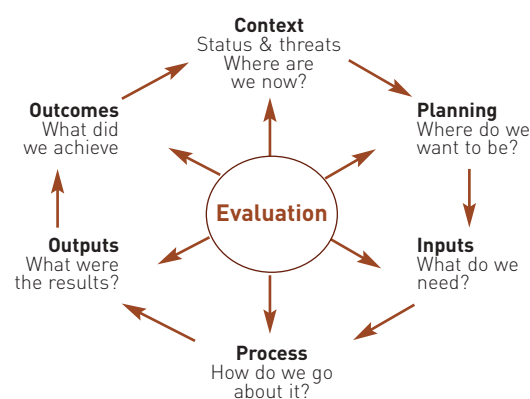


Table 7: The WCPA evaluation framework

Elements	Context	Planning	Inputs	Process	Outputs	Outcomes
Explanation	<i>Where are we now?</i>	<i>Where do we want to be?</i>	<i>What do we need?</i>	<i>How do we go about it?</i>	<i>What were the results?</i>	<i>What did we achieve?</i>
	Importance, threats and policy environment	PA design and planning	Resources needed to carry out management	The way in which management is conducted	Quantity of achievement	Quality of achievement
Focus of evaluation	Status	Appropriateness	Economy	Efficiency	Effectiveness	Effectiveness Appropriateness

on the premise that the process of management starts with establishing a vision (within the context of existing status and pressures), progresses through planning and allocation of resources and, as a result of management actions, produces results that (hopefully) lead to the desired outcomes. Monitoring and evaluation of these stages provide the link that enables planners and managers to learn from experience.

Ideally, assessments should cover each of the above elements, which are complementary rather than alternative approaches. Monitoring inputs and outputs over time can be especially useful to show changes in management efficiency and may highlight the effectiveness of a particular change to management. However, assessments are driven by particular needs and resources and a partial evaluation can still provide very useful information.

Several methodologies are being applied, from rapid assessments of protected area systems to detailed monitoring of individual protected areas. Depending on available time and resources and the objectives of evaluation, the processes range from complex and expensive to simple and cheap. For example, WWF has developed and tested a tool for assessing protected area systems at a national level – the Rapid Assessment and Prioritization of Protected Areas Management Methodology – which includes a review of available information and a workshop-based assessment, analysis of findings and recommendations.

A four-year United Nations Foundation, IUCN and UNESCO project – Enhancing our Heritage – is working in 10 World Heritage sites in Africa, Latin America and South Asia to provide managers with a consistent programme for assessing and reporting on effectiveness and conservation values. Evaluation involves field monitoring, workshops and interviews. Both the WWF/CATIE and PROARCA/CAPAS evaluation methodologies have been developed and refined over a number of years in Latin America. They involve scoring systems based around a hierarchy of indicators of different aspects of management performance and focus principally on management inputs and process. The World Bank and WWF have developed a simple, site-level assessment system for tracking progress in effectiveness. The methodology, which is also being used by the Global Environment Facility, is designed to provide a relatively quick, easy and consistent system for reporting progress in a diverse range of protected areas.

While significant progress has been made on developing methodologies, assessments of management



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effectiveness have so far been undertaken in only a small percentage of the world's protected areas. Nevertheless some consistent trends are emerging from these studies. Protected areas are, in general, chronically underfunded in relation to the perceived needs for adequate management. This is generally consistent across both developed and developing countries although the amount of funding available varies significantly. Most protected areas are also subject to multiple serious threats. Major threats identified across a range of studies include poaching, encroachment and fragmentation, logging, agriculture and grazing, alien invasive species and mining.

A major challenge is to have these tools widely used and to have monitoring and evaluation established as core business within protected areas management: to achieve this there needs to be a further increase in awareness of the benefits of evaluation; willingness to use such systems; and capacity of often under-resourced areas to conduct evaluation.

ALTERNATIVE FORMS OF PROTECTION

At one time, protected areas were considered to include a narrow group of sites, almost invariably owned and managed by governments, often in a fairly top-down fashion, with scant regard for the people who lived in the area. As we have seen, the last two decades have witnessed what is still a continuing revolution in attitudes towards the designation and management of protected areas. At the same time, there has been a blossoming of new approaches to protection, and a recognition of the many forms of



protection other than that covered by legally declared, government-owned areas.

