Protected Planet Report 2012

Tracking progress towards global targets for protected areas

UNEP WCMC

United Nations Decade on Biodiversity

IUCN WCPA World Commission on Protected Areas

protected planet

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Tracking progress towards global targets for protected areas

Compiled by UNEP-WCMC in cooperation with IUCN and other partners

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The United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) is the specialist biodiversity assessment centre of the United Nations Environment Programme (UNEP), the world's foremost intergovernmental environmental organisation. The Centre has been in operation for over 30 years, combining scientific research with practical policy advice.

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FOREWORD

Protected areas remain one of the cornerstones for promoting biodiversity, ecosystem services and human well-being. Today protected areas cover 12.7% of the world's terrestrial area and 1.6% of the global ocean area. They store 15% of the global terrestrial carbon stock, assist in reducing deforestation, habitat and species loss, and support the livelihoods of over one billion people.

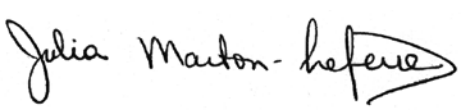
At the United Nations Conference on Sustainable Development (Rio+20) world leaders reaffirmed the value of biological diversity, its critical role in maintaining ecosystem services and the urgency to implement actions to halt and reverse the loss of biodiversity.

The *Protected Planet Report* is a new initiative that tracks global progress towards Target 11 of the Convention on Biological Diversity's (CBD) Aichi Biodiversity Targets. Achieving this ambitious target, which calls for at least 17% of the world's terrestrial areas and 10% of marine areas to be equitably managed and conserved by 2020, will require strong and effective partnerships: this report is an excellent example.

It has been compiled by the UNEP World Conservation Monitoring Centre, IUCN World Commission on Protected Areas and a wide range of organisations that build on the work of the CBD-mandated Biodiversity Indicators Partnership. Several of these indicators also regularly contribute to the Global Environment Outlook and Global Biodiversity Outlook assessments, as well as the Millennium Development Goals reports – they have a role to play in the development of Sustainable Development Goals post 2015 too.

The *Protected Planet Report 2012* underlines the successes of countries, communities and non-governmental organisations with respect to protected areas – since 1990, for example, protected areas have increased in number by 58% and in their extent by 48%. However, many protected areas face management, governance and financial challenges and half of the world's most important sites for biodiversity are still unprotected.

On a planet of seven billion people, rising to over nine billion by 2050, the need for robust, dynamic and well-managed protected areas is even more crucial today than it was in past decades and centuries. This report provides not only the facts and figures required by governments to make informed decisions and choices, but also illuminates some of the pathways towards achieving a sustainable 21st century – one that grows economies and generates jobs but keeps humanity's footprint within ecological boundaries.



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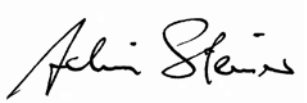

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1. INTRODUCTION

For over a century the establishment of protected areas has been a fundamental strategy to conserve biodiversity. Today we know that well-managed protected areas support not only healthy ecosystems and threatened species, but also provide multiple benefits to people. These benefits include a wide range of ecosystem services such as clean water provision, food security, disaster risk reduction and climate regulation. Thanks to their contribution to local and national economies, protected areas are now recognised as an integral part of sustainable development strategies. They are a tried and tested approach that is widely applied to conserve nature with associated ecosystem services and cultural values.

Protected areas come in many shapes and sizes, including strict no-take sanctuaries, sacred natural sites, peace parks, or multiple-use landscapes and seascapes (see also Box 1.1 on page 3). They are managed by governments, local communities, indigenous peoples, non-governmental organisations (NGOs), and/or private entities.

Protected areas and the Convention on Biological Diversity

Recognising the importance of protected areas, a number of international conferences, conventions and agreements have over the past 40 years set ambitious protected area targets for the international community. The 1992 Convention on Biological Diversity (CBD) requires its Parties to establish protected area systems to conserve biodiversity. In 2004, the CBD Parties adopted the Programme of Work on Protected Areas (PoWPA), the most comprehensive protected area commitment ever made by the international community. The PoWPA, whose implementation continues to date, includes 16 goals and a series of time-bound targets. At the same time, complementary protected area targets and indicators were agreed to assess progress towards the overall 2010 Biodiversity Target of the CBD[a], and these have been widely reported on, for example by the CBD-mandated Biodiversity Indicators Partnership (BIP)[1].

More information on the CBD Programme of Work on Protected Areas (PoWPA), including E-learning modules and other relevant resources, is available online at:

http://www.cbd.int/protected/pow/learnmore/intro/

a The 2010 Biodiversity Target was "to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth".

Concluding that the 2010 biodiversity target had not been met at the global level, in 2010 the CBD Parties adopted the Strategic Plan for Biodiversity 2011–2020, including a set of 20 headline targets known as Aichi Biodiversity Targets (Decision X/2). Effective protected areas are essential for the achievement of several of these targets, in particular Targets 5 and 12, which concern habitat and species loss. Target 11, however, is the one that deals specifically with protected areas and other area-based conservation measures:

> ***By 2020, at least 17% of terrestrial and inland water areas, and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.***

The Protected Planet Report 2012

A collaborative effort of many partners, the Protected Planet Report 2012 reviews progress towards key elements of Target 11 (Table 1.1) and summarises the status and trends in global biodiversity protection for decision makers and the conservation community. It is the first in a series that will be produced every other year at least until 2020 to evaluate progress towards international protected area targets. In order to highlight trends over time, this report draws on a range of indicators that cover at least the period 1990–2010, a timeframe which will be extended in future editions.

Table 1.1 Relationship between chapters of the Protected Planet Report 2012 and elements of Aichi Target 11 and other relevant Aichi Targets.

Report chapter		Element of Target 11 and other relevant Aichi Targets
2. Global protected area coverage	→	"at least 17% of terrestrial and inland water areas, and 10% of coastal and marine areas"
3.1. Protected area coverage of biodiversity	→	"ecologically representative" and "especially areas of particular importance for biodiversity and ecosystem services"
3.2. Protected area benefits for biodiversity	→	"effectively managed" and Aichi Targets 5 and 12 on habitat and species loss
4. Management	→	"effectively managed"
5. Governance	→	"equitably managed"
6. Financing	→	"effectively managed" and Aichi Target 20 on financial resources
7. Connectivity	→	"well connected systems of protected areas, integrated into wider landscapes and seascapes"

The World Database on Protected Areas

Many of the indicators underpinning the Protected Planet Report 2012 are derived from the CBD-mandated World Database on Protected Areas (WDPA), a joint product of UNEP and IUCN, prepared by UNEP-WCMC and the IUCN World Commission on Protected Areas (WCPA), working with governments and collaborating NGOs[2].

The WDPA is the most comprehensive global dataset on marine and terrestrial protected areas as defined by IUCN (see Box 1.1). ProtectedPlanet.net, the web interface of the WDPA, has been developed to improve access to information in the dataset, fill data gaps and facilitate reporting and review of data. This report series will support this process by synthesising existing information and analyses, and encouraging governments, NGOs and other stakeholders to help update the WDPA.

Building on the work of the Biodiversity Indicators Partnership (BIP), the Protected Planet Report 2012 uses a number of global indicators that measure progress towards international protected area targets. More information on the global indicators is available in Butchart *et al.* (2010), Volume 53 of the CBD Technical Series (BIP 2010), and online at:

1) http://www.bipindicators.net/

2) http://mdgs.un.org/unsd/mdg/Default.aspx

ProtectedPlanet.net is the web interface of the World Database on Protected Areas (WDPA). The interactive website allows you, among other things, to search, explore and download protected area data and to learn more about the world's protected areas:

http://www.protectedplanet.net/

Box 1.1 Defining and classifying the world's protected areas.

Different definitions of protected areas exist. Globally the most important definitions are those of the CBD and IUCN, which are widely interpreted to effectively mean the same thing. The WDPA, which underpins most of the analyses in this report, uses the IUCN definition: **A protected area is a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values**[3].

IUCN has also developed a system of protected area management categories that helps classify protected areas based on their primary management objectives (see also Chapter 4). The categories have long been used by the United Nations and many governments for protected area planning and reporting, including in the WDPA, and the value of the categories for reporting is explicitly recognised in the CBD PoWPA as well as several decisions adopted by the CBD Conference of the Parties (COP; for example Decisions VII/28 and IX/18)[4].

The IUCN protected area management categories are:

- **Ia Strict nature reserve**
- **Ib Wilderness area**
- **II National park**
- **III Natural monument**
- **IV Habitat / species management area**
- **V Protected landscape / seascape**
- **VI Protected area with sustainable use of natural resources**

More information on the IUCN definition and categories is available in the IUCN *Guidelines for Applying Protected Area Management Categories* (Dudley 2008). Supplementary guidelines for the application of these categories to marine protected areas will be launched by IUCN at the World Conservation Congress in September 2012.

UNEP SUPPORT TO PROTECTED AREAS

The United Nations Environment Programme (UNEP) supports strengthened and expanded protected area networks through a portfolio of projects. These projects focus on enhancing protected area management through providing tools to (1) mainstream environmental concerns into decision making, (2) demonstrate the value of protected areas, and (3) support approaches to integrate protected areas into the wider landscape and seascape.

To illustrate how UNEP supports progress on Aichi Biodiversity Target 11, the Protected Planet Report 2012 includes, in each chapter, a short case study from projects carried out within the framework of the *Spain-UNEP Partnership for Protected Areas in support of the CBD LifeWeb Initiative*. The Government of Spain initiated this strategic partnership with UNEP to improve the management of existing protected areas, help identify and establish new protected areas, and protect biodiversity for long-term human wellbeing and sustainable development.

The partnership currently implements 11 projects at over 15 marine and terrestrial protected areas across Africa, Asia, Latin America and the Caribbean. These projects assist countries, through the CBD LifeWeb Initiative, with the implementation of both the CBD Programme of Work on Protected Areas and the UNEP Programme of Work. The partnership provides technical, financial and educational assistance, enhancing the capacity of countries to (1) integrate the ecosystem management approach into development and planning processes, (2) apply ecosystem management tools, and (3) address degradation of ecosystems and ecosystem services. The projects include direct support to protected area management as well as a wide range of activities that enhance relevant enabling conditions.

2. GLOBAL PROTECTED AREA COVERAGE

The extent of the global protected area network continues to grow as governments, communities, organisations and individuals designate additional protected areas in response to the ongoing biodiversity crisis (Figure 2.1). This chapter reviews global progress towards the quantitative element of Aichi Target 11 which aims to protect 17% of the world's terrestrial and inland water areas and 10% of the world's marine areas by 2020 (see Box 2.1). The representativeness and effectiveness of the global protected area network will then be reviewed in Chapter 3.

Measuring global protected area coverage

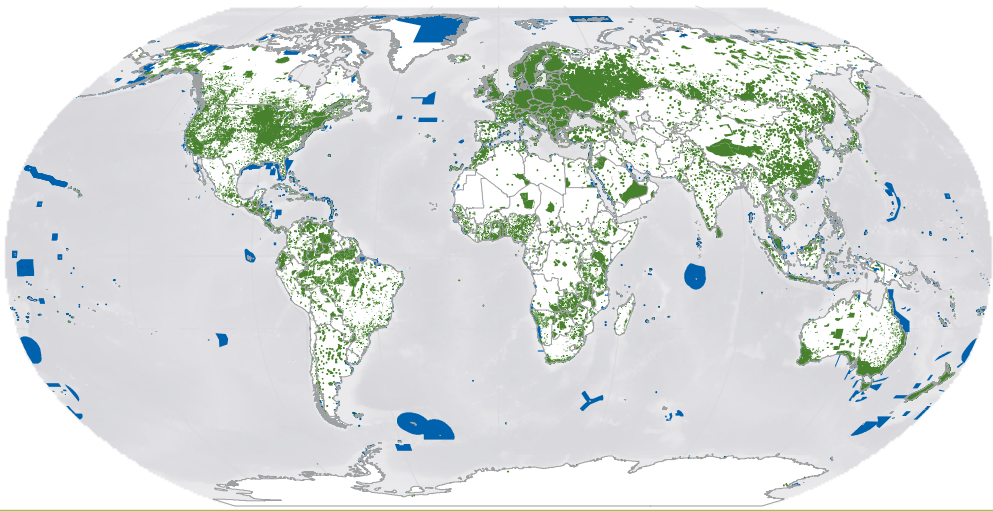
Most of the coverage statistics in this report are either directly derived from the WDPA or the most recent Millennium Development Goals (MDG) analysis carried out in early 2011[5]. The MDG analysis includes nationally designated protected areas[b] of all IUCN management categories, including

b Nationally designated protected areas, as opposed to those designated or recognised by international conventions and agreements, are commonly used to measure progress by countries towards international protected area targets (Jenkins and Joppa 2009, Jenkins and Joppa 2010).

Box 2.1 Summary: Global protected area coverage.

Relevant elements of Target 11	Indicators used	Status by 2010
"at least 17% of terrestrial and inland water areas, and 10% of coastal and marine areas"	Percentage of terrestrial and inland water areas protected	12.7% of the world's terrestrial and inland water areas protected
	Percentage of marine and coastal areas protected	1.6% of the global ocean area, 4% of all marine area under national jurisdiction and 7.2% of all coastal waters protected

Figure 2.1 Spatial distribution of 177,547 nationally designated protected areas around the world. Protected areas with a marine component are shown in blue, solely terrestrial protected areas are shown in green.
Source: WDPA 2012



those that have no category assigned. Because the analysis removes spatial overlaps among protected areas in the WDPA, it provides the best available data for total extent of protected areas. It does, however, exclude internationally recognised sites such as World Heritage sites, Ramsar sites, and Natura 2000 sites in Europe. We report separately on the expansion of these networks. The MDG analysis also excludes those indigenous peoples' and community conserved areas and other area-based conservation measures that do not meet the IUCN definition of protected areas and are therefore not included in the WDPA. These areas can however contribute substantially to the achievement of Target 11 (see Chapter 5).

