

## CONVENTION ON BIOLOGICAL DIVERSITY

Distr.  
GENERAL

UNEP/CBD/SBSTTA/9/5/Rev.1  
23 September 2003

ORIGINAL: ENGLISH

### SUBSIDIARY BODY ON SCIENTIFIC, TECHNICAL AND TECHNOLOGICAL ADVICE

Ninth meeting

Montreal, 10-14 November 2003

Item 4.1 of the provisional agenda\*

### STATUS AND TRENDS OF, AND THREATS TO, PROTECTED AREAS

*Revised note by the Executive Secretary*

#### EXECUTIVE SUMMARY

The concept of “protected areas” has been in existence since historical times. The more recent concept, with the formal establishment of protected areas by Governments, began to emerge in the nineteenth century. Originally, these were largely “wilderness areas” where there was no significant human impact, and where the place of humans was restricted to visitors. A 1959 United Nations Economic and Social Council resolution gave global recognition to protected-area systems including the first attempts to register their number, extent and location, through a request to compile the *World List of National Parks and Equivalent Reserves*. This was endorsed in a 1962 United Nations General Assembly resolution that initiated the periodic “United Nations List”. The World Database on Protected Areas, managed by the UNEP World Conservation Monitoring Centre, is the most comprehensive dataset on protected areas world-wide underpinning the production of the United Nations List of Protected Areas. The 2003 United Nations List of Protected Areas was released at the Fifth World Parks Congress in September 2003. The IUCN Protected Area Management Categories provide a common language and enable the comparison and summary of management objectives for the world’s protected areas and the basis for inclusion in the list, although classification systems have some shortcomings.

The number of global protected areas has been rising for the past few decades and is now in excess of 100,000 sites. The total area has also increased continuously from less than 3 million km<sup>2</sup> in 1970 to more than 12 million km<sup>2</sup> by the late 1990s. However, ecoregional and habitat representation remains uneven.

Protected areas cover more than 11 per cent of the Earth’s land surface. In terms of extent, using the IUCN management categories, national parks, ‘managed resource areas’ for biodiversity conservation and sustainable use, and habitat/species management areas and protected landscapes and seascapes are the most preferred means for conserving biodiversity. The expansion of urbanization and other development pressures have made it increasingly difficult to declare larger wilderness areas or to properly protect existing ones, – although some countries such as Brazil and Madagascar announced the establishment of

\* UNEP/CBD/SBSTTA/9/1.

/...

major reserves at the 5<sup>th</sup> World Parks Congress. Many reserve systems are often biased towards the economically less valuable and often species-poorer habitats, while leaving others inadequately protected. Although the economic benefits of natural protected areas remain unclear, a growing knowledge base supports the conclusion that they greatly exceed those of conversion.

Data for marine protected areas are limited but suggest that, while the oceans comprise 70 per cent of the Earth's surface, less than 0.5 per cent of the marine environment is adequately conserved. The high seas, outside national jurisdiction, which comprise an estimated 64 per cent of the world's ocean, are an area of obvious neglect. A relatively larger proportion of inland aquatic habitats are within protected areas. However, it is difficult to estimate the percentage of inland waters that is effectively protected, in particular as they are vulnerable to impacts from outside those areas (e.g., within-catchment influences). Similar concerns exist for the long-term future for marine protected areas.

The major lake systems of the world and temperate grasslands remain under-represented in the global protected areas system. Mountain areas were among the first to be accorded protected-area status and represent a relatively high proportion of sites. Many mountains cut across national boundaries and provide opportunities for international cooperation in protected-area management. The scientific focus of conservation has moved towards landscape-scale and ecosystem approaches and interest in transboundary protected areas has consequently increased.

At the global level about 12.4 per cent of the world's forest is in protected areas as classified by IUCN categories. There are, however, considerable differences between the regions, ranging from 5 in Europe to 20.2 per cent in North and Central America.

In the framework of the Convention, national biodiversity strategies and action plans, national reports and thematic reports on protected areas provide information on the status of, and threats to, the biodiversity within them, the legal and policy framework for action and the institutions responsible for it. They indicate that protected-area systems are well advanced in most countries and Article 8 of the Convention is identified as a high priority by most Parties. Human, institutional and financial resources limitations are the major constraints to the full implementation of the protected-area networks as well as the management of individual protected sites.

The majority of protected areas appear to be effective in conserving species, habitats and landscapes of value. However, a large number of protected areas are inadequately supported or fail for a variety of reasons. Direct and indirect threats to protected areas are well described but only a small fraction of protected areas have been subject to some kind of analysis of threat. A compilation of national thematic reports submitted in May 2003 indicates that less than 25 per cent of forest protected areas are considered to be well managed with a good infrastructure, and a large proportion of forest protected areas in responding countries had no management at all. Only 1 per cent of forest protected areas are regarded as secure in the long term. Even less is known about the threats to marine protected areas but a recent survey concluded that only 14 per cent were effectively managed. Lack of integrated marine and coastal area management was also a problem in most countries and for most marine and coastal protected areas.

International recognition of protected areas, including, *inter alia*, areas designated through the World Heritage Convention, the Ramsar Convention on Wetlands and the Man and Biosphere Programme, carries a significant element of prestige which assists both with the designation of sites and subsequent support for their management. All the programmes of work of the Convention directly or indirectly involve protected areas.

### **SUGGESTED RECOMMENDATIONS**

Suggested recommendations on the status and trends of protected areas are included in the suggested recommendations in the note by the Executive Secretary on the proposed programme of work on protected areas (UNEP/CBD/SBSTTA/9/6).

## CONTENTS

	<i>Page</i>
EXECUTIVE SUMMARY .....	1
SUGGESTED RECOMMENDATIONS .....	2
I INTRODUCTION.....	4
II. CHARACTERISTICS OF AREAS INCLUDED IN LISTS OF PROTECTED AREAS.....	4
A. Descriptions of protected areas .....	4
B. IUCN Protected Area Management Categories.....	5
III. GLOBAL PROTECTED AREAS COVERAGE.....	6
A. Sources of information .....	6
1. The World Database on Protected Areas and the United Nations List of Protected Areas .....	6
2. National information sources in the framework of the Convention on Biological Diversity .....	6
B. Number and extent of the world's protected areas .....	8
1. Global overview .....	8
2. Protected areas by thematic area and region .....	9
C. Role and effectiveness of protected areas .....	11
IV. TRENDS IN NUMBER AND EXTENT OF PROTECTED AREAS.....	12
A. Number and extent of protected areas .....	12
B. Factors determining trends .....	13
1. Threats to protected areas.....	14
2. Agreements and other initiatives promoting the establishment and expansion of protected areas .....	14
3. Decisions of the Conference of the Parties to the Convention on Biological Diversity .....	15
4. The Plan of Implementation of the World Summit on Sustainable Development .....	16
V. CONCLUSIONS.....	16
<i>Annex.</i> IUCN PROTECTED AREA MANAGEMENT CATEGORIES (1994).....	18
REFERENCES.....	19

## I INTRODUCTION

1. Article 8 of the Convention on Biological Diversity calls for: (i) the establishment of a system of protected areas or areas where special measures need to be taken to conserve biological diversity; (ii) the promotion of the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings; and (iii) the rehabilitation and restoration of degraded ecosystems and the promotion of the recovery of threatened species, *inter alia*, through the development and implementation of plans or other management strategies. In addition, the central role of protected areas in conservation and sustainable use of biological diversity has been repeatedly emphasized in decisions of the Conference of the Parties. Accordingly, national protected area systems have been developed and maintained as key elements of national strategies to conserve biological diversity.