Private and non-governmental protected areas:

Private protected areas are becoming a major component in some national and regional protected area networks and many governments are struggling with the question of how these can be officially recognized. In Brazil, legislation has been introduced that means declaration of a private protected area brings with it the same long-term management obligations as those for protected areas controlled by the state.

In both the United States and the United Kingdom, amongst other countries, charitable trusts own hundreds of nature reserves of varying sizes. In South Africa, the government is investigating options for some kind of certification system for private protected areas so that they can be given assurances of permanence and good management. In Sweden, widespread uptake of certification of good forest management means that the major forest companies owning many of the country's forests are obliged to set aside a proportion as protected areas, adding almost 5 000 km² to the national total.

There are also many other privately owned areas that are managed unofficially with biodiversity conservation in mind, without reaching the status of an official protected area. The increasing number of hunting reserves in Africa and elsewhere are often carefully managed to maintain the game and predator animals they need for commercial hunting, and the high value of these animals often ensures effective anti-poaching operations. Private hunting

reserves now form valuable buffer zones around many completely protected areas.

One specific kind of 'private' protected area that has emerged over the last few years is on land controlled by indigenous or traditional peoples. In some cases indigenous groups have lobbied to declare some or all of their traditional lands as protected areas, in order to help secure them from other forms of exploitation and also to gain recognition for their own good stewardship.

De facto conservation areas: Most areas of land or coastal sea are managed in some form of mosaic, with protected areas being one element amongst many that may include, for example, farming, forestry, fishing, various forms of industry, settlement and its associated infrastructure. Within this mosaic, large tracts of land or sea may be managed with some degree of protection for biodiversity, even when this biodiversity protection may not be the primary management objective.

Examples of such areas include the protection of vegetation on steep slopes to prevent erosion, the protection of forests to ensure secure water supplies, and the protection of wetlands and mangrove forests to help in water purification. They also include the closure of lands to public access for other reasons, such as military training, or even to avoid the threats posed by unexploded ordinance. Fisheries management often falls under separate administrative regimes from conservation, but there are many examples of management approaches including the spatial restriction of fishing, and even the declaration of 'no-take' areas. In the world's

most remote places isolation and distance from human settlement can be a further guarantor of protection, although this is by no means always the case. One of the oldest tropical forest reserves is in Tobago. Scientific concerns about the role of forests in maintaining rainfall (on the valuable sugar plantations) led, in 1776, to 'Instructions remove to Your Majesty a tract of Wood Land lying in the interior and most hilly parts of this island for the purpose of attracting frequent Showers of Rain upon which the Fertility of Lands in these Climates doth entirely depend'. This site was clearly not declared for biodiversity protection, although it has vicariously served this function now for over 225 years.

Cultural and spiritual protection. Other unofficial forms of protection are linked to cultural and spiritual beliefs. Communities throughout the world have protected sacred sites, which may be natural features such as a rock or mountain, particular groves of trees, springs, lakes or even species. Sacred sites have remarkable longevity and those found today often date from older religions than the one currently practised; for example the myriad sacred groves in Africa are mainly based on animist beliefs but continue to be maintained in predominantly Moslem or Christian areas. Most of the world's major faiths also have links to particular natural areas, such as the many sacred forests in Hindu, Taoist and Buddhist faiths, Christian prayer trees in Estonia and so on.

The oldest records of continual forest management, dating back almost 2 000 years, are associated with the production of timber needed to construct Shinto temples in Japan. The fact that these sites have high spiritual value means that they are often far better protected by local communities than are officially protected areas decided by the state. The Vth World Parks Congress supported the idea that official protected areas should be more accommodating of sacred sites, although in practice many of these are likely to remain outside protected areas.