The global, regional and national results of the most recent MDG analysis of protected area coverage are available online at:

1) **http://mdgs.un.org/unsd/mdg/Default.aspx**
2) **http://www.unep-wcmc.org/ppr2012_903.html**

***Since 1990, the world's protected areas have increased in number by 58% and in their extent by 48%.* (UN 2012)**

Terrestrial protected areas

In 2010, the nationally designated protected areas recorded in the WDPA covered 17 million square kilometres of terrestrial area (including inland waters), an area twice the size of Brazil, or 12.7% of the world's terrestrial area outside Antarctica (Figure 2.2). Overall, protection is higher in developing regions (13.3% of total area) than in developed regions (11.6%), with by far the highest national protection levels achieved in Latin America (20.4%)[6]. To meet the 17% target of the CBD with national protected areas alone, an additional 6 million square kilometres of terrestrial and inland water areas would have to be recognised as protected, an area 10 times the size of Madagascar.

***In terms of terrestrial area, protected areas are now one of the most important land-use allocations on the planet.* (Chape *et al.* 2008)**

Marine protected areas

Around 1.6% (6 million square kilometres) of the global ocean area is protected, but marine protection is still concentrated in the near-coastal areas (0–12 nautical miles, or 0–22 kilometres, from land), where 7.2% of the total area is protected[7]. Considering the total marine area under national jurisdiction, here defined as extending from the shoreline to the outer limit of the Exclusive Economic Zone (EEZ) at 200 nautical miles (370 kilometres), this figure decreases to 4% (Figure 2.2), far below the 10% target of the CBD originally set for 2012. To meet the target in marine areas under national jurisdiction, an additional 8 million square kilometres of marine and coastal areas will have to be recognised as protected, an area 14 times the size of Madagascar. Encouragingly, the number and extent of marine protected areas (MPAs), including very large offshore MPAs and community-supported MPAs, has increased rapidly in recent years[8]. At least 13 MPAs with a marine area greater than 100,000 square kilometres exist, each larger than Iceland[9].

Internationally recognised sites

Internationally recognised sites are an important part in the global protected area network although they can overlap considerably with nationally designated protected areas (e.g. Yellowstone is both a World Heritage site and a national park). By 2011, the World Heritage Convention recognised 211

natural heritage properties with outstanding universal value, totalling 2.6 million square kilometres of land and sea (Figure 2.3)[10]. This amounts to around 11% of the world's total protected area and includes five of the largest MPAs on the planet[11].

Figure 2.2 Growth in the percentage of the terrestrial and marine area protected, 1990–2010. The dashed lines show the 17% (green) and 10% (blue) target for terrestrial and marine areas respectively. Lags in national reporting are likely to be responsible for the slowing increase in recent years because it takes time for new protected areas to be included in the WDPA. Source: WDPA 2011

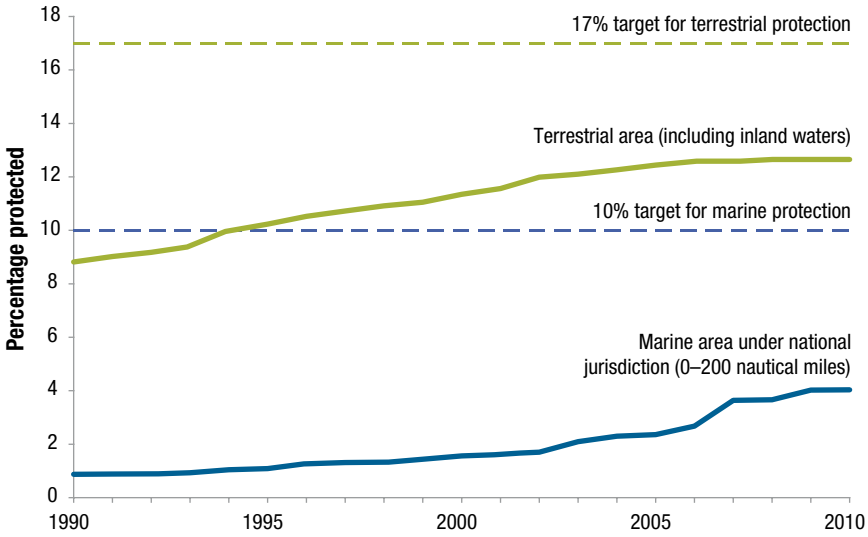
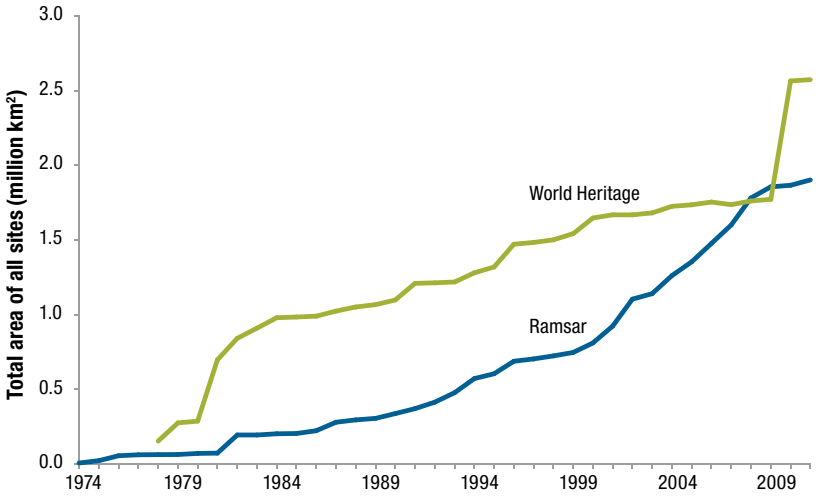


Figure 2.3 Growth in the total area of Ramsar sites (1974–2011) and natural and mixed World Heritage sites (1978–2011). The large World Heritage increase in 1981 and 2010 was a result of the inscription of three large marine protected areas: the Great Barrier Reef (Australia, 1981), Phoenix Islands Protected Area (Kiribati, 2010) and Papahānaumokuākea (USA, 2010). Source: Wetlands International 2011 and UNESCO 2011



The Ramsar Convention recognises 1,952 wetlands of international importance, totalling 1.9 million square kilometres (Figure 2.3), an area the size of Indonesia[12]. Around 80% of these Ramsar sites include inland wetlands and around 40% include marine and coastal wetlands (many Ramsar sites contain both wetland types), which underlines the importance of the Ramsar Convention for both the CBD Programme of Work on Inland Waters Biodiversity and the Programme of Work on Marine and Coastal Biodiversity.

In Europe, the Natura 2000 network has been developed to secure the long-term survival of Europe's most valuable and threatened species and habitats. The network now covers 18% of the total terrestrial area of the 27 European Union (EU) Member States, with great variation amongst countries in the degree of spatial overlap between Natura 2000 sites and nationally designated protected areas[13].

International cooperation has also resulted in the establishment of the first high seas protected areas in marine areas beyond national jurisdiction, such as the Pelagos Sanctuary in the Mediterranean Sea, the South Orkneys MPA in the Southern Ocean and the high seas MPAs established under the Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention)[14].

Reduction in protected area coverage

While the global protected area network continues to grow, existing protected areas are also sometimes reduced in size or the degree of protection (or management), or are degazetted altogether. A 2011 pilot study of this phenomenon, also known as protected area downgrading, downsizing, and degazettement (PADDD), found at least 89 instances of PADDD in 27 countries since 1900, and that PADDD is a current policy issue in at least 12 countries. PADDD is often initiated for access to land or sea, and the use of natural resources[15]. However, such changes can also result from efforts to improve the efficiency and effectiveness of protected area systems, for example by degazetting protected areas that are poorly located for effective biodiversity conservation[16]. PADDD events also occur when an existing protected area is degazetted prior to being re-gazetted as a protected area of higher category or with a larger boundary. More detailed information is needed to fully assess the importance of PADDD.

MANAGING CRITICAL HABITATS WITHIN AND BETWEEN PROTECTED AREAS

The recently created Takamanda National Park in Cameroon, on the border with Nigeria, encompasses an important array of biodiversity and protects a third of the population of the world's rarest great ape – the Cross River gorilla – along with other rare species such as chimpanzees and forest elephants. Since the gorillas exist in isolated populations of 20 or 30 individuals, protecting this species requires a landscape-level approach that ensures connectivity between populations through continuous forest habitat.

The *Spain-UNEP Partnership for Protected Areas in support of LifeWeb* helps to effectively manage forests in the area in order to maintain the ecosystem services they provide, thus securing local livelihoods and preserving important carbon sinks, and conserving landscape-level corridors that are vital for the gorillas. The project includes a feasibility study on how carbon financing from Reducing Emissions from Deforestation and Forest Degradation (REDD) mechanisms can help generate a sustainable income for local communities and protected area authorities.

3. BIODIVERSITY OUTCOMES

Biodiversity, the variety of life on Earth, is usually considered as diversity within species, between species and of ecosystems (CBD Article 2). This chapter deals with two questions concerning the effectiveness of protected areas for biodiversity. First, how well does the global protected area network cover the world's ecosystems and species? In other words, are protected areas in the right places to conserve areas of importance for biodiversity, one of the requirements of Aichi Target 11? Second, how effective are protected areas in preventing or reducing habitat and species loss, the two issues at the heart of Aichi Targets 5 and 12?

3.1 PROTECTED AREA COVERAGE OF BIODIVERSITY

Protected areas can help achieve the Aichi Targets only if they are located in the right places. Target 11 requires protected area networks to be ecologically representative and cover the most important sites for biodiversity and ecosystem services (see Box 3.1.1). The CBD-mandated Biodiversity Indicators Partnership has developed a number of indicators to assess the ecological representativeness of the global protected area network as well as its coverage of the most important sites for biodiversity[17]. The indicators measure the protected area coverage of a) terrestrial and marine ecoregions and b) two types of site-scale priorities for biodiversity conservation collectively known as Key Biodiversity Areas: Alliance for Zero Extinction sites and Important Bird Areas (Table 3.1.1 on page 12). This chapter reports the latest information on these indicators and also reviews protected area coverage of the world's species and ecosystem services.

Protected area coverage statistics for all terrestrial and marine ecoregions, biomes / provinces and realms for the period from 1990 to 2010 are available online at: http://www.unep-wcmc.org/ppr2012_903.html

Box 3.1.1 Summary: Protected area coverage of biodiversity.

Relevant elements of Target 11	Indicators used	Status by 2010
"ecologically representative" and "especially areas of particular importance for biodiversity and ecosystem services"	Percentage of terrestrial ecoregions protected	33% of the terrestrial ecoregions meet 17% target
	Percentage of marine ecoregions protected	13% of the marine ecoregions meet 10% target
	Percentage of Alliance for Zero Extinction sites (AZEs) protected	22% of AZEs are completely covered by protected areas, and 27% are partially covered
	Percentage of Important Bird Areas (IBAs) protected	28% of IBAs are completely covered by protected areas, and 23% are partially covered

SUPPORTING THE RECOVERY OF CRITICALLY ENDANGERED SPECIES

The Cap Blanc Satellite Reserve of the Banc d'Arguin National Park in Mauritania and adjacent areas protect the largest remaining subpopulation of one of the most threatened marine mammals in the world: the Mediterranean monk seal. With over 200 animals this subpopulation is the only one still preserving the structure of a seal colony. Thanks to the protection of Cap Blanc and various initiatives that have reduced the main human-induced threats in the region, the local population of the monk seal continues to grow.

The *Spain-UNEP Partnership for Protected Areas in support of LifeWeb* assists the implementation of the Action Plan for the Recovery of the Mediterranean Monk Seal in the Eastern Atlantic through establishing and managing Special Areas of Conservation for the Monk Seal. The partnership supports environmental education initiatives, enhanced surveillance of critical marine and terrestrial areas, and works with local communities to improve fisheries management and food security. All this helps the sustainable use of the rich marine resources in the area and thus the recovery of the monk seal.

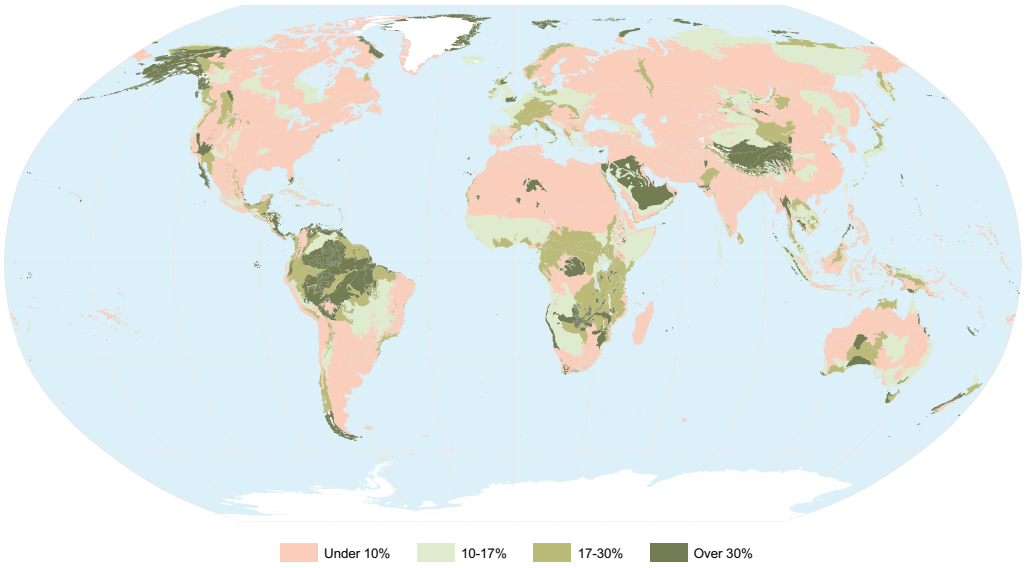
Table 3.1.1 Overview of the different biodiversity schemes used in the analyses underpinning this report.