2. Protected areas are also being developed in the context of other international and regional agreements and processes such as Wetlands of International Importance of the Ramsar Convention on Wetlands; World Heritage Sites of the Convention Concerning the Protection of the World Cultural and Natural Heritage; Biosphere Reserves established under the UNESCO-Man and the Biosphere Programme; Important Bird Areas (IBAs) developed by BirdLife International; “Frontier Forests” designated by the World Resources Institute (WRI); and WWF’s “Global 200” for the representation of all major habitat types.

3. It is likely that existing protected areas will be expanded and new ones established as tools for achieving: (i) the target of the Strategic Plan of the Convention and the Plan of Implementation of the World Summit on Sustainable Development to achieve a significant reduction in the rate of biodiversity loss by 2010; and (ii) the Millennium Development Goals (MDGs)—particularly goal 7, on ensuring environmental sustainability.

4. It is therefore important to have information on the current number and extent of protected areas, and how their establishment, maintenance and effectiveness are influenced by policies and other human interventions. Section II of the present note summarizes the characteristics of areas included in lists of protected areas and briefly introduces the IUCN Protected Area Management Categories, which are reproduced in the annex to the present note. Section III describes the number and extent of protected areas globally, per region and per thematic area, based on comprehensive data presented in the 2003 United Nations List of Protected Areas. The section also discusses limitations and gaps in the information used as well as on the effectiveness of protected areas. Section IV considers trends in the size, number and effectiveness of protected area sites and systems including the main factors determining current and future trends. Some conclusions are drawn in section V, relating mainly to possible future activities that could be carried out in the framework of the Convention.

## II. CHARACTERISTICS OF AREAS INCLUDED IN LISTS OF PROTECTED AREAS

### A. *Descriptions of protected areas*

5. The term “protected area” is described in Article 2 of the Convention on Biological Diversity as “a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives”. Other definitions of protected areas include:

(a) The IUCN-The World Conservation Union definition adopted at the Fourth World Parks Congress (1992) describing a protected area as “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”;

(b) The definition in the Global Biodiversity Strategy <sup>1/</sup> published in 1992 by the World Resources Institute which describes protected areas as “a legally established land or water area under either public or private ownership that is regulated and managed to achieve specific conservation goals”.

---

<sup>1/</sup> <http://wri.igc.org/wri/wri/biodiv/gbs-home.html>

6. There are currently more than 1,000 terms used to describe national protected areas in the World Database of Protected Areas. Throughout history, forests and groves, mountains, lakes, rivers, reefs and other components of the natural environment have been set aside by various cultures for religious, hunting, water conservation and species protection purposes. The “modern” concept of protected areas is historically benchmarked to the nineteenth century, with the formal establishment by Governments of protected areas, often equated with “national parks”. Such sites were perceived and managed as “wilderness areas” where there was no significant human impact. The emphasis in the early protected areas, established as game reserves or national parks by colonial powers in Africa and Asia, was on restriction of access by indigenous and other local people.

7. The importance of national parks and reserves was internationally recognized by a 1959 United Nations resolution, <sup>2/</sup> which pointed out their value for the inspiration, culture and welfare of mankind, as well as their ecological, economic and scientific values. This resolution also began the process of compiling a worldwide list of protected areas.

8. Protected areas can be established for various purposes including scientific research; wilderness protection; preservation of genetic, species, community and landscape diversity; maintenance of ecosystem services; protections of specific natural and cultural features; tourism and recreation; engines of local economic growth and social development; education; sustainable use of resources from natural ecosystems; maintenance of cultural and spiritual attributes; and national security. In some areas, these objectives may be achieved as a side-effect of some other activity or condition, although the site is not formally considered a “protected area”. These “*de facto* protected areas” include places such as isolated wilderness areas (where protection is a product of remoteness), watershed protection, military reserves and security zones, fisheries control areas, and even, more controversially, areas protected by destructive human activities such as minefields or abandoned oil platforms and shipwrecks (providing protection from seabed trawling).

### ***B. IUCN Protected Area Management Categories***

9. Given this diversity of protected-area names, objectives and management systems, the IUCN developed a 10 category system in 1978, drawing on global experience, management categories that were later on revised in 1994 to the six categories listed in the annex to the present note. The IUCN categories provide a common language and enable the comparison and summary of management objectives for the world’s protected areas.

10. However, the *2003 United Nations List of Protected Areas* includes all protected areas from all countries and territories, provided that they comply with the IUCN protected areas definition, with or without IUCN management categories assigned, regardless of the size, and including international and regional designated sites.

11. The IUCN categorization system is widely accepted, and has been very useful in both obtaining information in a more standardized manner and providing guidance to countries as they establish and expand their protected areas systems. The system nevertheless has a number of shortcomings relating to both its applicability on the ground, and its accuracy as it has been applied in various regional and international overviews. Some sites are difficult to place in single categories, particularly where they are internally zoned with particular zones fitting different categories. In other cases, the legislation or details appear to fall between two categories. Another common problem comes where classification is undertaken by parties remote from the sites and with insufficient information to accurately determine the category. It has also been observed that, either intentionally or accidentally, an authority has categorized sites quite differently from the situation on the ground. Finally, sites are often placed in management categories based on their hypothetical management status, usually based on a site’s legal designation rather than the actual situation of its resources and management regime on the ground. This problem has given rise to calls for addition of a complementary dimension of classification, based on management effectiveness.

---

<sup>2/</sup> Resolution 713 of the twenty-seventh-session of the Economic and Social Council.

12. A project “Speaking a Common Language” is under way to examine these issues of protected area categorization, including Cardiff University in the United Kingdom, IUCN and its World Commission on Protected Areas (WCPA) and the World Conservation Monitoring Centre (UNEP-WCMC). <sup>3/</sup>

### III. GLOBAL PROTECTED AREAS COVERAGE

#### A. Sources of information

##### 1. *The World Database on Protected Areas and the United Nations List of Protected Areas*

13. The most comprehensive dataset on protected areas world-wide is managed by the UNEP-World Conservation Monitoring Centre on behalf of the international community and in partnership with the IUCN World Commission on Protected Areas. This World Database on Protected Areas (WDPA) is being upgraded by a consortium of non-governmental organizations, which have pooled data and knowledge. Although this is still a work in progress, the World Database currently holds more than 100,000 records of protected areas. The WDPA was launched into the public domain at the Fifth World Parks Congress in September 2003.