Other conservation. Other forms of management may be insufficient to justify the claim of protected area, but may still be an important tool in the armoury of biodiversity conservation. In the oceans this might include the large areas of seasonal protection, temporary closures or areas closed to particular fisheries. The vast whale sanctuaries in the Indian and Southern Oceans provide one such

example. On land, communities and governments often place restrictions on certain activities, ranging from hunting bans to restrictions on agriculture, forestry, new buildings or land modification. They may include limitations on pesticide use, restrictions on land clearance near waterways or on slopes over a particular incline, on the number of new buildings allowed in certain areas, or on the drainage or other interference in waterways.

WORKING WITH THE PRIVATE SECTOR AND EXTRACTIVE INDUSTRIES

As protected areas have grown and expanded their remit, several new stakeholders have come to prominence, demanding a place in negotiations about protected areas and sometimes also in their management. One of the most important is the private sector, and particularly the extractive industries, which often have an interest in areas around or even within protected area networks.

Past involvement with extractive industries has generally been antagonistic: many protected areas have been set up to prevent the very activities – mining, logging, fossil fuel extraction and major infrastructure projects – that are the lifeblood of the private sector. Dialogue about cooperation has been rare.

Matters came to a head with a recommendation at the IUCN Amman World Conservation Congress in 2000 that suggested governments introduce legislation banning mining activities in all category I-IV protected areas. What was seen as many in the conservation field as the rubber-stamping of something that was already implicit in the designation of protected areas created a huge backlash from the industry and, more positively, kick-started a dialogue about the relationship between the private sector and the world's protected areas network.

While some conservation groups have tried to advocate a stance of non-negotiation, many individual companies have been interacting with protected areas and protected areas managers for decades, particularly when extractive industries are involved near or sometimes inside existing protected areas. In these cases it has sometimes been possible to ensure greater sensitivity to biodiversity as a direct result of negotiation. Where extraction has taken place, high-quality restoration can be built in, and in some cases the replacement and/or expansion of protected areas has been supported by the industry as a form of compensation or 'no net loss'. In addition to physical activities of avoidance, restoration, recovery or expansion, private-sector companies are well resourced and can potentially become a key financial contributor to protected areas management (including subsidizing staffing, infrastructural and equipment costs, and outreach and

education programmes]. Over the last few years these ideas, and others, have begun to be addressed at a much broader level with the involvement of the sector as a whole.

The recent establishment of the International Council on Mining and Metals (ICMM) has provided an important forum for mining companies to talk with conservation interests. In May 2003, the ICMM adopted a set of 10 principles on sustainable development. The principles provide an important framework to drive continuous improvement in industry performance. ICMM and the Global Reporting Initiative (GRI) have recently signed a Memorandum of Understanding to develop a Mining and Metals Supplement to the GRI 2002 Sustainability Reporting Guidelines through a multi-stakeholder process. ICMM is also working with UNCTAD, UNEP and the UK Department of International Development on a 'good practice' library website.

An IUCN-ICMM Dialogue on Mining and Biodiversity was announced at the World Summit on Sustainable Development. Intended to provide a forum for a full exchange of views and perspectives, it is hoped that the Dialogue can also establish a foundation of trust and, in so doing, catalyse further performance improvements in the mining industry.

One of the Dialogue's priority areas is to develop best practice guidance to raise levels of industry performance in the way biodiversity is assessed and managed. A joint workshop was held in July 2003, the draft report of which was discussed at a side event during the Vth World Parks Congress in Durban. An IUCN-ICMM team will be established to develop related performance criteria and implementation guidance in a number of priority areas, taking into account the recommendations of the workshop.

A key outcome of the dialogue to date has been the ICMM Position Statement on Mining and Protected Areas, approved by the ICMM Council in August 2003. This decision signals ICMM's commitment to engage with the conservation community on the contentious issue of 'no-go' areas. It also contains a number of important undertakings that establish key precedents not only for the mining industry but also for other extractive industries. ICMM recognizes the role of properly designated and managed protected areas in conservation strategies and that, in some cases, exploration and mining development may be incompatible with the objectives for which areas are designated. To give effect to this principle, ICMM members have undertaken 'not to explore or mine in World Heritage properties' and to take all possible steps to ensure that operations are not incompatible with the outstanding universal values of World Heritage properties. ICMM members have also made a commitment to respect all legally designated protected areas.