	Scheme	Number of units assessed for this report	Description	Source
Ecosystem based	Terrestrial ecoregions, biomes and realms	823 ecoregions outside Antarctica (nested within 14 biomes and 8 realms)	A comprehensive biogeographic system to classify terrestrial areas	Olson *et al.* 2001
	Marine ecoregions, provinces and realms	232 ecoregions (nested within 62 provinces and 12 realms)	A comprehensive biogeographic system to classify marine areas	Spalding *et al.* 2007
Species based	Alliance for Zero Extinction sites (AZEs)	588 AZEs	Critical sites supporting the last remaining populations of highly threatened species	Ricketts *et al.* 2005, Alliance for Zero Extinction 2010
	Important Bird Areas (IBAs)	10,993 IBAs	Important sites for the conservation of the world's birds	BirdLife International 2010a

Terrestrial ecoregions

The global protected area network does not yet provide adequate coverage of the world's terrestrial ecoregions. Terrestrial ecoregions are large areas with characteristic combinations of habitats, species, soils and landforms[18]. The degree to which the 823 ecoregions assessed are protected varies greatly on all continents (Figure 3.1.1).

Figure 3.1.1 Percentage of each terrestrial ecoregion covered by nationally designated protected areas in 2010 (Antarctic and Greenland ice sheets shown in white). Two thirds of the 823 ecoregions have less than 17% of their area protected, and half still have less than 10% protected, a target originally set for all terrestrial ecoregions to be achieved by 2010. Source: WDPA 2011 based on ecoregions from Olson *et al.* 2001



By 2010, half of the 823 terrestrial ecoregions had less than 10% of their area protected, and 84 (10%) ecoregions still had less than 1% of their area protected (Figure 3.1.2), indicating significant gaps in the protection of large areas with distinctive biodiversity.

Applying the new global 17% target to each terrestrial ecoregion, at present a third of the 823 ecoregions would meet this target (Figure 3.1.3). Based on progress between 1990 and 2010, meeting the 17% target in all terrestrial ecoregions by 2020 will be an uphill challenge (Figure 3.1.4).

In many countries, the terrestrial protected area system is not yet ecologically representative, with only some ecoregions well covered by protected areas while others remain under-represented or unprotected.
(Barr *et al.* 2011)

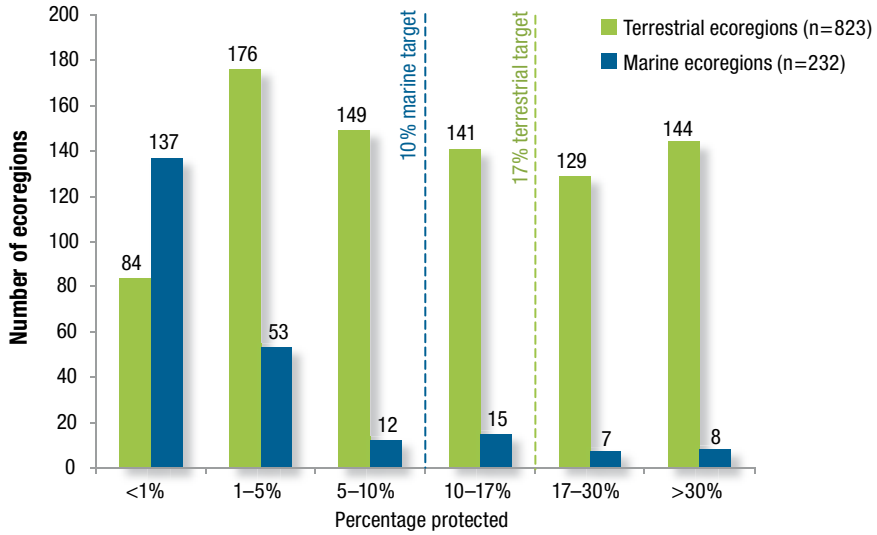


Figure 3.1.2 Protection status of terrestrial and marine ecoregions in 2010 (marine ecoregions out to 200 nautical miles). A third (273) of the 823 terrestrial ecoregions (green) have at least 17% of their area protected, and 13% (30) of the 232 marine ecoregions (blue) have at least 10% of their area protected.
Source: WDPA 2011 based on terrestrial ecoregions from Olson *et al.* 2001 and marine ecoregions from Spalding *et al.* 2007

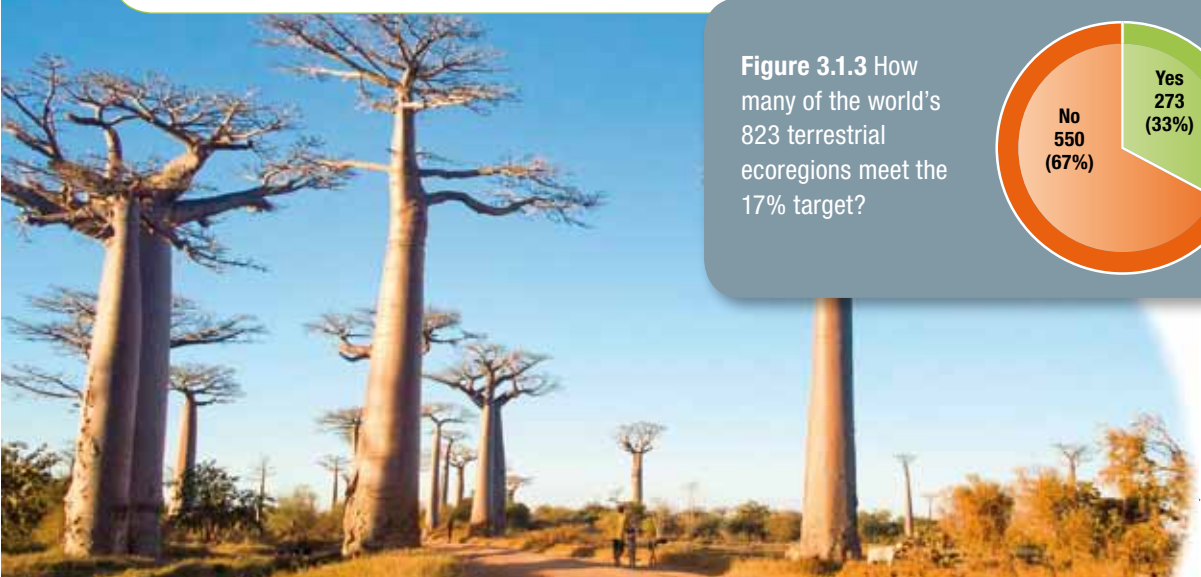


Figure 3.1.3 How many of the world's 823 terrestrial ecoregions meet the 17% target?

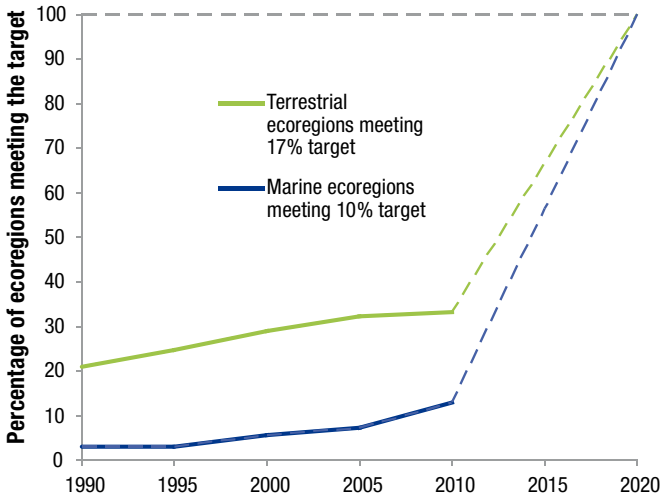


Figure 3.1.4 Percentage of the world's ecoregions that meet the 17% terrestrial protection target and 10% marine protection target of the CBD (solid line; marine ecoregions out to 200 nautical miles) and hypothetical progress required to meet the targets in all ecoregions (dashed line). Source: WDPA 2011 based on terrestrial ecoregions from Olson *et al.* 2001 and marine ecoregions from Spalding *et al.* 2007

Recent analyses for several of the focal biomes of the CBD provide more detailed information on the protection status of the world's dry and sub-humid lands, forests and mountains (see Box 3.1.2). With the ongoing development of new global datasets, similar analyses will also become possible for islands and inland waters, which are not yet sufficiently accounted for in protected area analyses[19].

Marine ecoregions

Despite the recent rapid expansion of the marine protected area network, marine ecoregions continue to be considerably less well protected than terrestrial ecoregions, and very few marine ecoregions meet the 10% target originally set for 2012 (Figure 3.1.5). Marine ecoregions are large areas with characteristic combinations of species that are clearly distinct from adjacent areas[23]. By 2010, only 30 (13%) of the 232 ecoregions met the 10% target, while 137 (59%) had still less than 1% of their area protected (Figures 3.1.2 and 3.1.6).

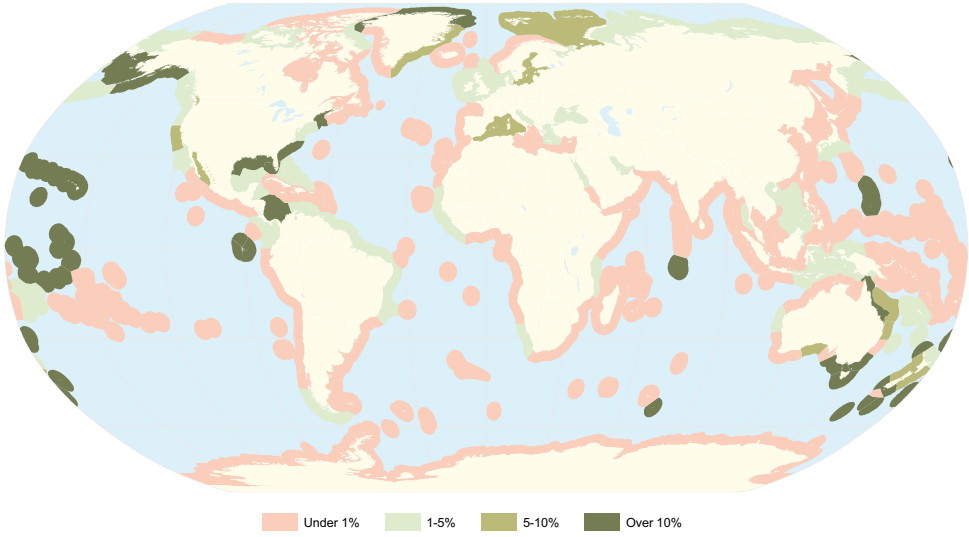
Box 3.1.2 Protection status of dry and sub-humid lands, forests and mountains.

Dry and sub-humid lands[20]: Drylands cover approximately 40% of the world's land area and 9% of the world's dryland area is protected. Among the different dryland types, sub-humid and hyper-arid areas are better protected (11% and 10% respectively) than semi-arid and arid areas (8% each).

Forests[21]: Forests cover approximately 29% of the world's land area, with 14% of the world's forest area covered by protected areas in IUCN management categories I–VI. However, protected areas still cover less than 10% of the forest area in 308 (46%) ecoregions with forests.

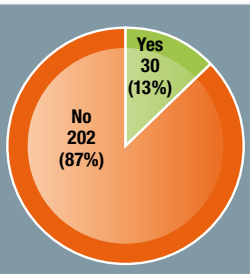
Mountains[22]: Mountains cover approximately 25% of the world's land area outside Antarctica and 17% of the world's mountain area is protected. However, mountain protection still falls short of the 17% target in 437 (61%) ecoregions with mountains.

Figure 3.1.5 Percentage of each marine ecoregion (out to 200 nautical miles) covered by nationally designated protected areas in 2010. Of the 232 ecoregions, 59% still have less than 1% of their area protected and 87% have less than 10% protected, the target originally set for all marine ecoregions to be achieved by 2012.
Source: WDPA 2011 based on ecoregions from Spalding *et al.* 2007



Marine protected area coverage increased by over 150% since 2003 but is still very uneven and does not adequately represent all ecoregions important for conservation.
(Toropova *et al.* 2010)

Figure 3.1.6 How many of the world's 232 marine ecoregions meet the 10% target?



These results are difficult to compare to previous studies, in part because they are based on an outer ecoregion limit of 200 nautical miles (see also Chapter 2) and not the 200-metre depth used by previous studies[24]. All analyses, however, clearly show that in terms of ecoregion representation, the global marine protected area network is far from being "ecologically representative", a target originally set for 2012 by both the previous CBD Strategic Plan and the 2002 World Summit on Sustainable Development (WSSD)[25].

Although the percentage of marine ecoregions that meet the 10% target has increased from 3% to 13% within 20 years, meeting the 10% target in all ecoregions by 2020 will require dramatic acceleration of marine protected area establishment (Figure 3.1.4).

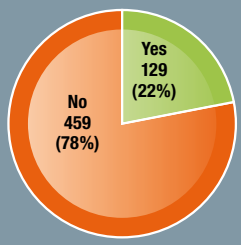
Areas of particular importance for biodiversity

The global protected area network does not yet provide adequate coverage of particularly important terrestrial and freshwater sites for biodiversity. “Key Biodiversity Areas” are such sites and are identified based on globally standardised criteria[26]. Alliance for Zero Extinction sites (AZEs) and Important Bird Areas (IBAs) are the only two subsets of Key Biodiversity Areas identified globally to date, with important sites for freshwater biodiversity, plants, invertebrates and non-bird vertebrates being identified only in certain parts of the world.

By 2008, only 22% of the world’s 588 AZEs were completely covered by protected areas, an increase from 17% in 1990, while 51% remained entirely unprotected (Figures 3.1.7, 3.1.8 and 3.1.9)[27]. Each of these sites is critical for the survival of one or more highly threatened species and therefore represents an urgent priority for protection[28]. Similarly, 28% of the world’s 10,993 IBAs were completely covered by protected areas in 2008, an increase from 21% in 1990, while 49% were not protected at all (Figures 3.1.8, 3.1.10 and 3.1.11)[29].