14. The United Nations List of Protected Areas is compiled from information provided by national protected area agencies and other organizations to the World Database of Protected areas and through literature search. The 2003 version was launched at the Vth World Parks Congress. It notes, however, that the information provided is a static snapshot of the World Database on Protected Areas. Data are continuously gathered and the process of protecting an area can change over time, and therefore changes can occur at any time in the size, classification and status of protected areas.

##### 2. *National information sources in the framework of the Convention on Biological Diversity*

###### *National reports*

15. Parties to the Convention provide information on protected areas officially to the Secretariat of the Convention in the form of case studies and, more importantly, in national reports as required by Article 26 of the Convention and thematic reports. Additional information can be found in the national biodiversity strategies and action plans.

16. The first national reports were due at the end of 1998. To date, 133 reports have been submitted by Parties. The second national reports were due on 15 May 2003. As of 30 June 2003, the Secretariat had received 98 reports. Ninety of these reports had responded to the questions on Article 8.

17. National reports provide summaries of the status of biodiversity, threats to it, the legal and policy framework for action and the institutions responsible for action. The reports contain information about the relative importance of the protected area system in a country, the level of resources available for the system, the capacity building needs of the system, and nature of the plans and guidelines implemented. These reports are based on an extensive planning and assessment exercise, supported by the financial mechanism. From a preliminary assessment of these reports it is clear that the protected area network is central to most Parties' efforts to implement the Convention. For more than 70 per cent of Parties, which submitted their second national reports, Article 8 was identified as a high priority. Over 80 per cent of the reporting countries have developed a system of protected areas and 65 per cent have developed national guidelines for the selection, establishment and management of protected areas. However, only one out of five Parties reported that sufficient resources were available to adequately manage and maintain the protected area network.

###### *Thematic reports on protected areas*

18. The Conference of the Parties, at its sixth meeting, invited Parties to submit a thematic report on protected areas or areas where special measures need to be taken to conserve biological diversity. These thematic reports contain information on the following topics: system of protected areas; regulatory

---

<sup>3/</sup> <http://www.cf.ac.uk/cplan/sacl/>.

framework; management approach; available resources; assessment; and regional and international cooperation.

19. The thematic reports were due by 31 May 2003. As of 30 June 2003 the Secretariat had received 34 thematic reports (four from Africa, seven from Asia, five from Central and Eastern Europe (CEE), seven from the group of Latin American and the Caribbean countries (GRULAC) and eleven from the Western European and Others Group (WEOG)). The thematic reports on protected areas generally complemented the results of the national reports, providing additional specific information. A full synthesis of information in thematic reports on protected areas has been made available as an information document (UNEP/CBD/SBSTTA/9/INF/2) for the ninth meeting of SBSTTA. Many reporting countries included protected areas or other sites in their countries that have been recognized or designated under an international or regional convention or programme. A compilation of information received indicates that:

(a) Over 80 per cent of respondents attached a high priority to the development and implementation of a national system of protected areas (compared to 70 per cent responding positively to the same question in the national report). A little less than a half of the reporting countries indicated that they have put in place a systematic planning process for development and implementation of a national system of protected areas and have made an assessment of the extent to which the existing network of protected areas covers all the areas identified as being important for conservation of biodiversity;

(b) Most reporting countries (82 per cent) have developed or established a policy framework and/or enabling legislation for establishment and management of protected areas. Five countries are in advanced stages of developing such policies and/or legislation and only one country is in early stages of policy and/or legislative development in this regard. Almost 60 per cent of respondents have adopted some guidelines, criteria and targets to support the selection, establishment and management of protected areas. Some Parties apply relevant guidelines developed by IUCN or under NATURA 2000;

(c) Almost 60 per cent of respondents have assessed the principal threats to protected areas and the biodiversity they contain, while in another 25 per cent such assessments are under way or planned;

(d) Only just over one third of reporting countries have formally recognized protected areas established and managed by NGOs, citizen groups, private sector and individuals;

(e) The majority of reporting countries, including developed countries, found human, institutional and financial resources limiting (65 per cent) or very limiting (25 per cent) for the full implementation of the protected areas networks as well as the management of individual protected areas. Only two reporting countries find resources adequate or good for the actions in this regard. Out of 22 of the reporting countries eligible for funding by the Global Environment Facility (GEF), 15 countries have received some funds; four countries are requesting funds and three countries have not received any funds from GEF for establishment and management of protected areas;

(f) Almost one out of two reporting countries is currently developing a programme to assess on a regular basis the effectiveness of protected areas management while one out of four already has such a programme in place;

(g) Over 70 per cent of responding Parties reported on collaboration with neighbouring countries in the establishment and/or management of transboundary protected areas;

(h) While both national reports and thematic reports provide excellent information on activities by Parties they do not contain information on conservation outcomes.

## **B. Number and extent of the world's protected areas**

### *1. Global overview*

#### *Statistics*

20. The 2003 United Nations List of Protected Areas includes 102,102 sites covering 18.8 million km<sup>2</sup>. Significant progress has been made in conserving representative areas of the world's terrestrial biomes, although some biomes, including lake systems and temperate grasslands, remain under-represented. Of the total area protected it is estimated that 17.1 million km<sup>2</sup> constitute terrestrial protected areas, or 11.5% of the global land surface. Unfortunately, marine areas are significantly under-represented in the global protected area system. Approximately 1.64 million km<sup>2</sup> comprise marine protected areas - less than 0.5% of the world's oceans and less than one-tenth of the overall extent of protected areas worldwide.

<b>Category</b>	<b>No. of sites</b>	<b>Proportion of total no. protected areas (%)</b>	<b>Area covered (km<sup>2</sup>)</b>	<b>Proportion of total area protected (%)</b>
<b>Ia</b>	4,731	4.6	1,033,888	5.5
<b>Ib</b>	1,302	1.3	1,015,512	5.4
<b>II</b>	3,881	3.8	4,413,142	23.6
<b>III</b>	19,833	19.4	275,432	1.5
<b>IV</b>	27,641	27.1	3,022,515	16.1
<b>V</b>	6,555	6.4	1,056,008	5.6
<b>VI</b>	4,123	4.0	4,377,091	23.3
<b>No. Category</b>	34,036	33.4	3,569,820	19.0
<b>Total</b>	<b>102,102</b>	<b>100</b>	<b>18,763,407</b>	<b>100</b>

21. Table 1 shows the number and size of protected areas on the basis of IUCN management categories as well as those sites without categories (*2003 United Nations List of Protected Areas*):

(a) The overview of global statistics indicates that 67% of the world's protected areas have been assigned an IUCN management category, covering 81% of the total area protected. Among the categorised sites, the largest number lie within Category IV (Habitat/Species Management Area) and Category III (Natural Monument). Together they comprise almost 47% of all protected areas. In terms of total area, Category II and Category VI comprise 47% of all protected areas. This is not surprising, since national parks have traditionally been established to protect larger areas at the ecosystem and landscape level, and the 2003 figures reflect the trend in previous *United Nations Lists*, although in relative terms the extent of Category II is marginally less than it was in 1997. However, the considerable extent of Category VI is a relatively recent phenomenon. It was the most significant innovation in the last revision of IUCN's management category system, and recognised the important role protected areas play in the sustainable livelihoods of local people;

(b) With increasing populations and development pressures, it becomes more and more difficult to protect strict nature reserves and large wilderness areas, which have tended to remain the smallest in number and fourth to fifth in extent of the IUCN management categories (categories 1a and 1b).