ICMM intends to continue to work with IUCN to

Box 7: Commitments on protected areas from Shell International

Shell has developed a Group Biodiversity Standard, published in July 2001 and the first to emerge from an energy company. The company has also recently announced a number of commitments with regard to protected areas.

First, Shell will not explore for, or develop, oil and gas resources from within natural World Heritage sites, in recognition of the outstanding universal value that these sites represent for society.

Second, operational practices will be upgraded wherever the company operates in IUCN category I-IV protected areas or where an environmental, social, health impact assessment indicates high biodiversity values.

This will involve spatial/regional planning exercises, assessing secondary impacts, implementing Biodiversity Action Plans, and conducting appropriate baseline and monitoring studies.

Third, Shell will publicly report on activities in IUCN categories I-IV and, finally, will work with IUCN and others to develop and pilot ways of strengthening the management effectiveness of protected areas through the provision of key skills, creation of sustainable livelihoods and by exploring options for sustainable financing.

strengthen its system of protected areas categorization. ICMM members recognize that sufficient reform of the system's application and use will lead to recognition of categories of protected areas as 'no-go' areas and others with a multiple-use designation. This work is intended to influence the way decisions are taken in ICMM member companies, so that potential confrontations over land use with the conservation community are minimized.

The fossil fuel sector has been undertaking a similar exercise. Some specific commitments by Shell International are outlined in Box 7.

It would be naïve to claim that there are not remaining tensions between the private sector and the protected areas community, particularly with respect to 'no-go' areas. However, today these issues are being discussed in a far more constructive way than they were in the past. The growing recognition that protected areas need to take their place as a part of wider landscapes and seascapes, rather than remaining separate entities, means that the importance of this dialogue is increasing all the time.

ACCESS AND BENEFIT-SHARING PERSPECTIVES

Bioprospecting companies have focused attention on protected areas for many years in their search for commercially valuable genetic materials, but protected area agencies have generally been slow in developing policies to reap benefits from these enterprises. This is changing and issues of access and benefit-sharing (ABS) are high on the agenda of governments and protected area managers.

Protected areas have yielded valuable commercial products. For example, Taq (a DNA polymerase enzyme), was extracted from a microorganism collected from Yellowstone National Park in the United States in 1966 and has been used in a range of biotechnological applications, with annual sales exceeding \$200 million. Cyclosporine came from a soil sample taken from Hardangervidda National Park in Norway in 1969 and was the 33rd top-selling drug worldwide in 2000, with sales of \$1.2 billion.

Governments are increasingly asking for a share of these profits to help maintain the protected areas that play such a major role in preserving genetic material. A well-known example is the relationship that the National Institute of Biodiversity has with the Ministry of Environment and Energy in Costa Rica, where the former includes a 'conservation overhead' in the budgets of its commercial research partnerships with 10 per cent of all bioprospecting budgets, and 50 per cent of all royalties, being donated to the Ministry. The Great Barrier Reef Marine National Park is also marketing its genetic resources to the biotech industry. Similar arrangements are being explored elsewhere.

A range of legal and policy developments has helped to create a new research framework. In total, around 100 governments have implemented or are drafting ABS measures. Countries are also beginning to introduce laws regulating access to traditional knowledge, independent of whether it is obtained in conjunction with genetic resources, which complement national ABS measures. A range of documents developed by indigenous peoples, researchers, professional associations and companies has also marked a significant shift in the ethical and policy framework for biodiversity research and prospecting partnerships.

Access and benefit-sharing under the Convention on Biological Diversity: The Bonn Guidelines and the CBD are the centrepieces of international ABS policy relevant to protected areas.

The CBD recognizes the sovereign rights of States over their natural resources and of national governments to determine access to genetic resources, but requests that each state shall try to facilitate access to genetic resources for environmentally sound uses by other Parties. They are required to support access and transfer of technologies to developing countries under 'fair and



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most favourable terms', to help countries providing genetic resources participate in biotechnology research and to be given priority access to results and benefits (Articles 15, 16 and 19).