These sites are important for the conservation of the world’s birds, but also for other biodiversity as they cover 80% of the area of Key Biodiversity Areas in countries that have identified these sites for a broader set of species[30]. While the conservation importance of many of these areas has long been known, global datasets for IBAs and AZEs have only become available within the past 10 years, and datasets for other types of terrestrial Key Biodiversity Areas, for example for plants[31], are still being developed.

Figure 3.1.7 How many of the 588 Alliance for Zero Extinction sites are completely covered by protected areas?



This could be one of the reasons why, overall, limited progress has been made since 1990 with enhancing protected area coverage of priority areas for biodiversity conservation, and many gaps remain. Regional and national gap analyses have recently highlighted these gaps for example in Africa and Asia[32]. As global datasets on marine Key Biodiversity Areas and

Figure 3.1.8 Percentage of Important Bird Areas (IBAs) and Alliance for Zero Extinction sites (AZEs) completely covered by protected areas. By 2008, only 22% of the 588 AZEs and 28% of the 10,993 IBAs were completely protected. Source: Butchart *et al.* 2012

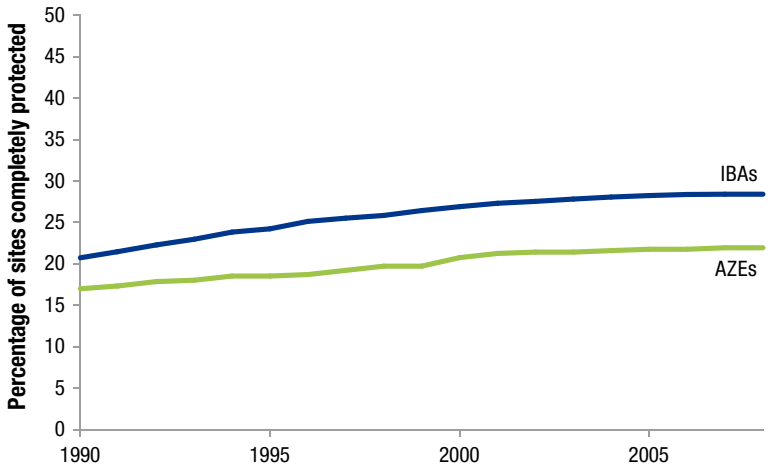


Figure 3.1.9 Distribution of Alliance for Zero Extinction sites that are completely covered by protected areas (green), partially covered by protected areas (amber), or unprotected (red). Source: Butchart *et al.* 2012

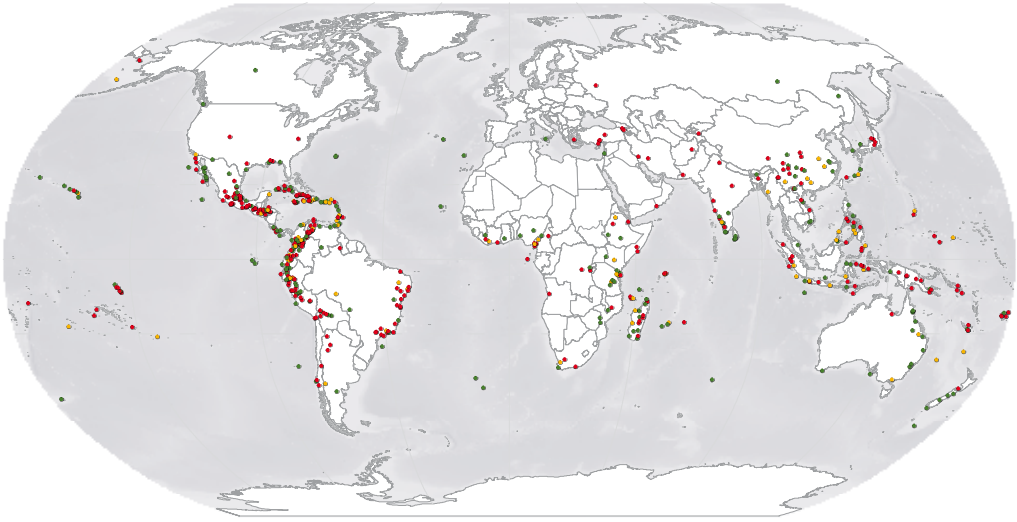


Figure 3.1.10 Distribution of Important Bird Areas (IBAs) that are completely covered by protected areas (green), partially covered by protected areas (amber), or unprotected (red). IBAs with unknown protection status are shown in grey. Source: Butchart *et al.* 2012

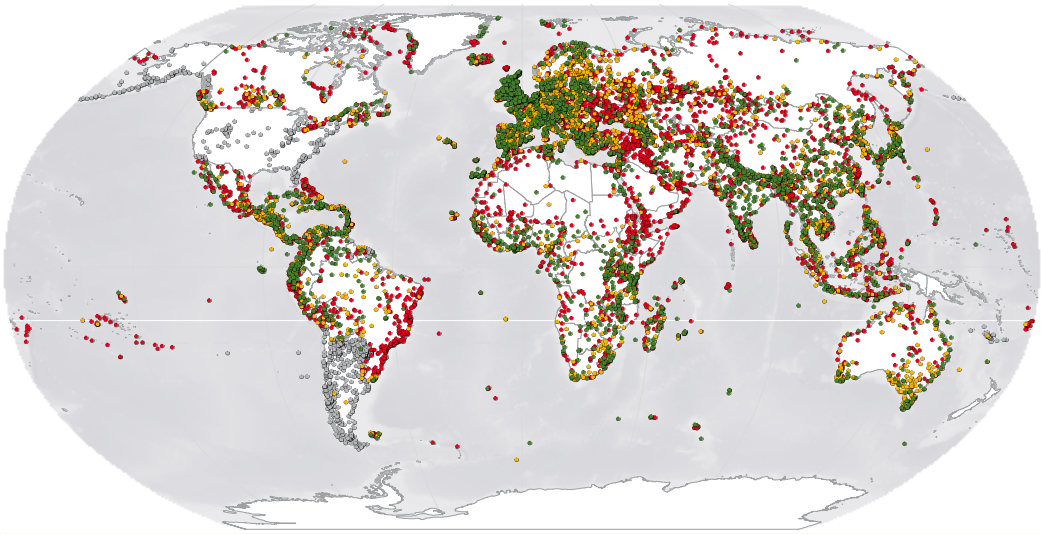
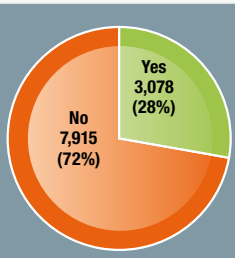


Figure 3.1.11 How many of the 10,993 Important Bird Areas are completely covered by protected areas?



Ecologically and Biologically Significant Areas (EBSAs) become available (for example, for marine IBAs), we must expand these analyses to include important marine sites for biodiversity[33]. The *Biodiversity and Protected Areas* task force of the IUCN WCPA and Species Survival Commission (SSC) is currently leading an initiative to consolidate a global approach for all taxa and sites to identify Key Biodiversity Areas.

***Alliance for Zero Extinction sites represent clear opportunities for urgent conservation action to prevent biodiversity loss.* (Ricketts *et al.* 2005)**

Species representation in protected areas

Another important issue is how well species are covered by current protected area networks. Most of the world's vertebrate species occur in one or more protected areas, with some species being completely confined to protected areas, or even a single protected area. However, a landmark study in 2004 found that 12% of 11,633 mammal, bird, turtle and amphibian species around the world were not found in any protected area[34]. When considering only threatened species, the percentage of such "gap species" increased to 20%, meaning that every fifth species of conservation concern was not safeguarded by any protected area at that time. This global gap analysis has not yet been repeated and hence we do not know how much this situation has improved, but several more recent studies have confirmed that significant gaps still exist in regional and national protected area networks (Table 3.1.2). Closing gaps in species representation, especially for threatened species, should be priorities in the development of comprehensive protected area systems. This gap filling should be guided by species-specific conservation targets that usually require a certain proportion of a species' range or population to be protected.

Table 3.1.2 Overview of results from selected gap analyses of species representation in protected areas.

Study area	Species analysed	Results	Reference
Global	11,663 mammals, birds, turtles and amphibians	12% of all species and 20% of threatened species not covered by any protected area	Rodrigues *et al.* 2004
Iberia	3,249 mammals, birds, reptiles, amphibians and plants	Up to 27% of all species not covered by any protected area	Araújo *et al.* 2007
Australia	1,320 threatened mammals, birds, reptiles, amphibians and plants	13% of all threatened species and 21% of Critically Endangered species not covered by any protected area	Watson *et al.* 2011
Mexico	462 mammals	18% of all species not covered by any protected area	Ceballos 2007
Africa	157 threatened birds	26% of all threatened species not covered by any protected area	Beresford *et al.* 2011
Madagascar	55 threatened amphibians	82% of all threatened species and 33% of Critically Endangered species not covered by any protected area	Andreone *et al.* 2005

The global protected area network is far from complete: 20% of the world's threatened species are not covered by any protected area.
(Rodrigues *et al.* 2004)

Protecting ecosystem services

Existing protected areas are well known to provide important ecosystem services, but the extent to which important sites for ecosystem services are protected has not been globally assessed, primarily due to a lack of adequate spatial datasets. Protected areas can provide a wide range of ecosystem services such as clean water provision, food and fuel, building materials, medicines, agricultural pollination, nutrient cycling, climate regulation via carbon storage and sequestration, protection from flooding and other natural disasters, cultural services and eco-tourism. Only some of these services have been mapped at global level. For example, it has been estimated that protected areas contain about 15% of the global terrestrial carbon stock[35] and provide a significant proportion of the drinking water for a third of the world's 105 largest cities[36].

Initial analyses suggest that important areas for some ecosystem services may coincide with important areas for biodiversity conservation, thus representing win-win situations for targeted protection, but tradeoffs exist elsewhere between the conservation of biodiversity and ecosystem services[37]. Effective protection of Alliance for Zero Extinction sites, for example, has great potential to also provide substantial benefits to people, including through carbon storage and freshwater provision[38]. However, there is currently no comprehensive analysis of the location of important sites for ecosystem services that help maintain human livelihoods for many people, analogous to Key Biodiversity Areas. The low congruence among many ecosystem services (Figure 3.1.12), and the degree to which the value of ecosystem services varies dependent on the user, challenges such analysis. Additional work is required to assess how well the most important sites for different ecosystem services are represented in the current global protected area network. Beyond representation, protected areas have recently

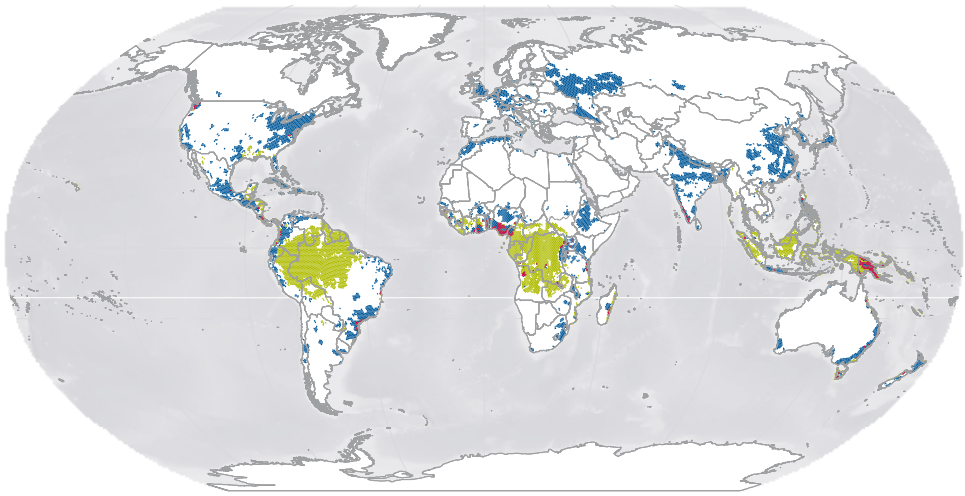


Figure 3.1.12 Important areas for biomass carbon storage (green), freshwater provision to downstream populations (blue), and both carbon storage and freshwater provision (red). These areas were selected independently to maximise global biomass carbon storage and continental-scale freshwater provision on 10% of the world's land area. Source: Larsen *et al.* 2011

been found to be effective in maintaining plant productivity, an important ecosystem function that underpins biodiversity and other ecosystem services[39].

> ***Between 2000 and 2005, unprotected humid tropical forests lost about twice as much carbon to deforestation as the same area of protected forest.*** **(Scharlemann *et al.* 2010)**

3.2 PROTECTED AREA BENEFITS FOR BIODIVERSITY

One of the main questions in biodiversity conservation is how effective protected areas are in conserving the species, habitats and other biodiversity features they contain[40]. This question is highly relevant not only to Aichi Target 11, but also Targets 5 and 12 concerning habitat and species loss (see Box 3.2.1). The effectiveness of protected areas can vary from "paper parks" with no management on the ground and where species and habitats are disappearing at the same rate as outside the reserve, to very successful and well managed protected areas that play a critical role in the survival of species and habitats that would otherwise have been lost[41]. A multitude of factors affects the effectiveness of protected areas, including their size and location, anthropogenic and other pressures, and the governance, management and enforcement arrangements in place. This chapter provides a brief summary of key studies of protected area effectiveness for habitat and species conservation, highlighting current challenges in this area.

Do protected areas effectively conserve habitats?

Many studies indicate that protected areas prevent or reduce the conversion of natural land cover compared to surrounding unprotected areas[42]. An important study from 2011, based on remotely sensed information and a matching approach that compares protected and unprotected areas of similar characteristics, found that protection reduced land conversion in 75% of 147 countries analysed[43]. According to another study, between 2000 and 2005, unprotected humid tropical forests lost about twice as much carbon to deforestation as the same area of protected forest[44].

Box 3.2.1 Summary: Protected area benefits for biodiversity.

Relevant Aichi Targets	Current status and trends
Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.	Many studies indicate that the global protected area network helps prevent or reduce the rate of loss of natural habitats, including deforestation and degradation. However, protected area effectiveness varies widely due to a range of factors, which need to be better understood and addressed.
Target 12: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	Global studies indicate that protected areas help prevent species extinctions, reduce the rate of decline in species and populations, and thus improve their conservation status. However, studies of small numbers of species and protected areas found that effectiveness varies widely due to a range of factors, as noted above for habitats.