### *Representativeness*

22. Many reserve systems are biased towards particular subsets of natural features, usually the economically less valuable and often species-poorer habitats, while leaving others inadequately protected (Pressey, 1994). Therefore, existing reserve networks are currently not always the best approach for representing the biodiversity of particular regions, and over the last decade numerous analyses at the national and regional scales have revealed that the coverage of biodiversity in protected areas is woefully inadequate (Scott *et al.*, 2001).

### *Economic value*

23. Some efforts have been made to assess the total value of ecosystem goods and services to humanity. One 1997 study estimated the annual value of ecosystems services from the entire biosphere at \$33 trillion, noting that most of this value is outside the market (Costanza *et al.*, 1997), although this figure has been rather controversial (Daily, 2000). The ecological benefits of protected areas are global, and their value will increase as pressures increase on unprotected natural resources and as global environmental change continues. There is a need for equity in the disbursement of the real costs of developing countries maintaining protected areas for the global good - the high level of global benefits accruing from protected natural ecosystems require major adjustments to the way we support protected areas. Balmford *et al.* (2002) calculate that an effective terrestrial and marine reserve system would cost around \$45 billion per year. This is considerably in excess of the current \$6.5 million - but a small proportion of economically and ecologically perverse subsidies, estimated globally at \$950-\$1,950 billion annually, that continue to drive habitat loss. In return for this modest investment, the authors calculate that their "hypothetical global reserve network would ensure the delivery of goods and services with an annual value (net of benefits from conversion of between ~\$4,400 billion and \$5,200 billion, depending on the level of resource use permitted within protected areas". This is a cost/benefit ratio of about 100:1.

## 2. *Protected areas by thematic area and region*

### *Marine and coastal protected areas*

24. Current data regarding the number and extent of marine and coastal protected areas (MCPAs) are mainly based on information available in the World Database on Protected Areas (WDPA). There are significant limitations to these data, however, including the lack of geographic coordinates for many protected areas, which limits possibilities for a more complete analysis. The last comprehensive global analysis of marine protected areas dates from 1995 (Kelleher *et al.*, 1995). The 2003 United Nations List indicates that, while the oceans comprise 70 per cent of the Earth's surface, less than 0.5 per cent of the marine environment is within protected areas, compared with about 11.5 per cent of the land surface.

25. Areas set aside for protection in the marine environment provide a highly variable degree of protection to biodiversity, which was not necessarily the prime purpose for which the areas were established. MCPAs are found in all of the world's marine regions, in sizes ranging from a few hectares to hundreds of thousands of square kilometres (e.g. the Great Barrier Reef Marine Park).

26. Areas outside of national jurisdiction are an obvious gap in the current global system of marine and coastal protected areas. The high seas, comprise an estimated 64 per cent of the world's oceans. However, nearly all of the existing marine and coastal protected areas lie within national jurisdiction. There are currently no marine and coastal protected areas outside of national jurisdiction that provide effective protection to a wide range of biodiversity, although there are a few areas which protect specific species or control a particular impacting activity. The exception to this is a high-seas protected area established recently in the Mediterranean under the Protocol Concerning Mediterranean Specially Protected Areas.

27. Plans are under way to update the global inventory of marine protected areas.

### *Wetlands/inland waters*

28. UNEP-WCMC estimated that 570 million ha (6 per cent of Earth's land surface) are composed of wetlands of which 30 per cent are bogs, 26 per cent fens, 20 per cent swamps, 15 per cent floodplains, and

2 per cent lakes. A considerable portion of these is under some form of protection. There are currently 1180 sites recognized as Wetlands of International Importance recognized under the Ramsar Convention covering a total area of 103 million ha. However, this area includes both inland waters and coastal areas. A 1997 analysis of World Heritage sites inscribed for their inland water ecosystems concluded that one out of two sites was inscribed primarily for its freshwater wetlands or held significant freshwater wetland values (Thorsell *et al.*, 1997). Many of these sites contain Ramsar sites or are also Biosphere Reserves under the UNESCO Man and the Biosphere Programme. Over 75 per cent of the World Heritage sites with significant freshwater values are located in one of the WWF Global 200 Ecoregions. At the national or sub-national level numerous mechanisms exist to conserve the integrity of inland waters, including watershed protection, riverbank and shore land protection, floodplain protection etc. However, it is difficult to estimate the percentage of inland waters that is effectively protected. With respect to the world's major lake systems, the 2003 United Nations List has determined that only about 1.5% of this biome is protected.

### *Mountains*

29. As noted in the *Mountain Watch 2002* (UNEP-WCMC, 2002), <sup>4/</sup> many mountain areas were among the first to be accorded protected-area status for their spectacular scenery and recreational opportunities. As the concept of protected areas evolved to include areas of particular importance for biodiversity: protected mountain areas included biodiversity hotspots and other locations with high species diversity. Increasingly, management of protected areas also sought to meet the needs of people living in mountains and their foothills. Because many mountains cut across national boundaries, mountain ecosystems provide opportunities for international cooperation in protected-area management. Mountains constitute 32 per cent of protected areas. This figure is based on UNEP-WCMC definition of mountains. Accordingly, the global mountain area is about 40 million km<sup>2</sup> or about 27 per cent of the Earth's land surface. The estimates of protected mountain areas reported here include IUCN management categories I-IV. Some 190 Biosphere Reserves are within mountains. Mountain World Heritage sites (55 in total) are among the three most common biomes on the World Heritage List along with terrestrial wetlands and marine and coastal environments. Five out of the eight transboundary natural sites on the World Heritage List occur in mountains.

### *Forests*

30. The last comprehensive global analysis of forest protected areas dates from 2001 (UNEP-WCMC 2001) and is based on an updated map of protected forest areas prepared for FAO. This analysis indicates that at the global level 479 million hectares of forest, or 12.4 per cent of the world's forest area is in protected areas. There are however considerable differences between the regions, ranging from 5 per cent in Europe to over 20 per cent in North and Central America.