The Bonn Guidelines establish a basic model for ABS and provide voluntary guidance to the CBD's Contracting Parties regarding the CBD obligations, including operational guidance for 'users and providers' of genetic resources, to assist governments drafting national laws and to guide governments, communities, companies, researchers and others involved in ABS agreements. The standardized procedures clarify mutual responsibilities, including prior informed consent; behaviour in the field; the nature and schedule of benefits to be shared; and research relationships with local communities whose knowledge and resources are often the subject of research. ABS policies can also require commercial projects to contribute financially to protected areas manage-

ment, or broader national protected area systems in the short, medium and long terms.

Protected areas and ABS. CBD commitments are intertwined and mutually supportive, so CBD provisions regarding ABS apply to activities in and around the protected areas network. In developing management policies, park managers should take note of the relevant provisions contained both in the CBD and in the Bonn Guidelines. Collectively, the provisions of the Convention and decisions taken by the Conference of the Parties promote the integration of protected area resources into the national economy in a sustainable manner and the management of threats to protected areas in a holistic and integrative manner. Protected area managers and policy makers can best address ABS issues by drafting protected area ABS policies and collaborating on national ABS consultations, strategies and drafting of measures.

Implementation of the CBD ABS provisions. More than 50 Parties have officially reported efforts to develop national legislation or policies to implement the CBD's provisions on the use of genetic resources. Key lessons include the importance of involving a wide range of stakeholders in national consultations; the need for effective implementing institutions and clear and transparent regulatory processes; the importance of partnerships and non-monetary benefits from the research process; the need to build capacity to address this complex new suite of issues; and the value of collaborating on a regional or international level.

The Philippines and the Andean Community were the first to introduce ABS measures. Protected areas did not feature prominently in these and the



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impacts on protected areas in these countries appear limited. Research in protected areas is still guided by protected areas legislation and regulations and often bypasses the new ABS regulatory processes. It also appears that, in cases where ABS measures are not bypassed, they act as deterrents to biodiversity research and prospecting. To address these problems, the Philippines 2001 Wildlife Resources and Conservation and Protection Act (RA 9147) no longer considers academic research as bioprospecting for the purposes of permitting agreements. A simpler Memorandum of Agreement between the Department of Environment and Natural Resources and researchers now serves to govern academic research. The Philippines' Protected Areas and Wildlife Bureau expects that these streamlined procedures will encourage increased scientific research.

In other countries protected area managers are called upon to take an active role in managing biodiversity research and prospecting partnerships, because it is outlined in the relevant legislation or, more frequently, because there is no-one else. Either way, protected area managers have become an important part of the evolving international and national ABS policy framework. As a result, they should play an important role in national consultative processes that address ABS issues and that develop national measures to implement the CBD.

YOUTH AND YOUNG PROFESSIONAL INVOLVEMENT

Protected areas represent hope for a biologically viable world for the generations to come. But they will only survive to play their role in international biodiversity conservation if they win the respect and support of future generations in perpetuity. A third of the world's population is under 15 years old. This generation will quickly come to play a dom-

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inant role in decisions relating to biodiversity conservation. Today's younger generations are tomorrow's managers, rangers and scientists, as well as tomorrow's political leaders and decision-makers. Governments and communities need to build support among younger generations and to provide opportunities for participation and capacity-building so that each rising generation can assume the roles required to sustain protected areas in the future.

There have been recent efforts at the local, national, and international levels to involve younger generations in different aspects of biodiversity conservation, including in formulating the principal output documents – the Durban Accord and the Durban Plan of Action – at the Vth World Parks Congress. At the opening of the Congress, former President of South Africa and WPC Patron Nelson Mandela spoke about the need to reach out to younger generations to ensure the future of protected areas. At the Seventh Meeting of the Conference of the Parties to the CBD there is an opportunity to secure more effective engagement of younger generations at the global governance level and to develop better communication between older and younger generations, to combine experience and wisdom with energy, open-mindedness and enthusiasm.

Yale University conducted a survey of young people around the world to learn more about their views on protected areas. Respondents identified the following values:

- ☐ biodiversity conservation and protection of essential ecosystem services
- ☐ opportunities for scientific research and education
- ☐ income generation for local communities
- ☐ meeting human spiritual and religious needs and ensuring co-existence of humans and nature
- ☐ preservation of cultural heritage.