Protected areas have also been found to be effective in reducing the incidence of tropical forest fires[45]. However, protected area effectiveness varies among countries and regions, and different types of protected areas[46]. Several studies also indicate that indigenous and community conserved areas can be as effective, or even more effective, than protected areas in reducing deforestation and forest fires[47]. Marine protected areas have been shown to maintain coral cover, which is in decline in many unprotected reefs[48]. However, more studies are needed in the marine environment, including for marine habitats other than corals.

***Protected areas have reduced conversion of natural land cover in 75% (110) of 147 countries.* (Joppa and Pfaff 2011)**

Do protected areas effectively conserve species?

Conservation actions can reduce the rate of biodiversity loss. The IUCN Red List Index quantifies trends in overall extinction risk for sets of species. It shows that, while the status of the world's mammals, birds and amphibians is declining, trends would have been considerably worse without conservation interventions such as establishing protected areas or controlling hunting of certain species[49]. Such interventions have produced a result equivalent to preventing 39 bird species and 29 mammal species from moving one Red List category closer to extinction between 1988 and 2008, and 1996 and 2008, respectively[50]. In addition, many species would have deteriorated even further without conservation interventions, so the impact of conservation is even greater than these figures imply. But is there evidence specifically for protected areas reducing the extinction risk of species?

A 2012 study showed that the increase in extinction risk over the last two decades was a third lower for mammals, birds and amphibians restricted to Alliance for Zero Extinction sites that are completely covered by protected areas, compared with those restricted to unprotected sites or sites that are only partially protected[51]. For Important Bird Areas (IBAs), the increase in extinction risk was only half as large for bird species with over 50% of the IBAs they occur in being completely protected, compared with those for which less than 50% are completely protected (Figure 3.2.1). Recent work in Kenya may help explain these findings: protected IBAs benefited from substantially higher levels of conservation interventions and tend to be in slightly better condition than unprotected IBAs[52].

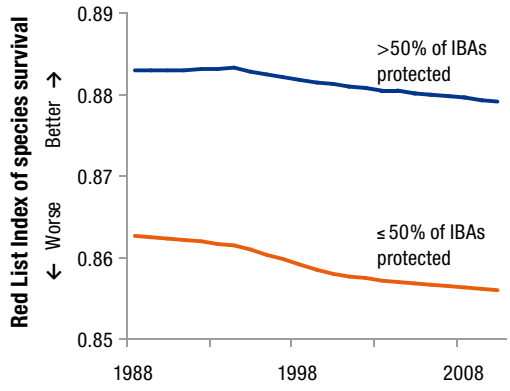


Figure 3.2.1 Red List Index of species survival for bird species for which more than 50% of Important Bird Areas (IBAs) they occur in are completely covered by protected areas, compared with those for which less than 50% are completely protected. The increase in extinction risk (i.e. decrease in index value) over the last two decades was half as large for better protected species (blue line) than for less well-protected species (orange line). Source: Butchart *et al.* 2012

STRENGTHENING THE MANAGEMENT OF TERRESTRIAL PROTECTED AREAS

Together with adjacent protected areas, the Gunung Leuser National Park in northern Sumatra forms one of the largest protected area complexes of the mega-diverse country of Indonesia. These protected areas cover a wide range of ecosystems and conserve a high number of endemic species, including the charismatic Sumatran orangutan, tiger, rhino and elephant. However, deforestation and forest degradation both within and outside the protected areas have drastically reduced the habitat of these Critically Endangered species, thus threatening their survival.

The *Spain-UNEP Partnership for Protected Areas in support of LifeWeb* helps to improve the management of the protected area complex to prevent the continued destruction of the forest. Through the provision of equipment and training on law enforcement and monitoring, the partnership supports the establishment of community patrols, aiming to improve the conservation of the protected areas. Other activities include the ecological restoration of degraded forest areas as critical habitat for the orangutans and other wildlife species.

***Species occurring in Key Biodiversity Areas with greater protected area coverage experienced smaller increases in extinction risk over recent decades.* (Butchart *et al.* 2012)**

However, studies which have analysed population trends for small numbers of species in small numbers of protected areas have found mixed evidence for their effectiveness in maintaining species' populations[53]. A 2012 study of 60 tropical forest protected areas showed that half of these areas experienced marked declines across 10 well-studied groups of animals and plants over the past 20–30 years[54]. A 2010 study also found, on average, a 59% decline in large mammal populations between 1970 and 2005 in African protected areas[55]. The study showed that the observed population trends in protected areas varied strongly between different regions of Africa (Figure 3.2.2) but was unable to demonstrate if these trends were better or worse than in unprotected areas. Other studies show how effectiveness varies between different types of protected areas: In Australia, populations of threatened plant and animal species with greater coverage in strictly protected areas are more likely to be stable or increasing, but the same is not true for "less strictly" protected areas[56]. Given the small number of studies available and their limitations, it is clear that further work is needed to better understand population-level effects of protected areas. The IUCN WCPA / SSC task force on *Biodiversity and Protected Areas* is currently striving to facilitate such assessments.

More evidence is also needed in the marine environment. Here, an important distinction is usually made between no-take marine protected areas (MPAs), which do not allow extractive uses of any kind, and other protected areas that may be used for fisheries for example. A 2011 review found mixed evidence for the effect of no-take MPAs on coral reefs, with tangible benefits to some

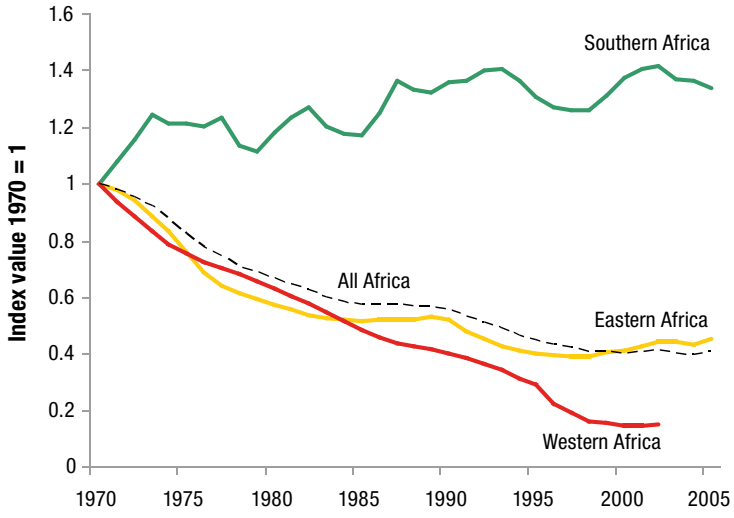


Figure 3.2.2 Change in the population abundance of large mammals in African protected areas from 1970 to 2005. The "All Africa" index (dashed line) is based on 583 time series of population abundance for 69 large mammal species in 78 protected areas. The eastern, southern and western African sub-indices are based on data for 43, 35 and 11 protected areas, respectively. Source: Craigie *et al.* 2010

species, but few tangible benefits to others[57]. Other reviews and studies found overall positive effects on the density, diversity, abundance, biomass and body size of marine species but few if any studies have yet been able to account for compounding factors[58].

> ***The ecological performance of protected areas, both in terms of the representation and the maintenance of key biodiversity features, remains poorly understood.*** **(Gaston *et al.* 2008)**

More work is needed on biodiversity outcomes

Further studies are needed to analyse the biodiversity outcomes of protected areas – for ecosystems, species and also genetic resources – across multiple sites around the world. This challenging task requires not only comprehensive datasets on protected areas and biodiversity (for example species or habitat trends inside and outside protected areas and/or before and after protected area establishment), but also sophisticated approaches that take into account compounding factors such as the location bias in most protected area networks to higher elevations, steeper slopes and greater distances to roads and cities[59]. The latter has been addressed for habitat studies through matching approaches that compare protected areas with unprotected areas of similar characteristics[60]. However, many species studies still suffer from methodological shortcomings and/or are difficult to compare due to the different methods they employ. Existing evidence for the effectiveness of protected areas thus remains more robust for habitat trends compared to species trends. Several initiatives are now underway that will help to fill these existing knowledge gaps. For example, the Zoological Society of London (ZSL) is currently conducting a large-scale analysis of the biodiversity outcomes of protected areas, and the IUCN WCPA / SSC task force on *Biodiversity and Protected Areas* is facilitating the continuation of such assessments into the future.

4. MANAGEMENT

Protected areas can only be successful tools for biodiversity conservation if they are effectively managed. Effective management ensures that a protected area safeguards its values and achieves its objectives[61]. To be effective, management should be tailored to the particular needs of the area, and also be able to adapt to changing needs. Effective management may entail minimum levels of intervention, for example in large wilderness areas, or "intensive care", for example in small habitat or species management areas[62]. Effective management usually involves a wide range of stakeholders, including government agencies, NGOs, private entities, indigenous peoples and local communities. Whatever the means, it is clear that implementing appropriate management for a protected area is fundamental for its effective conservation of biodiversity.

The need for effectively and equitably managed protected areas is highlighted in Aichi Target 11 (Box 4.1) and the CBD PoWPA agreed in 2004. Goal 1.4 of the PoWPA calls for all protected areas to have effective management in existence by 2012, and stresses the importance of adequate management plans to guide effective management. Considering the value of management effectiveness assessments for improved protected area planning and management, Goal 4.2 called on CBD Parties to assess at least 30% of their protected areas by 2010. This chapter reports global progress on these targets.

Global trends in management objectives of protected areas

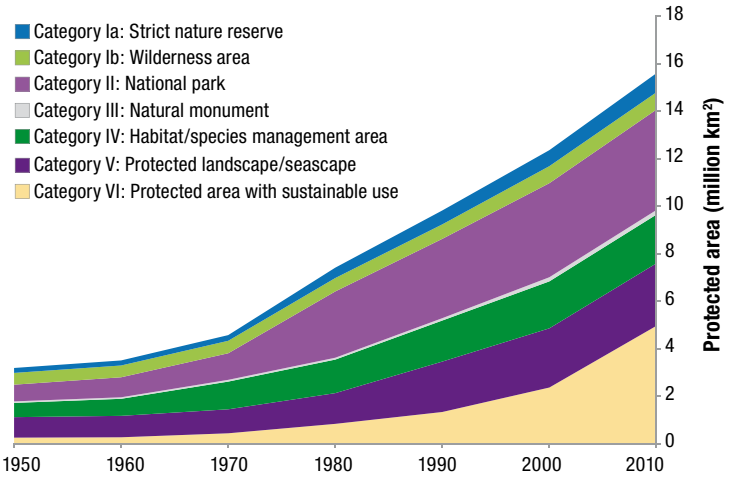
IUCN has developed a system of protected area management categories that helps classify protected areas based on their primary management objectives (see also Chapter 1). The system implies a gradient of human intervention from strictly protected areas (Category I) to sustainable use areas (Category VI) but recognises the importance of all these categories for biodiversity conservation[63]. At present, the WDPA includes category information for three quarters of the Earth's protected area, and this information can be used to review general trends in the primary management objectives of the world's protected areas.

In the past 20 years the global protected area network has diversified in terms of its management approaches. There has been a remarkable increase in the extent of protected areas that support sustainable use of natural resources (Category VI) (Figure 4.1). Their contribution to the total area protected with assigned IUCN categories has increased from 14% in 1990 to 32% in 2010. Over the same time, the share of "more strictly" protected areas (Categories I–IV) decreased from 65% to

Box 4.1 Summary: Management.

Relevant elements of Target 11	Current status and trends
"effectively managed"	The global protected area network has diversified substantially in terms of its management approaches, with a great increase especially in sustainable use areas. However, it has been estimated that less than a third of the world's protected areas have a management plan, and only a quarter of all protected areas have been judged to have sound management according to the 2010 global study of management effectiveness.

Figure 4.1 Total extent of nationally designated protected areas in each of the IUCN management categories, 1950–1990 (10 year intervals).
Source: WDPA 2011



51%, over half of which is in national parks (Category II; 27%) and a quarter in habitat / species management areas (Category IV; 13%). However, it is important to understand that these categories do not provide any information on the management effectiveness of these protected areas, or the condition of the habitats and species they contain. A global study from 2010 showed, for example, that sustainable-use protected areas (Category VI), on average, have the same level of naturalness (or human influence) as the national parks (Category II) recorded in the WDPA[64].

Progress with management planning

Management planning is a critical prerequisite for effective management of protected areas because it helps protected area agencies and managers to define and achieve the objectives of the protected areas under their care[65]. Good management planning is a learning process that involves ongoing research, monitoring, evaluation and adjustment. Management plans define the management approach and objectives for protected areas and provide a framework for decision making[66]. They are often accompanied by more detailed issue-based plans, business plans and annual work programmes to guide the implementation of specific management aspects.

Management planning is however still a relatively weak aspect of protected area management around the world[67]. A global registry of management plans does not exist; however, based on information from 103 countries, it has been estimated that less than 30% of the world's protected areas have a management plan[68]. Where plans exist, they are often inadequate, out of date, or not well integrated into everyday management[69].

Progress with management effectiveness assessments

Management effectiveness assessments can help to evaluate how well protected areas are being managed and thus generate vital information for protected area planning and management[70]. These evaluations are carried out by relevant stakeholders, including protected area donors, agencies, managers and local communities, to determine if current management is effective and how it can be improved[71].