### *Regional data*

Information gathered in the GEO-3 provides some indication of the status of protected areas in different regions of the globe: <sup>5/</sup>

(a) In Africa, approximately 7 per cent of the land area has been designated as protected. Africa contains 1254 protected sites (UNEP, 2002), including 198 marine protected areas, 50 biosphere reserves, 80 Wetlands of International Importance and 34 World Heritage Sites. Distribution of protected areas differs between sub-regions. Southern Africa has the largest amount of sites as well as the largest extent of protected areas. Sub-Saharan Africa accounts for 18 per cent of the global mean investment in protected areas;

(b) The total size of protected areas in Asia and the South Pacific is around 287 million ha representing some 8.3 per cent of the total area with 6789 protected-area sites (UNEP, 2002). Australia has the largest number and area under protection;

---

<sup>4/</sup> See [http://www.unep-wcmc.org/mountains/mountain\\_watch/pdfs/WholeReport.pdf](http://www.unep-wcmc.org/mountains/mountain_watch/pdfs/WholeReport.pdf).

<sup>5/</sup> No information was given on protected areas in North America

(c) The total size of protected areas in Europe is 118.35 million ha representing some 5 per cent of the area with 22077 designated sites. Countries of Central and Eastern Europe still possess a wealth of well-preserved landscapes, ecosystems and species that are rare or already extinct in Western Europe. Most protected areas had been designated by the end of the 1970s. State financing has since declined and many of these areas are under severe pressure;

(d) The total size of protected areas in Latin America and the Caribbean is 213.54 million ha representing some 10.6 per cent of the total area with 2675 designated sites. Many private protected areas especially forest reserves have been established. A related trend in the 1990's has been the creation of a number of community-managed forest reserves;

(e) In West Asia, 86.24 million ha are protected. The 52 designated sites represent about 23.2 per cent of the total area. Ecoregional representation is probably uneven, with large desert areas designated for conservation.

#### *Transboundary protected areas*

31. The efficient conservation and management of natural areas crossing one or more borders often require the establishment of transboundary protected areas. Such initiatives have significant value in promoting cooperation between nations as well as great practical benefits for management. As the focus of conservation has moved towards landscape-scale and ecosystem approaches, and recognition of the importance of ecological corridors and connectivity, interest in the practical conservation benefits of transboundary protected areas has increased (Sandwith *et al.* 2001). As of 2001, there were at least 169 complexes of two or more adjoining protected areas divided by international boundaries, involving a total of 667 protected areas representing 113 countries. Levels of formalization and cooperation vary, with some already formally established as transboundary protected areas (TBPAs), but all with potential to become formal TBPAs.

### **C. Role and effectiveness of protected areas**

32. Many protected areas are effective in conserving species, habitats and landscapes of value. A recent analysis of 93 protected areas from around the world indicated that most parks are successful at stopping land clearing and, to a lesser extent, at mitigating logging, hunting, fire and grazing (Bruner *et al.*, 2001). Some of the benefits of protected areas include:

(a) Protecting ecosystem structure, functioning and beauty, and allowing recovery from past damage;

(b) Protecting the genetic variability of exploited species;

(c) Improving fishery and forestry yields, including through protecting spawning stocks, enhancing recruitment, reducing over-harvesting of vulnerable and endangered species, reducing conflicts between users, and protecting essential habitats;

(d) Providing other direct and indirect social and economic benefits, including through benefits to tourism, traditional uses of biodiversity, and preserving reefs and natural areas of unique value;

(e) Increasing our understanding of biodiversity components and systems, including by providing a baseline for identifying human-induced changes, allowing measurement of natural mortality, and providing areas for research where experiments are not affected by human activities; and

(f) Providing opportunities for the public to enjoy natural or relatively natural environments, and opportunities for public education and to allow the public to develop an understanding of the effects of humans on the ecosystems.

33. However, a large number of protected areas is inadequately supported because of a lack of financial resources or capacity, and this can greatly reduce their effectiveness (UNEP-WCMC, 2002; see also the synthesis of thematic reports on protected areas (UNEP/CBD/SBSTTA/9/INF/2)). Commonly recurring themes for the failure of protected areas to achieve their objectives include:

- (a) Insufficient financial and technical resources to develop and implement management plans or lack of trained staff;
- (b) Lack of scientific data and information for management decisions, including information on the impacts of resource use and on the status of biological resources;
- (c) Lack of public support and unwillingness of users to follow management rules, often because users have not been involved in establishing such rules;
- (d) Inadequate commitment to enforcing management rules and regulations;
- (e) Unsustainable use of resources occurring within protected areas;
- (f) Impacts from activities in land and sea areas outside the boundaries of protected areas, including pollution and overexploitation;
- (g) Lack of clear organizational responsibilities for management and absence of coordination between agencies with responsibilities relevant to protected areas;
- (h) Problems related to the size and habitat coverage, particularly in the case of marine and coastal protected areas;
- (i) Conflicting objectives of the protected areas;
- (j) Lack of national or regional networks; and
- (k) Lack of understanding and integration of social and economic issues into the establishment and management of protected areas.

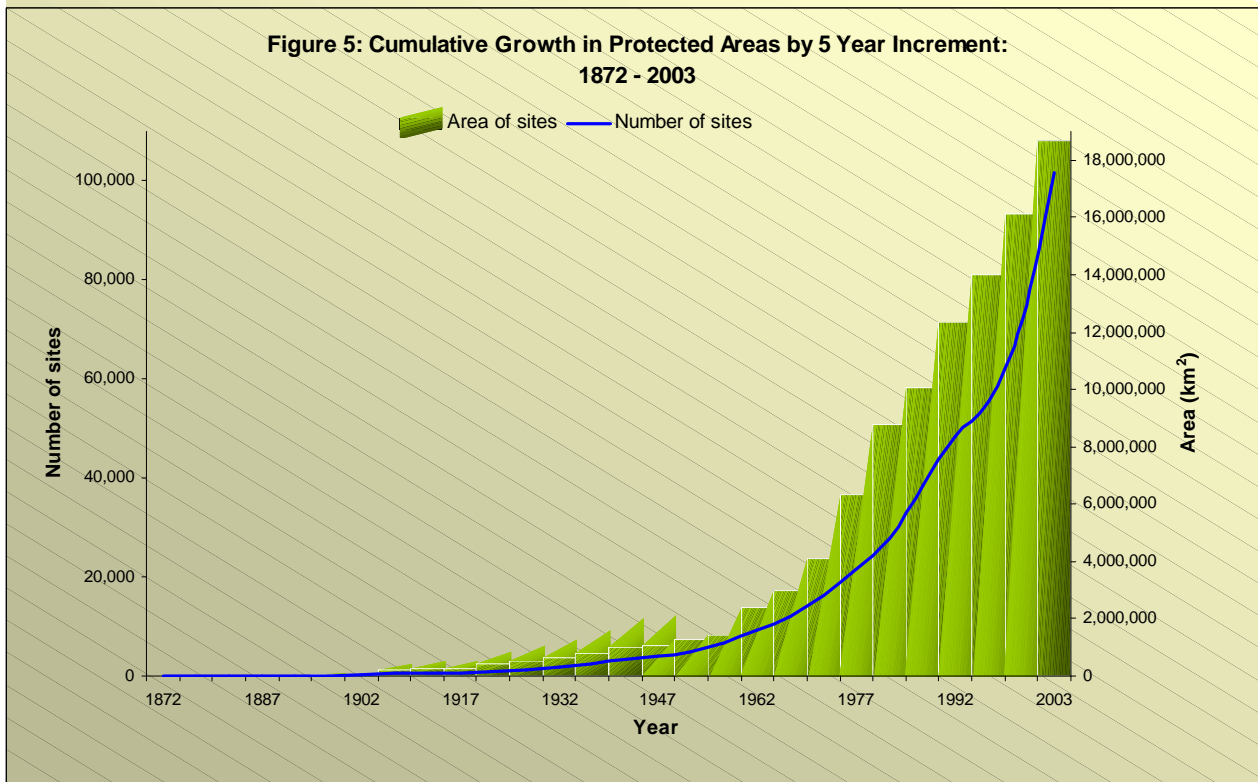
34. It is also generally agreed that the existing systems of protected areas are not sufficient to meet the role anticipated by the Convention of conserving representative components of biodiversity and of meeting the target of significantly reducing the rate of biodiversity loss by 2010. Many of the planet's ecoregions are either not represented or inadequately represented by protected areas. In addition many unique sites and biodiversity hotspots are not, or not adequately, protected.