Many barriers and challenges exist that reduce the opportunities and incentives for young people to become engaged in the greater effort to maintain and expand the

global protected areas network. Opportunities for young people to have firsthand experiences with nature are becoming fewer in the south, and thus the potential for each generation to develop an understanding of and appreciation for the importance of biodiversity is reduced. When younger generations have no firsthand knowledge of the values of protected areas there is little likelihood that they will be able to appreciate them, and then in turn to act to maintain them. Often the only way that young people are able to interact with and appreciate their natural heritage is through specially designed programmes: examples include the New York City Urban Park Rangers Youth Program, the Green Balkans Youth Programs and the South Africa Young Park Rangers. Yet most young people do not have the opportunity to take part in such activities. The scope and number of such efforts should therefore be greatly expanded. Protected areas also present ideal venues for formative educational experiences and can serve as a tool both for learning about the natural world and for more personal development. School programmes such as 'Nature's Classroom' for middle-school children in the United States demonstrate this potential.

The international community, particularly sovereign States, can take advantage of the values younger generations hold for protected areas through the development of policy instruments at the global and national levels that will ensure ongoing and strengthened involvement of younger generations in the conservation of protected areas. Such programmes could cover youth programmes in national parks, including working partnerships between protected areas and youth organizations; incentives to encourage younger generations into environmental careers such as internship programmes, financial mechanisms and scholarships; mechanisms for dialogue between private- and public-sector young professionals to encourage private-sector engagement in protected areas; policies to increase research including grants and north-south exchange programmes between young protected area professionals; and





continuing support for environmental education and the use of protected areas as living classrooms.

To secure the future of protected areas, Parties to the CBD must take the necessary steps to recognize fully and effectively engage younger generations from all sectors of society in all aspects of the stewardship of protected areas. The challenge for COP 7 is to develop a mechanism which would facilitate the incorporation of concerns voiced by the younger generations throughout the world into global debates and decision-making processes. This will ensure that each younger generation fully appreciates and understands the values of protected areas and passes protected areas on to their children in an unimpaired state.

FINANCING PROTECTED AREAS

Protected areas cost money. They have an opportunity cost, in that they tie up land and sea resources that could be used for other purposes that would create wealth for both states and for private companies and individuals. They also have significant running costs, to ensure that they really are protected, to provide facilities for the many people who want to visit them, to ensure that local communities benefit and to ensure that protected area values are maintained in perpetuity.

Today we run our protected areas network on the cheap in most countries, and some of the problems outlined earlier are a direct result of this lack of capacity. But at the same time, providing long-term finance to protected areas is hard to justify for governments that are already struggling with immediate problems of health, poverty, rapid population growth and sometimes with intense security concerns. Much of the world's threatened biodiversity and most important protected areas lie within developing countries where such issues are acute. Over the

past five years, new global commitments to poverty and a deteriorating international security situation have both reduced funding streams, although it is gratifying to see that most governments continue to recognize the importance of protected areas, including the governments of developing countries.

As noted previously, in many cases these protected areas are providing real and quantifiable services – such as soil and water conservation and provision of valuable genetic material – and proper valuation and payment for such services could go a long way to meeting the present and future financial needs of protected areas. Encouragement of both the capacity to measure such benefits and the political will to use these measurements to recoup costs could be a major outcome of COP 7. In some countries, such as Costa Rica, successful partnerships have been established with local private businesses that derive benefits from protected area resources, resulting in regular income for local people and management agencies.