Although significant progress has been made with management effectiveness assessments in recent years, most countries have not yet achieved Goal 4.2, i.e. assessing at least 30% of their protected areas by 2010 (Figure 4.2). The only global study of protected area management

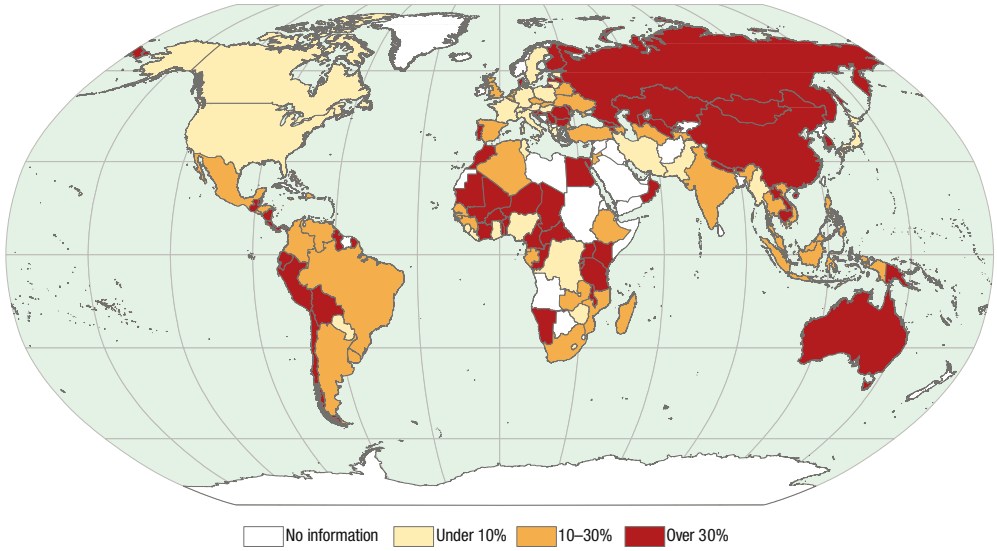


Figure 4.2 Percentage (by area) of the total protected area of each country known to be covered by management effectiveness assessments. Source: adapted from Leverington *et al.* 2010a

effectiveness found in 2010 that, while 99 countries had already assessed more than 15% of their protected area, only 67 countries had met the 30% target[72]. At the end of 2010, the CBD encouraged its Parties to expand and institutionalise, with full and effective participation of stakeholders, management effectiveness assessments to cover 60% of the total area of protected areas by 2015 (CBD COP 10 Decision X/31). An updated analysis of progress towards the 60% target is expected to be released in late 2012.

How effectively are the world's protected areas managed?

An increasing number of studies have used available data from individual management effectiveness assessments to evaluate protected area effectiveness at national, regional and global scales[73]. One of the greatest challenges in doing so is to make the data from different assessments comparable. Over a hundred different assessment methodologies are currently in use worldwide to assess management effectiveness at site or system level[74].

Based on data from 4,151 assessments, the 2010 global study of management effectiveness concluded that only 24% of protected areas have sound management (Figure 4.3)[75]. The management of 27% of protected areas was found to have major deficiencies and 13% to be completely inadequate, with the weakest aspects of management relating to the adequacy and reliability of funding, facilities and equipment, staff shortages, and the lack of appropriate benefit sharing programmes for local communities[76]. In Europe, a supplementary study found a higher percentage (30%) of protected areas under sound management, but still noted major deficiencies or completely inadequate management in 33% of the protected areas for which data was available (Figure 4.3)[77].

Management effectiveness assessments need to be repeated regularly so that changes can be tracked over time, and corrective measures implemented if protected areas are poorly managed. Only a limited number of such repeat assessments were available for the 2010 global study and they

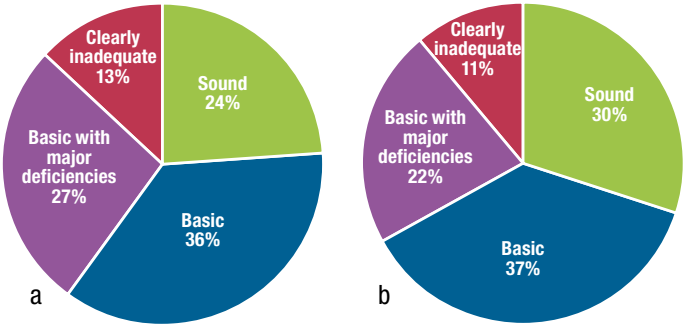


Figure 4.3 Effectiveness of protected area management: a) globally, based on 4,151 management effectiveness assessments and b) in Europe, based on 738 assessments. Sources: Leverington *et al.* 2010a and Nolte *et al.* 2010

showed an encouraging trend: management effectiveness had improved over time in 207 (76%) of the 272 protected areas with repeat assessments[78].

Regular assessments also facilitate adaptive management and policy responses. Adaptive management is a learning process that integrates research, planning, management, monitoring and evaluation in repeated cycles[79]. It improves the effectiveness of protected areas by enabling their management to adapt to changing environmental and socio-economic conditions[80].

> ***Tropical forest protected areas in which actual, on-the-ground protection efforts have increased over the past 20 to 30 years generally fare better than those in which protection has declined.*** **(Laurance *et al.* 2012)**

Certification schemes for protected areas and their managers may help to set standards and improve recognition and reward for effective management[81]. Thus the IUCN WCPA is currently facilitating the development of a "Green List" of well-managed protected areas in order to encourage, evaluate and celebrate good management of marine and terrestrial protected areas.

Future direction

Considerable additional efforts are needed to achieve effective management at all the world's protected areas, a target originally set for 2012. Adequate management plans need to be developed and implemented effectively with the participation of relevant stakeholders, including local communities. In addition, management effectiveness assessments need to be expanded substantially to achieve the 60% area target set by the CBD for 2015 (Decision X/31). This could be achieved by institutionalising the assessment process at the site level and within national management agencies. Institutionalisation could also help to ensure that the assessment results are implemented and improve management on the ground.

The assessments could also be improved through participation of relevant stakeholders, including local communities, and greater consideration of governance issues and the social costs and benefits of protected areas (Decision X/31). To facilitate global monitoring and reporting, more assessment results need to be reported to the global database on management effectiveness maintained by the University of Queensland in collaboration with UNEP-WCMC and other partners. Finally and most importantly, existing management deficiencies need to be addressed, and in most cases this will require additional resources that provide sustainable financing for adequate protected area management.

STRENGTHENING THE MANAGEMENT OF MARINE PROTECTED AREAS

Mangroves harbour rich biodiversity and provide vital ecosystem services for coastal populations, including food, wood and protection from storms, flooding and coastal erosion. In Guinea-Bissau, extensive mangrove forests support over 180 bird species, 40 species of terrestrial mammals, and five species of sea turtles. However, the country's marine protected areas face severe challenges from illegal fishing and mangrove cutting, and both additional resources and capacity are required to effectively address these issues.

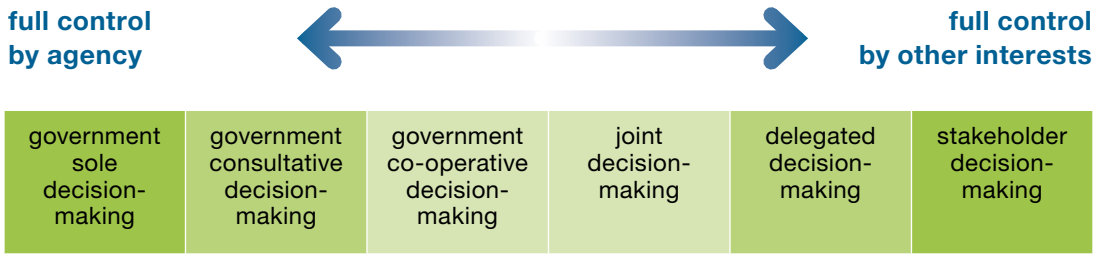
The *Spain-UNEP Partnership for Protected Areas in support of LifeWeb* helps strengthen the management and enforcement of three important marine protected areas in Guinea-Bissau through the development of a maritime surveillance system and increased participation of the local population in monitoring processes. The project is also expected to raise public awareness and therefore improve the conservation of important sea turtle and seabird nesting sites.

5. GOVERNANCE

Protected area governance is about how decisions are made and power is shared among the different actors involved in the establishment and management of protected areas[82]. It is widely recognised that effective protected area management requires good governance as a prerequisite[83]. Good governance in the protected area context should reflect relevant principles – freely chosen by the relevant peoples, communities and governments – such as legitimacy and voice, fairness, direction, performance, accountability and human rights[84]. Decision-making in protected areas can be carried out by government agencies, indigenous peoples, local communities, private entities, public groups, NGOs, and others. Often, authority, responsibility and accountability are shared amongst several actors and institutions. IUCN has developed a classification system for protected area governance, which comprises four main types (see Box 5.1). Importantly, any governance type can exist with any of the IUCN protected area management categories (see Chapter 1), and *vice versa*[85]. The sharing of power in protected area governance can follow a gradient of control among the various stakeholders (Figure 5.1)[86].

A conservation system comprising territories under various governance types has better chances to address conservation gaps.
(Borrini-Feyerabend 2003)

Figure 5.1 The range of options for governing protected areas from full control by government agencies to full control by other stakeholders. Source: adapted from Dearden *et al.* 2005



Box 5.1 Protected area governance types[87].

1. Governance by governmental agencies (at various levels)
2. Shared governance (e.g. by government agencies and local communities, NGOs and private sector)
3. Private governance (e.g. by individual land owners, NGOs or private sector)
4. Governance by indigenous peoples and local communities

Progress with governance-related targets

The CBD PoWPA specifically recognises the importance of the different governance types, and Aichi Target 11 aims for "equitably managed" systems of protected areas and "other effective area-based conservation measures" (see Box 5.2), including indigenous peoples' territories and community conserved areas (ICCAs for short). In addition, Aichi Target 18 aims for the incorporation of "the traditional knowledge, innovations and practices of indigenous and local communities" in the Convention through "full and effective participation". The UN Declaration on the Rights of Indigenous Peoples also supports moral and practical claims of indigenous peoples to govern areas and territories where they possess customary rights, traditional ownership or occupation. Therefore there is an increased need for collaborative, multi-stakeholder processes in the governance of biodiversity and protected areas.

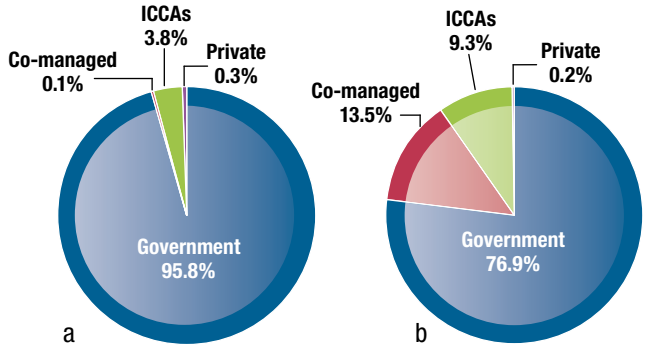
While in practice there are still significant challenges in empowering a diversity of actors in conservation, recent decades have seen some devolution of power amongst various actors, leading to increased engagement of local communities, indigenous peoples, private groups, and shared management models in the governance of protected areas[88]. This trend is also evident in the WDPA, which currently has governance information for half of the world's total protected area: From 1990 to 2010, the total protected area governed by non-governmental actors or under co-management arrangements has increased substantially from about 4% to 23% (Figure 5.2). This diversification in protected area governance types indicates some progress towards the CBD PoWPA and Targets 11 and 18.

Increased recognition of the different protected area governance types as well as other area-based conservation measures has great potential to contribute to the achievement of the quantitative

Box 5.2 Summary: Governance.

Relevant elements of Target 11	Current status and trends
"equitably managed"	The global protected area network has diversified in terms of its governance approaches, with increasing involvement of different actors. However, limited information is available on the extent of other area-based conservation measures, and the equity of protected area governance and management.

Figure 5.2 Percentage of the global protected area network (by area) under different governance types in (a) 1990 and (b) 2010. The charts exclude protected areas that do not have a governance type assigned in the WDPA (i.e. 54% of total protected area in 1990 and 49% in 2010). Source: WDPA 2011



element of Target 11 (see Chapter 2). A more detailed discussion of the cases of ICCAs and sacred natural sites, private protected areas, and marine areas follows below. Measuring progress towards other relevant elements of Target 11 and 18 remains difficult, however, as no globally accepted indicators exist to assess the equity of protected area governance and management, and the degree to which traditional knowledge is incorporated.

ICCAs and sacred natural sites

While Aichi Target 11 explicitly includes "other effective area-based conservation measures", at present there is neither a clear definition of what these measures are, nor comprehensive information on the total area covered by such measures. Some information is available on ICCAs and sacred natural sites (SNSs), whose contribution to biodiversity conservation, sustainable development and human rights is increasingly recognised[89]. Many of these sites meet the IUCN protected area definition and can therefore be included in the WDPA (see Chapter 2): By 2010, the WDPA recorded some 700 protected areas known to be governed by indigenous peoples and/or local communities, covering over 1.1 million square kilometres or 9.3% of the total protected area with a known governance type (Figure 5.2). These sites have been included in the spatial analyses underpinning this report.

However, this is likely to represent only a fraction of the total area of these types of sites. For example, it has been estimated that at least 3.7 million square kilometres of the total forest area in Latin America, Africa, and East and South Asia fall under community conservation, suggesting that in some parts of the world ICCAs cover as much forest area as public protected areas[90]. More generally, it has been estimated that at least 22% of all forests in developing countries is owned by (14%), or reserved for (8%), indigenous and local communities[91]. With a wide range of partners, UNEP-WCMC has recently started to develop the ICCA Registry (www.iccaregistry.org), a pilot database which currently includes information on some 60 ICCAs. For sites that cannot be included in the WDPA because they do not meet the IUCN protected area definition, the ICCA Registry and other ongoing initiatives will help to improve our understanding of the global coverage of other area-based conservation measures.

Assessing the extent of ICCAs and SNSs can be difficult because, unlike most protected areas designated by governments, many ICCAs and SNSs do not have clearly defined boundaries. However, some countries have national legislation which recognises a broader range of governance types, thus making non-governmental protected areas and other area-based conservation measures more easily accountable. For example, Australia has developed a category of indigenous protected areas (IPAs) within its national reserve system (Figure 5.3). Communities are able to decide whether or not they will become officially declared IPAs following a consultation period[92].