#### **IV. TRENDS IN NUMBER AND EXTENT OF PROTECTED AREAS**

##### ***A. Number and extent of protected areas***

35. Throughout the twentieth century the number of protected areas steadily increased (see figure 1). The concept of protected areas also evolved from national parks and strict nature reserves to areas where management could ensure conservation of species, habitats and ecosystem functions and services, and guarantee the needs of local people living within or outside these protected areas. The widening of the range of conservation and sustainable use benefits delivered by protected areas led to a concomitant widening of the range of stakeholders—importantly including indigenous and local communities as key drivers and beneficiaries in many locations.

36. The number of global protected areas has been rising for the past decades and is now in excess of 100,000 sites (figure 1). The total area of protected sites has also increased continuously during the past three decades from less than 3 million km<sup>2</sup> in 1970 to more than 12 million km<sup>2</sup> by the late 1990s (Green and Paine, 1997 cited in UNEP, 2002), indicating that there are continuing efforts by Governments to establish protected areas. It should, however, be noted that the recent increase in number and area partly results from the fact that not all the protected areas were reported in the early years of the World Database on Protected Areas.



**Figure 1:** Growth of the global number and total area of protected areas from 1872 to 2003.

Source: 2003 United Nations List of Protected Areas.

37. The trend in marine and coastal protected areas illustrates the changes in number of protected areas in the past few decades. Marine and coastal protected areas have existed for hundreds of years. In the Pacific, for example, there were many areas where community leaders prohibited extractive use so as to allow regeneration of the resources. Examples of such traditional marine and coastal protected areas can also be found elsewhere in the world. Although the current global inventory is out of date, it is known that the number of marine and coastal protected areas has grown over the past 20 years, and that most coastal countries now have at least one. However, most statutory marine and coastal protected areas are very recent and, as noted above, the global marine protected area coverage is minimal. In 1970, only 118 were known; by 1985, only 430. By 1994, there were some 1306 marine and coastal protected areas, but over half were in four marine regions – the Wider Caribbean, the Northeast Pacific, the Northwest Pacific and Australia/New Zealand. Moreover, these figures exclude marine and coastal protected areas, which were established voluntarily, rather than by statute, and protected areas that are predominantly terrestrial, but include some marine components (IUCN, 1999).

### **B. Factors determining trends**

38. Protected areas are globally faced with various threats to their viability and integrity. These threats have been described in general terms in many publications. However, their impacts need to be monitored, assessed and taken into account in the design and management of protected areas and systems. There are also factors that promote the establishment of protected areas including a number of decisions of the Conference of the Parties to the Convention on Biological Diversity, and international and regional agreements and programmes. These factors influence the changes in the number and extent of protected areas over time.

### 1. *Threats to protected areas*

39. An IUCN survey conducted in 1999 in 10 key forest countries <sup>6/</sup> (IUCN, 1999) found threat levels to be high, and identified two key issues:

(a) *Management*: Less than 25 percent of forest protected areas were considered to be well managed with a good infrastructure, and 17 to 69 percent of forest protected areas had no management at all;

(b) *Security*: Only one percent of forest protected areas were regarded as secure in the long term. A further one percent had been so badly degraded that they had lost the values for which protection was given. Some 22 per cent were suffering various levels of degradation and 60 per cent were currently safe but faced possible future threats.

40. Threats to protected areas are not confined to developing countries or to the tropics. Loss of old-growth forest in Europe and North America, for example, has been nearly complete in most areas except the boreal north, and remaining forest fragments within protected areas are under threat from air pollution, acid rain, overuse of national parks, and other threats.

41. Even less is known about the threats to marine protected areas. A recent survey of 342 marine protected areas in South-East Asia concluded that only 14 per cent were effectively managed. The same study observed that “human activities now threaten an estimated 88 per cent of Southeast Asia’s coral reefs.... For 50 percent of these reefs, the level of threat is ‘high’ or ‘very high’” (Burke *et al.*, 2002). Similarly, in 1995, the World Resources Institute estimated that over half of marine and coastal protected areas were at high risk from nearby intensive coastal development. In most regions, marine and coastal protected areas with effective management were outnumbered by those with ineffective or no management at all. Lack of integrated marine and coastal area management (IMCAM) was also a problem in most countries and for most marine and coastal protected areas. If pollution and erosion from land that reaches the sea are not controlled, protective action in the marine environment may be futile (IUCN, 1999). As a result, at global, regional and national levels marine and coastal biodiversity is declining or being lost. Habitats are being fragmented, degraded or lost, and species are being affected at community through to the genetic level, resulting in local or regional extinctions.

42. The WCPA report entitled “National System Planning for Protected Areas” concluded that the major threats to conservation in most countries lie outside the protected-area system. Unless the linkages between protected-areas management and external factors are identified and addressed, fundamental conservation issues are difficult to resolve (Davey, 1998).

43. Direct and indirect threats to protected areas as well as their underlying causes have been reviewed by many authors (e.g. WRI *et al.* 1992, UNEP, 1995; Carey *et al.* 2000). Additional factors include: the impact of climate change, hunting and wildlife trade of the species living in protected areas.