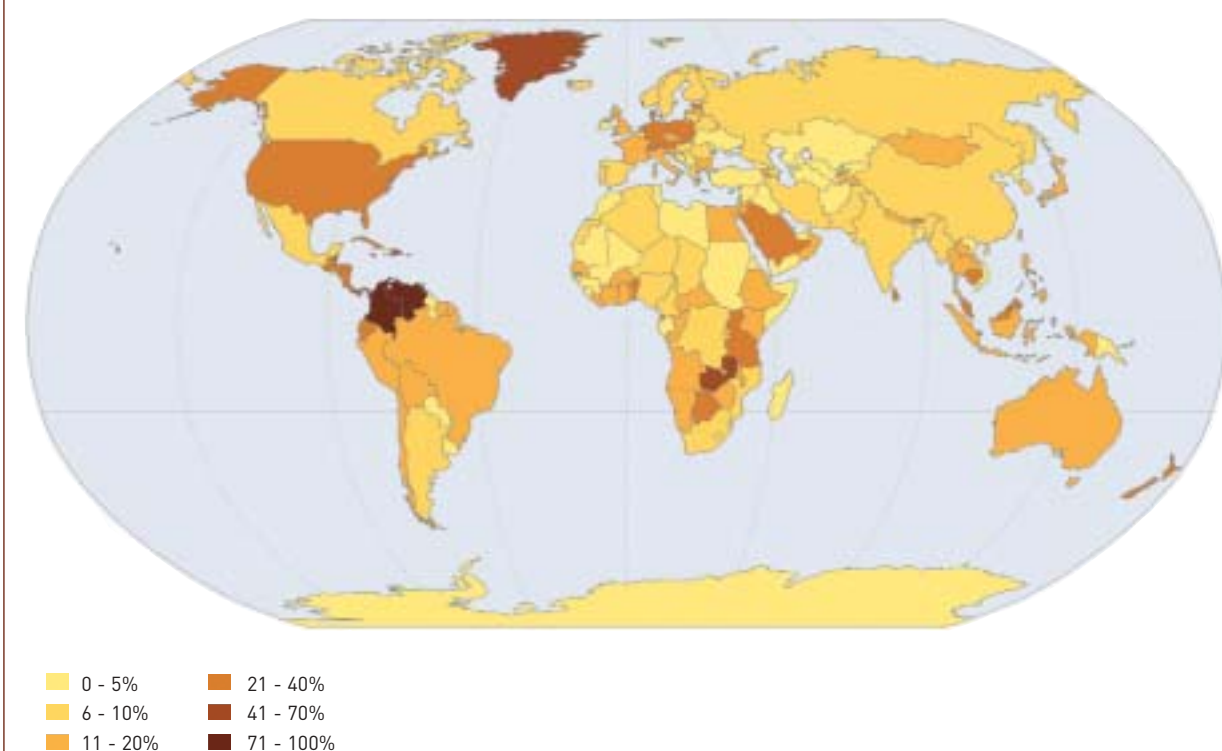
The broadening of economic assessment and rationalization of taxation and systems of subsidy might further reduce pressures on protected area. For example, the correct calculation of environmental costs should lead to pollution controls or at least to pollution taxes which should lead to reductions in pollutants. Similarly the removal of subsidies in agriculture, fisheries or regional development programmes will, in many cases, reduce problems of pressure on protected lands, pollution and overfishing.

But at the same time, some values will remain hard to quantify, or hard to assign to a particular stakeholder. While park fees can help to maintain some of the larger national parks they are clearly impractical for many smaller protected areas. Other values, such as buffering against climate change, protecting sacred sites and existence value for future needs are not amenable to simple charges.

A recent study estimated that an effective terrestrial and marine protected areas system would cost more than \$40 billion per year, compared with a current total global expenditure estimate of less than \$7 billion. The Durban Action Plan recommends an additional annual budget of \$25 billion. Such an increase in expenditure could easily be offset against the cost of economically and ecologically perverse subsidies for natural resource exploitation that are estimated at between \$1 and \$2 billion annually. Some of this could come from such sources as fees and payment for environmental services schemes. Maintaining and strengthening protected area systems is a global concern and it is clear that richer countries should be prepared to help those with fewer financial and technical resources to sustain benefits that are of global good. Support through the GEF is one way that this can occur, in partnership with national governments.

The way ahead: consolidating international support

Figure 7: Per cent of land protected by country, 2003



Over the last two years the world community has agreed upon strategies and actions that will contribute to the establishment and management of effective and comprehensive protected area systems. The convening of the Seventh Meeting of the Conference of the Parties (COP 7) to the Convention on Biological Diversity, with its thematic focus on protected areas, presents a window of opportunity to further strengthen global support for the implementation of the Convention objectives and in particular Article 8 on *In Situ* Conservation. This opportunity links directly to the impetus provided by other recent initiatives, in particular the WSSD Plan of Implementation, the Millennium Development Goals and the Durban Accord and Action Plan arising from the Vth World Parks Congress held in 2003.