> ***At present, nearly 25% of Australia's national reserve system is governed by indigenous peoples, including through co-management arrangements with government agencies. (Australian Government 2011)***

Private protected areas

Many conservation efforts take place on lands that are privately owned. Although private protected areas have been around for centuries, they are becoming a more widespread phenomenon[93]. In several African countries, private conservancies often constitute large-scale protected areas that contribute substantially to biodiversity protection, often under complex tenure arrangements[94]. In

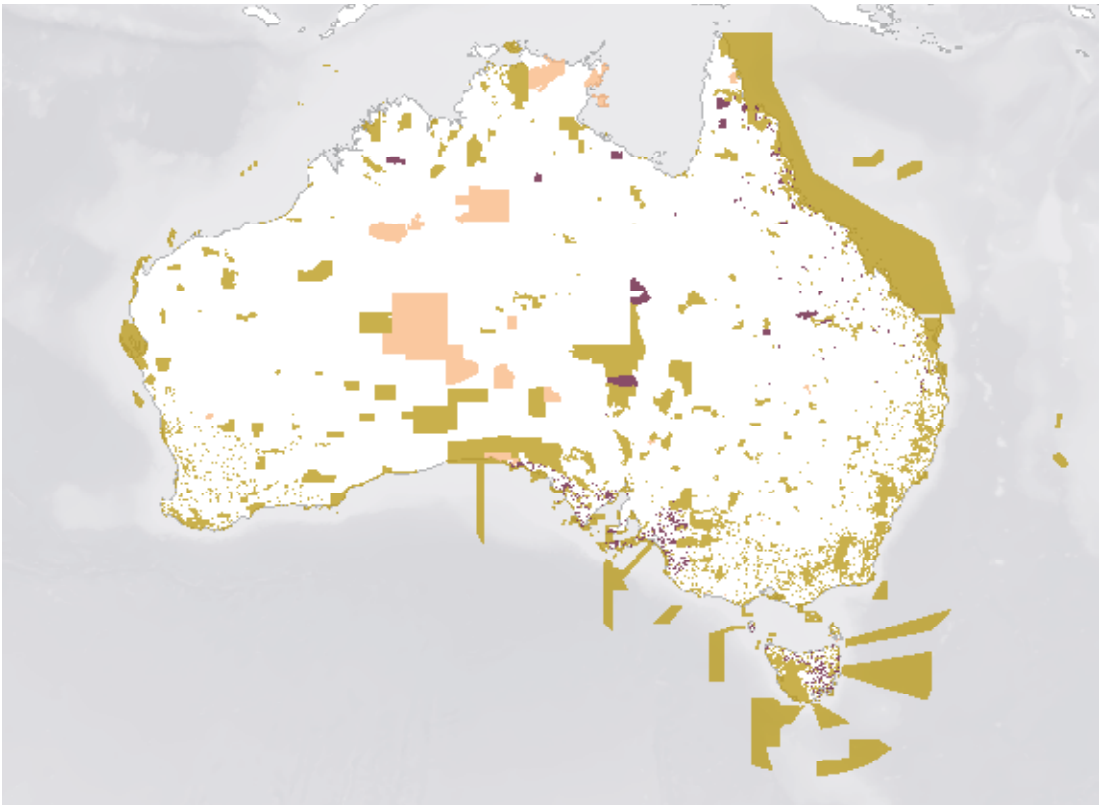


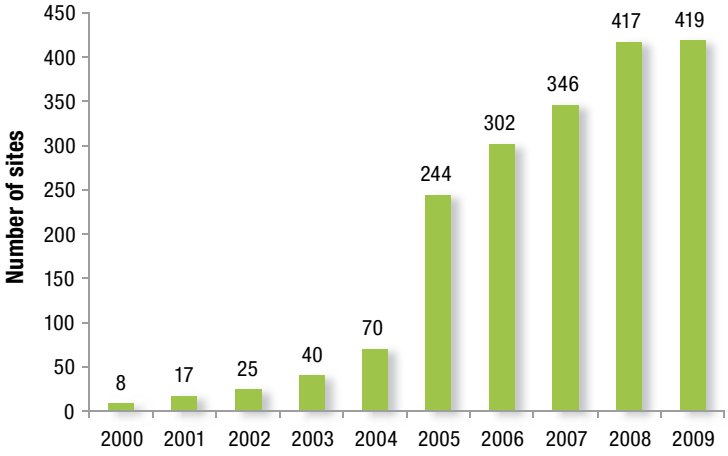
Figure 5.3 Network of indigenous protected areas (pink), private protected areas (purple) and other protected areas (kahki) in Australia. Source: WDPA 2012

Australia, the national reserve system includes over 2,500 private protected areas (Figure 5.3). A recent report by WWF in Malaysia indicated that almost 40% of forests in Borneo could potentially be managed by the private sector[95]. By 2010, the WDPA recorded some 6,900 private protected areas, which were included in the spatial analyses underpinning this report. However, due to their relatively small size, they cover only 28,000 square kilometres or 0.2% of the total protected area with a known governance type (Figure 5.2).

Governance challenges in marine areas

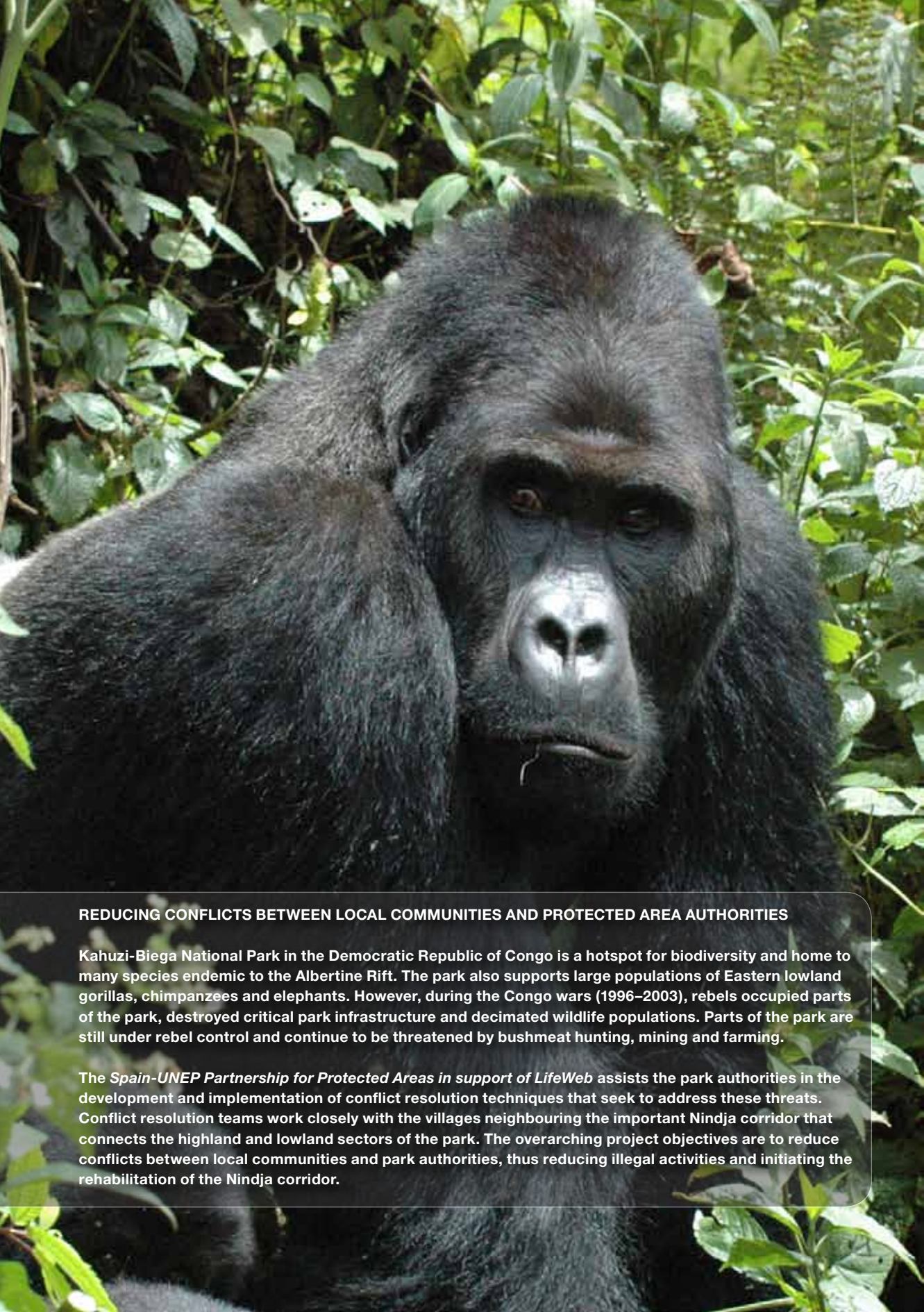
Governance of marine and coastal areas is often complex, particularly as property rights and ownership are less clear than in many terrestrial areas. However, the Pacific Islands, where over 75% of managed marine areas are locally governed, are an excellent example of organised networks of community conserved areas. The number of locally managed marine areas in the network has dramatically increased since the year 2000 (Figure 5.4). Marine areas beyond national jurisdiction are a special case: Currently there is no single entity with the authority to establish, govern and manage protected areas on the high seas, which are important especially for the conservation of wide-ranging species[96]. International cooperation has however helped to successfully overcome this challenge, facilitating the establishment of several high seas protected areas (see Chapter 2).

Figure 5.4 Number of locally managed marine areas in the Pacific from 2000 to 2009. Source: adapted from Govan *et al.* 2009



Future direction

More work is needed to determine the best ways to measure progress in the equity of protected area governance, management and benefit sharing. This work can draw, for example, on the findings of a 2011 IUCN review of protected area legislation[97] and a governance toolkit for protected areas that will be launched by IUCN at the CBD COP 11. Organisations such as the ICCA Consortium (http://www.iccaforum.org) and tools such as the ICCA Registry (http://www.iccaregistry.org) will provide increased qualitative and quantitative information that can help evaluate trends toward 2020. Global protected area analyses will also provide a better representation of different governance types as more governance information and non-governmental protected areas are reported to the WDPA. Lastly, building capacity for good governance of protected areas is crucial for the success of biodiversity conservation in the future.



REDUCING CONFLICTS BETWEEN LOCAL COMMUNITIES AND PROTECTED AREA AUTHORITIES

Kahuzi-Biega National Park in the Democratic Republic of Congo is a hotspot for biodiversity and home to many species endemic to the Albertine Rift. The park also supports large populations of Eastern lowland gorillas, chimpanzees and elephants. However, during the Congo wars (1996–2003), rebels occupied parts of the park, destroyed critical park infrastructure and decimated wildlife populations. Parts of the park are still under rebel control and continue to be threatened by bushmeat hunting, mining and farming.

The *Spain-UNEP Partnership for Protected Areas in support of LifeWeb* assists the park authorities in the development and implementation of conflict resolution techniques that seek to address these threats. Conflict resolution teams work closely with the villages neighbouring the important Nindja corridor that connects the highland and lowland sectors of the park. The overarching project objectives are to reduce conflicts between local communities and park authorities, thus reducing illegal activities and initiating the rehabilitation of the Nindja corridor.

6. FINANCING

Financial sustainability, both at the site and system level, is a critical requirement of the effective protected area networks envisaged by Aichi Target 11. Sustainable financing is about planning and putting in place funding mechanisms that cover the full cost of establishing and effectively managing protected area networks in the long term. Finance is a critical and necessary mechanism for protected areas. The importance of this is recognised in Goal 3.4 of the CBD PoWPA, "to ensure financial sustainability of protected areas and national and regional systems of protected areas". At a higher level, Aichi Target 20 addresses the need to mobilise substantial additional resources for the full implementation of the Strategic Plan for Biodiversity 2011–2020, including Target 11, and the suite of CBD Programmes of Work (see Box 6.1).

Since the lack of financial resources is currently one of the major barriers for the establishment and effective management of protected areas, especially in developing countries, the CBD COP 10 stressed that this issue needs greater attention and adopted a number of recommendations (see Decision X/31)[98]. As Target 11 affirms, ecologically representative and effectively managed protected areas are considered cost-effective tools to conserve biodiversity and ecosystem services[99]. Considering this and the economic value of protected areas discussed below, new and robust efforts must be made to accelerate progress on sustainable financing across the global protected area system.

Economic value of protected areas

Globally, more than a billion people depend on protected areas for a significant percentage of their livelihoods[100], and protected areas supply a wide range of ecosystem goods and services to rural and urban populations around the world[101]. An expanded and effective global protected area network has in fact been estimated to potentially deliver goods and services worth trillions of US dollars to local, national and global economies[102]. Many studies, including *The Economics of Ecosystems and Biodiversity* (TEEB)[103], therefore consider the total economic benefits of protected areas to greatly exceed the cost of establishing and effectively managing them. Although financial mechanisms that recognise these economic values have great potential to contribute to the sustainable financing of protected areas[104], they currently play a minor role in protected area funding.

Box 6.1 Summary: Financing.

Relevant Aichi Target	Current status and trends
Target 20: By 2020, at the latest, the mobilisation of financial resources for effectively implementing the Strategic Plan 2011–2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilisation should increase substantially from the current levels.	Many studies have shown substantial gaps between the estimated cost of expanding and effectively managing protected areas, and current protected area spending, especially in developing countries. However, more detailed information is needed on the cost of effectively implementing Aichi Target 11 to assess and address existing funding shortfalls.