### 2. *Agreements and other initiatives promoting the establishment and expansion of protected areas*

#### *Organizations and programmes*

44. Numerous organizations and programmes are devoted to promoting the role of protected areas and their effectiveness at the international level. Notable examples include: the UNESCO Man And The Biosphere Programme; the Critical Ecosystems Project of the World Bank; the Global 200 system of the World Wide Fund for Nature (WWF); and the Parks in Peril initiative of The Nature Conservancy. Quantitative analysis of the value of protected areas is increasingly employed to justify and support the development and strengthening of protected-area networks (IUCN 1998). Information on values to different user groups, and of the underlying cultural and socio-economic circumstances, is also important for enabling better management, controlling threats, and resolving conflicts. However, to date efforts to

---

<sup>6/</sup> The IUCN survey covered Brazil, China, Gabon, Indonesia, Mexico, Papua New Guinea, Peru, the Russian Federation, the United Republic of Tanzania and Viet Nam.

communicate these values to decision makers and others has been ad hoc and often relied on poorly tailored communication strategies and tools.

### ***International and regional agreements***

45. A significant number of international agreements influence the designation of new protected areas, whilst others add layers of legal protection onto existing sites. Where international designations are applied, in many cases there is also an element of prestige. This is clearly recognized for World Heritage sites, but is also the case with Ramsar sites and Biosphere Reserves, and with the Council of Europe Diploma Sites and the forthcoming Landscape Award of the Council of Europe. It is instructive to note that both the Council of Europe designations and Biosphere Reserves are established under non-treaty agreements, and are thus not binding under international law. Much of their success, therefore, depends on the prestige associated with designation.

46. Enhanced prestige, however, needs to be used to leverage effective conservation, raise international, national and local awareness, and mobilize human and financial resources for effective site management.

### ***3. Decisions of the Conference of the Parties to the Convention on Biological Diversity***

47. The Conference of the Parties specifically considered the implementation of Article 8 at its second and third meetings, where it emphasized the importance of regional and international cooperation, and of disseminating relevant experience (decisions II/7 and III/9). The Conference of the Parties also instructed the financial mechanism to support Parties' efforts to implement Article 8 as a matter of urgency and priority (decisions I/4 and II/6).

48. Protected areas form a central element of the various thematic programmes work adopted at the fourth and subsequent meetings of the Conference of the Parties.

(a) Programme element 3 of the programme of work on marine and coastal biological diversity 7/ is dedicated to marine and coastal protected areas. The two aims of this programme element are to facilitate research and monitoring activities; and to develop criteria for the establishment of, and for management aspects of, marine and coastal protected areas;

(b) The programme of work on the biological diversity of inland water ecosystems 8/ recommends the sharing of information and experience relevant to conservation and sustainable use of such ecosystems, specifically referring to use of protected areas and their management strategies for conservation and sustainable use of inland water ecosystems; 9/

(c) The expanded programme of work on forest biodiversity contains a number of activities related to protected areas. The programme of work also calls for work on the role and effectiveness of protected areas; 10/

(d) The use and establishment of additional protected areas is identified as one of the necessary target actions for the implementation of the work programme on dry and sub-humid lands; 11/

(e) The proposed programme of work on mountain biological diversity calls for, *inter alia*, the protection of unique, fragile mountain ecosystems, giving special consideration to measures aimed at strict protection whenever feasible; 12/

(f) In the Global Strategy for Plant Conservation, 13/ the Conference of the Parties adopted targets 4 and 5, which specify respectively that by 2010: (i) at least 10 per cent of each of the world's

---

7/ Decision IV/5, annex.  
8/ Decision IV/4, annex I; and in SBSTTA recommendation VIII/2, annex  
9/ Decision IV/4, paragraph 4  
10/ Decision VI/22, annex.  
11/ Decision V/23, annex I, II, part B, activity 7 (a).  
12/ Approved by SBSTTA in its recommendation VIII/1 A

ecological regions should be effectively conserved, implying increasing the representation of different ecological regions in protected areas, and increasing the effectiveness of protected areas; and (ii) protection of 50 per cent of the most important areas for plant diversity should be assured through effective conservation measures, including protected areas;

(g) The programme of work on Article 8(j) includes a component on protected areas; 14/

(h) The value of taxonomic data in assisting protected areas site selection is recognized in the programme of work for the Global Taxonomic Initiative; 15/

(i) Protected areas are also mentioned in connection with identification, monitoring, indicators and assessments 16/ and the proposed Addis Ababa principles and guidelines for sustainable use of biodiversity. 17/

#### 4. *The Plan of Implementation of the World Summit on Sustainable Development*

49. In paragraph 32 (c) of its Plan of Implementation, the World Summit on Sustainable Development recommended the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks by 2012 and time/area closures for the protection of nursery grounds and periods, proper coastal land use and watershed planning and the integration of marine and coastal areas management into key sectors.

## V. CONCLUSIONS

50. Available data indicate that protected areas encompass more than 11 per cent of the Earth's land surface. The 1992 World Parks Congress adopted a target of securing 10 per cent protection of the world's major biomes. The 2003 United Nations List indicates that has been achieved or exceeded for nine of the 14 biomes under the Udvardy system. Experience gained with monitoring progress on this voluntary global target could be instructive for the process, led by the Convention on Biological Diversity, to achieve the 2010 biodiversity target.

51. However, it should be recognized that, although at the global level the number and extent of protected areas have been increasing in the past decades, existing systems of protected areas are not representative of the categories of biodiversity important for its conservation and sustainable use as set down in Annex I to the Convention on Biological Diversity. This is particular true for marine areas, of which less than 0.5 per cent are protected, and with regard to hotspots, in line with the Plan of Implementation of the World Summit on Sustainable Development. There is a need to identify the categories of biodiversity as set down in Annex I of the Convention with a view to identifying species and sub-species, habitats or ecosystems requiring urgent actions, taking into account the ecosystem approach and in line with the Global Taxonomy Initiative.

52. In addition, comprehensive evaluations of the effectiveness of protected areas and their systems have been relatively rare, despite the importance of such evaluations in ensuring that protected areas fulfil the aims for which they were established. As indicated in the thematic reports submitted in May 2003, many countries have or are currently developing programmes to assess on a regular basis the effectiveness of protected areas management. These programmes require adequate financial support and the development of capacities.

53. There is a need for clear outcome-oriented target for improving the representativeness and effectiveness of protected areas in meeting the Convention objectives, consistent with the recently agreed global targets, and drawing *inter alia* on the work of relevant United Nations organizations and

---

13/ Decision VI/9: annex.

14/ Decision V/16, annex, part II, task 2.

15/ Decision VI/8.

16/ Decision VI/7 B.

17/ UNEP/CBD/SBSTTA/9/9 and relevant information documents.



conventions, and on the outcomes and recommendations of the Fifth IUCN World Parks Congress. A particular focus should be placed on marine and coastal protected areas, for which the Ad Hoc Technical Expert Group on Marine and Coastal Protected Areas, SBSTTA at its eighth meeting and the World Summit agreed that marine and coastal biological diversity should be maintained both in areas within and beyond national jurisdiction. The World Summit set a target date of 2012 for completion of such a global network. This target date could also be adopted for the work of the Convention.