The WSSD, while reaffirming that the CBD is the key instrument for the conservation and sustainable use of biological diversity, forged the conceptual link between the

objectives of the Convention and the attainment of sustainable development and poverty alleviation.

Key Target 1 of the Vth World Parks Congress called on the CBD to undertake a series of specific actions related to protected areas to meet the 2010 biodiversity target. The Congress also called on the COP to adopt a rigorous programme of work on protected areas that responds to the needs identified at the Congress, and establish an effective means of monitoring and assessing its implementation. COP 7 will consider adopting a programme of work that includes direct action for planning, selecting, establishing, strengthening and managing protected areas; ways and means to improve governance, participation and equity; and enabling activities relating to protected areas. The programme of work on protected areas and the various tools agreed upon at the global level need to be integrated into national strategies, action plans and programmes. Implementation of these plans and programmes at national

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and sub-national levels will require firm political commitments and adequate financial support, together with the effective participation of all categories of stakeholders, including recognition of traditional knowledge in accordance with the Convention.

The CBD provides an ideal instrument to consolidate and strengthen coherent approaches to resolving key

protected area issues. Conservation and sustainable use of biological diversity is a common concern of humankind. It is through our collective action that we can plan, establish and effectively manage protected area sites and networks that can contribute to the globally agreed target of significantly reducing the rate of biodiversity loss for the benefit of all life on Earth by 2010.

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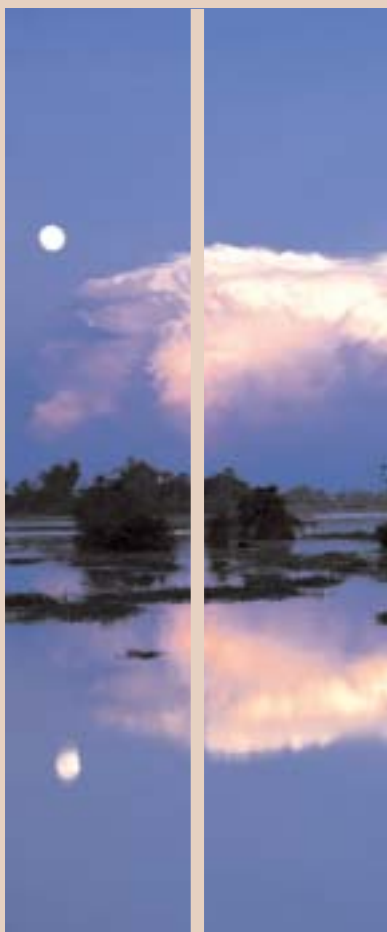
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Protected areas and biodiversity

The area set aside for conservation by concerned governments and communities covers almost 12 per cent of the Earth's land surface – probably the largest conscious, collective land-use decision in history. Most of the growth in the establishment of protected areas occurred in the latter half of the 20th century, and a considerable proportion since the global commitments made at the 1992 Earth Summit. The Convention on Biological Diversity (CBD) was also adopted in 1992 and protected areas are pivotal to CBD Article 8 on *In Situ* Conservation. Establishment of protected areas by Parties can therefore be seen as an increasing commitment to *in situ* biodiversity conservation.

Protected areas are such a significant factor in the planet's natural resource allocation that they are important indicators in global environment monitoring. Recognition of the importance of participatory approaches and the values of community-conserved areas has also increased significantly. A more holistic approach to conservation and development is being promoted through the application of ecological networks and bioregional planning concepts. However, there is much to be done to ensure that protected area systems and their management are effective in ensuring the survival of species and ecosystems, and the environmental benefits they provide. Species loss continues at an alarming rate, the world's marine ecosystems are poorly protected, and global environmental change threatens natural systems, as well as many aspects of human endeavour.

This publication synthesizes key aspects in the development of protected areas, the level of international commitment and the relationship of protected areas to sustainable development, and reviews critical issues related to their effectiveness. It has been compiled by the Secretariat of the CBD and UNEP-WCMC as input to the Seventh Meeting of the Conference of the Parties.

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