54. Monitoring mechanisms with appropriate indicators are important to facilitate assessing the role of protected areas in achieving the 2010 biodiversity target, building on existing guidelines and methodologies.

55. The IUCN Protected Area Management Categories, as contained in the annex to the present note, are a valuable tool for the provision of information that is comparable across countries and regions, despite some shortcomings relating their applicability on the ground. The system could be further elaborated and refined to include *inter alia* criteria relating to the representativeness and effectiveness of protected areas.

56. The value of the World Database on Protected Areas and the United Nations List of Protected Areas has been demonstrated as tools for making information on protected areas readily available to support assessment, monitoring and decision-making and reporting on progress made towards the achievement of the objective of the Convention on Biological Diversity and related conventions and agreements and programmes.

57. There is a clear need for promoting and strengthening collaboration among all stakeholders including among international organizations and conventions dealing with protected areas, and governmental agencies, local and indigenous communities living within or adjacent to protected areas and the private sector, with a view to streamlining activities, promoting synergies, avoiding unnecessary duplications and ensuring availability of all required resources.

58. As international efforts to preserve biological diversity have evolved, it has become clear that protected areas are at the heart of any global biodiversity strategy for success. Without the preservation of core areas of habitat as well as the preservation of buffer zones around cores and linking wildlife corridors, biodiversity will be lost. Moreover, protected areas preserve landscapes, seascapes and natural areas for appropriate, long term, appreciation and use by human beings.

59. In brief, given their many benefits, protected areas are important instruments for meeting the Convention's targets of significantly reducing the rate of biodiversity loss by 2010. However, the current global network of protected areas is not sufficiently large, sufficiently representative and coherent, nor sufficiently well managed to optimize its contribution to preventing global biodiversity loss. Therefore, there is an urgent need to take action to improve the coverage, representativeness, connectedness and management of protected areas nationally, regionally and globally.

*Annex*

**IUCN PROTECTED AREA MANAGEMENT CATEGORIES (1994)**

**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.

**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.

**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.

**CATEGORY III – Natural Monument: Protected area managed mainly for conservation of specific natural features.**

Area containing one or more specific natural or natural/cultural features which are of outstanding or unique value because of their inherent rarity, representative or aesthetic qualities or cultural significance.

**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 V – Protected Landscape/Seascape: Protected area managed mainly for landscape/seascape conservation and 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.

**CATEGORY VI – Managed Resource Protected Area: Protected area managed mainly for the sustainable use of natural ecosystems.**

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.

Source: IUCN 1994.

## REFERENCES

- Balmford, A., Bruner, A., Cooper, P., Costanza, R., Farber, S., Green, R. E., Jenkins, M., Jefferiss, P., Jessamy, V., Madden, J., Munro, K., Myers, N., Naeem, S., Paavola, J., Rayment, M., Rosendo, S., Roughgarden, J., Trumper, K., Turner, R.K. 2002. "Economic Reasons for Conserving Wild Nature." *Science* Vol, 297. August 9.
- Bruner, A. Gullison, R. E., Rice, R. E., da Fonseca G. A. B. 2001. "Effectiveness of Parks in Protecting Tropical Biodiversity". *Science* Vol. 291:125-128.
- Burke, L., E. Selig and M. Spalding. 2002. *Reefs at Risk in Southeast Asia*. Washington DC, USA: World Resources Institute.
- Carey, C., N. Dudley and S. Stolton. 2000. *Squandering Paradise? The importance and vulnerability of the world's protected areas*. Gland, Switzerland: WWF.
- Chape, S., S. Blyth, L. Fish, P. Fox, and M. Spalding (compilers) (2003). 2003 United Nations List of Protected Areas. UNEP-WCMC and WCPA. IUCN, Gland, Switzerland and Cambridge, UK
- Costanza, R.; d'Arge, R.; de Groot, R.; Farber, S.; Grasso, M.; Hannon, B.; Limburg, K.; Naeem, S.; O'Neill, R.; Paruelo, J.; Raskin, R.; Sutton, P., and van den Belt, M.1997. "The value of the world's ecosystem service and natural capital." *Nature* 387: 253-260.
- Daily, G.C. 2000. "The Value of Nature and the Nature of Value." *Science* Vol. 289: 395.
- Davey, A.G. 1998. *National System Planning for Protected Areas*. Gland, Switzerland and Cambridge, UK: IUCN.
- FAO, 2001. *Global Forest Resources Assessment 2000*. FAO Forestry Paper 140, Rome, Italy. 479p.
- IUCN. 1994. *Guidelines for Protected Areas Management Categories*. CNPPA with assistance of WCMC. Gland, Switzerland and Cambridge, UK: IUCN.
- IUCN. 1998. *Economic Values of Protected Areas: guidelines for protected area managers*. Produced by the Task Force on Economic Benefits of Protected Areas of the World Commission on Protected Areas (WCPA) of IUCN in collaboration with the Economics Services Unit of IUCN.
- IUCN. 1999. *Threats to Forest Protected Areas: Summary of a survey of 10 countries carried out in association with the World Commission on Protected Areas*. Research Report for the World Bank/WWF Alliance for Forest Conservation and Sustainable Use. November.
- Pressey, R. L. 1994. "Ad Hoc Reservations – Forward or Backward Steps in Developing Representative Reserve Systems". *Conservation Biology* Vol. 8: 662-668.
- Sandwith, T., C. Shine, L. Hamilton and D. Sheppard. 2001. *Transboundary Protected Areas for Peace and Cooperation*. Gland, Switzerland and Cambridge, UK: IUCN.
- Scott, J. M., F. W. Davis, R. G. McGhie, R. G. Wright, C. Groves and J. Estes 2001. "Nature reserves: Do they capture the full range of America's biological diversity?" *Ecological Applications* Vol. 11: 999-1007.
- Thorsell, J., Ferster Levy, R. and Sigaty, T. (1997) *A global overview of wetland and marine protected areas on the World Heritage list. A Contribution to the Global Theme Study of World Heritage Natural Sites* carried out in collaboration with The World Conservation Monitoring Centre
- UNEP. 1995. *Global Biodiversity Assessment*. Cambridge University Press
- UNEP. 2002. *Global Environment Outlook-3: Past, present and future perspectives*. United Nations Environment Programme, Nairobi, Kenya and Earthscan.
- UNEP-WCMC. 2001. *GEO-3 Protected areas snapshot*. United Nations Environment Programme, Nairobi, Kenya (cited in UNEP, 2002)
- WRI, IUCN and UNEP. 1992. *Global Biodiversity Strategy: Guidelines for action to save, study and use Earth's biotic wealth sustainably and equitably*. ISBN: 0-915825-74-0.