Ecosystems inside protected areas provide a multitude of benefits and the global benefits of protection far outweigh costs. However, benefits from protection are often broadly disbursed, long-term and non-market, while the costs of protection and the earning potential from non-protection choices are often short-term and concentrated. Policy actions are needed to address this unequal distribution of benefits and costs.
(Kettunen *et al.* 2011)

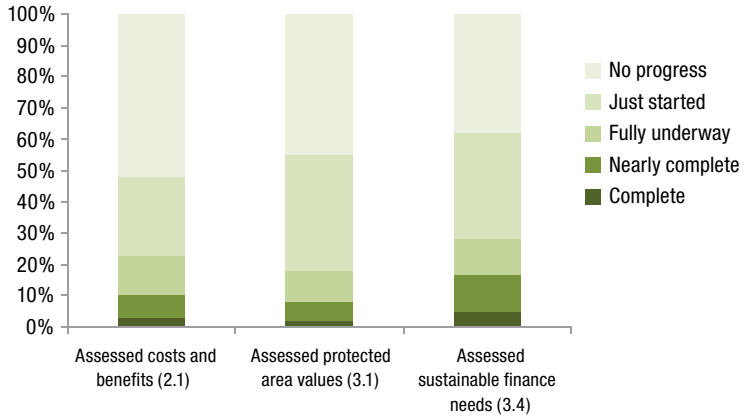
Progress with finance-related targets

The importance of understanding the global costs of establishing and effectively managing protected areas, as well as spending and shortfalls, is widely recognised[105]. However, estimating these costs is a complex task, and there is no established system that tracks protected area budgets, funding needs and funding gaps at the global level[106]. The most recent global review of protected area budgets, for example, dates from 1999[107]. There are also no currently agreed upon global indicators of protected area financing.

In 2010 the CBD Secretariat reviewed progress towards PoWPA Goal 3.4 on sustainable financing and concluded that there has been very little progress since the PoWPA was adopted in 2004 and that the international community is far behind meeting the goal at the global level[108]. To facilitate standardised reporting, the CBD COP 10 proposed a new framework for reporting on national PoWPA implementation, including financial sustainability. The framework includes questions on progress with assessing financial needs, developing and implementing sustainable finance plans and/or business plans, revenue-sharing mechanisms, new funding mechanisms, improved resource allocation, accounting and monitoring[109].

Implementation of finance-related aspects of the CBD PoWPA has lagged behind other PoWPA goals. In a survey of 110 countries in 2009 by the CBD, for example, the three finance-related PoWPA goals all showed very low implementation, with less than 5% of countries having completed any of the required assessments, and between 70% and 80% of all countries showing no or very little progress (Figure 6.1). Nonetheless, more than 80% of all countries reported some activities related to improving protected area sustainable financing, including the development of business plans, developing new finance and revenue-sharing mechanisms, removing legal barriers

Figure 6.1 Global implementation of finance-related goals of the CBD Programme of Work on Protected Areas across 110 countries in 2010.
Source: Ervin *et al.* 2010



to sustainable finance, improved accounting, budgeting and monitoring procedures, and improved inter-agency fiscal planning.

Protected area spending, costs and shortfalls[c]

The most recent study of global annual investments in protected areas, conducted in 2007, estimated an amount between US$6.5 and US$10.1 billion (Figure 6.2)[110]. This includes domestic government budgets in both developed and developing countries as well as overseas development assistance. Additional support in excess of US$1–2 billion per year is estimated to come from communities who spend significant amounts of time and resources to support conservation activities in protected areas and ICCAs[111].

Many studies have shown substantial gaps between the estimated cost of expanding and effectively managing protected areas, and current protected area spending, especially in developing countries[112]. An expanded global marine protected area network that covers 10% of the global ocean area, for example, has been estimated to cost, excluding start-up costs, between US$3 billion and US$6 billion to run on an annual basis[113]. This is about three to six times more than the estimated annual spending on marine protected areas in 2000[114]. Similar studies have estimated the annual running cost of an expanded global terrestrial protected area network to be at least US$11.6 billion per year, with an additional US$10.9 billion per year required over 30 years to cover start-up costs[115]. These funding needs do not take into consideration the recent addition of protected areas to the global network since the studies were conducted. They also clearly exceed the most recent estimate of protected area spending of US$6.5 to US$10.1 billion per year.

Recent studies for both developing and developed regions support this global picture. The funding shortfall for 18 countries in Latin America and the Caribbean has been reported at between US$314 and US$699 million per year for basic and optimal management, respectively. This represents 45% to 64% of the estimated annual management cost of the existing protected areas (Figure 6.3)[116]. In Africa, the effective management of 10% of all ecoregions (the previous CBD target) would cost around US$630 million per year, approximately double current protected area

c Note that throughout this chapter we use the original US$ and € amounts from the references cited. The amounts have not been adjusted for changes in purchasing power.

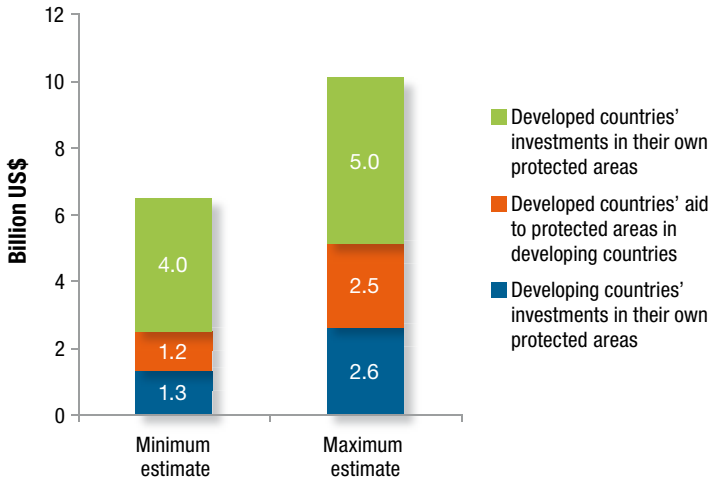


Figure 6.2 Estimated annual investments in the global protected area network, c. 2005. Source: Gutman and Davidson 2007

spending[117]. In Europe, the annual cost of implementing the Natura 2000 network in the 27 EU Member States has been conservatively estimated as €5.8 (c. US$7.4) billion per year, which is approximately four times higher than the estimated annual biodiversity allocations in the 2007–2013 EU budgets[118]. All these studies show that protected area costs, spending and shortfalls vary greatly among regions[119].

More detailed information is needed on the cost of effectively implementing Aichi Target 11 to assess and address existing funding shortfalls. A new project commissioned by the UK Department for Environment, Food and Rural Affairs, in cooperation with the CBD, is expected to deliver this information together with cost estimates for meeting the other Aichi Targets.

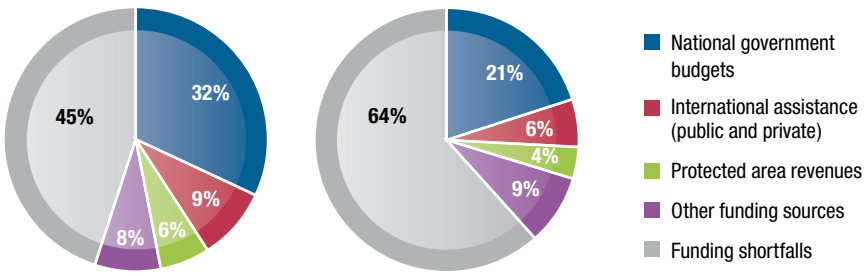
Traditional funding sources for protected areas

Major sources of protected area funding currently include national government budgets, international assistance from NGOs, bilateral and multilateral agencies (e.g. member countries of the Organisation for Economic Co-operation and Development (OECD), the Global Environment Facility (GEF) and the World Bank; see Box 6.2 on page 41), private institutions, tourism revenue generated at protected areas, and a range of other sources (see Figure 6.3 for a regional example). Generally, however, neither government budgets nor international assistance have kept pace with the expansion of the global protected area network since the CBD came into force in 1993[120]. Increasing efforts are now devoted to finding ways to make protected areas financially self sustaining because unfunded protected areas cannot be effectively managed and are at risk of becoming "paper parks".

Alternative financial approaches for protected areas

Although public sector funding and bilateral/multilateral assistance in developing countries will certainly continue to be important funding sources[121], new and innovative financial mechanisms are required to fill existing and future funding gaps. A wide range of mechanisms, including tourist fees, taxes and surcharges, trust funds, private sector funding, biodiversity offsets, payments for ecosystem services and green accounting are available and have great potential to increase and diversify revenues[122]. While several of these mechanisms have been around for some years, they continue to evolve in response to lessons learned from the field. Their successful implementation may also require new approaches to benefit sharing and to ensure protected areas indeed retain critical funds for future growth.

Figure 6.3 Current funding sources and shortfalls relative to estimated annual management cost for (a) basic management (shortfall of US$314 million) and (b) optimal management (shortfall of US$699 million) in 18 national protected area systems in Latin America and the Caribbean. Source: Bovarnick *et al.* 2010



Nature-based tourism and recreation is still on the increase in most parts of the world and has considerable potential to generate funds for protected areas, especially those with attractive landscapes/seascapes and charismatic wildlife, provided that tourism revenues are properly re-invested in the management of these areas[123]. Both terrestrial and marine protected areas can benefit, for example, from tourist entry fees, charges for recreational activities, or surcharges and taxes levied on tourism-related goods and services[124]. The full potential of such schemes, however, is yet to be realised, as many surveys have shown that protected area visitors are willing to pay more than they are charged at present[125].

Payments for ecosystem services (PES) schemes for water are already being implemented by some countries but there is still potential for these schemes to be more widely utilised[126]. For example, the inclusion of protected areas in schemes that aim to reduce emissions from deforestation and forest degradation in developing countries could potentially generate substantial funding for the expansion and/or improved management of protected area systems[127]. For protected areas in humid tropical forests it has been estimated that the value of carbon emission reductions achieved between 2000 and 2005 was 1.5 to 1.8 times greater than the spending on protected area management over the same period[128].

Finally, changing current government spending practices has great potential for both sustainable development and biodiversity conservation. A representative terrestrial protected area system covering 17% of the global land area, as envisaged by Target 11, could be established and effectively managed at a cost that represents only a fraction of the amount governments currently spend on environmentally harmful subsidies[129]. Such a protected area system would deliver a wide range of benefits such as climate regulation and clean water provision that are in addition to those gained from the removal of harmful subsidies. Similarly, it has been estimated that a fraction of the harmful subsidies for enhancing the world's fisheries would be sufficient to cover the annual running costs of all marine protected areas, which act as "beneficial subsidies" and enhance fisheries by boosting fish stocks[130].

Box 6.2 Some important global players in protected area financing.

Global Environment Facility (GEF)
The GEF is the largest funding mechanism for protected areas worldwide. Since 1991, the GEF has provided more than US$2.2 billion towards the establishment or management of 2,400 protected areas covering more than 634 million hectares, leveraging an additional US$7.35 billion in co-financing[131]. The GEF has supported a large number of developing countries to establish innovative financial mechanisms for protected areas.

The World Bank
The World Bank, which provides assistance to developing countries around the world primarily for the purpose of fighting poverty, is also one of the largest funders of biodiversity conservation. It spends, on average, US$275 million annually on protected areas in developing countries, including managing a substantial part of the GEF's protected area funding. Of this, US$100 million annually was from the Bank's own sources, US$60 million came from the GEF (but was wholly managed by the Bank), and US$115 million was leveraged through co-financing[132].

United Nations Development Programme (UNDP)
UNDP manages a GEF-funded biodiversity portfolio which included, from 2003 to 2012, 147 protected area projects working in more than 100 countries, totalling US$456 million and US$1.4 billion in co-financing[133]. These projects supported the establishment or management of over 700 protected areas, as well as the drafting of many national policies on protected area financing. One of UNDP's key protected area strategies is to help countries assess their funding needs and gaps, and diversify their funding sources, including by capturing the financial benefits of protected areas, and thus ensure financial sustainability.

United Nations Environment Programme (UNEP)
UNEP supports strengthened and expanded protected area networks through a portfolio of projects. These projects focus on enhancing protected area management through providing tools to mainstream environmental concerns into decision making, demonstrate the value of protected areas, and support approaches to integrate protected areas into the wider land and seascape. Since 2006, the UNEP investment in protected areas has totalled over US$135 million, including the UNEP portfolio of GEF projects[134].

CBD LifeWeb Initiative
In 2008, the CBD COP 9 created the LifeWeb Initiative to leverage new and additional funding into protected area projects based on national strategies and action plans for the implementation of the CBD PoWPA and to support achievement of the Aichi Biodiversity Targets. The LifeWeb Initiative promotes and strengthens financing by matching protected area projects with the interests of public and private donors. Since 2008, the CBD LifeWeb Initiative has helped facilitate 62 matches of funds for protected areas, totalling over US$200 million[135].

Critical Ecosystem Partnership Fund (CEPF)
Founded in 2000, CEPF unites six global organisations, including the GEF and the World Bank, who are committed to enabling NGOs and private sector organisations to help protect vital ecosystems. Since 2000, CEPF has supported civil society in 21 of the world's 35 biodiversity hotspots with US$139 million and US$318 million in co-financing, and helped to create or expand protected areas covering more than 12 million hectares[136].

GENERATING INCOME FOR PROTECTED AREAS AND PEOPLE

Typical of many Mesoamerican protected areas, Volcán Barú National Park in Panama and La Montañona Conservation Area in El Salvador cover a wide range of ecosystems and support high numbers of plant and animal species, including howler monkeys and beautiful birds such as quetzals.

The *Spain-UNEP Partnership for Protected Areas in support of LifeWeb* seeks to reduce human pressure on these protected areas, improve their financial sustainability and at the same time promote the sustainable use of biodiversity in the region. The project supports the valuation of the social and economic values of the region's ecosystems, the services they provide, and the cost related to their loss and degradation. This information can then be used to develop payment schemes for ecosystem services or to assess the potential of improved agricultural practices and ecotourism to generate income for indigenous and local communities.

7. CONNECTIVITY

Habitat fragmentation is a substantial threat to biodiversity; thus, an important strategy for biodiversity conservation is connecting protected spaces[137]. Connectivity conservation seeks to retain, restore or create linkages between protected and unprotected habitats in order to facilitate species movements and other essential ecological processes. Connectivity conservation areas are commonly described as corridors and their active management is referred to connectivity conservation management[138]. Although some studies caution against the dangers of corridors as vectors for disease and the spread of invasive species, an increasing number of studies suggest that habitat connectivity does have positive effects on species movement, dispersal, diversity and abundance, in both terrestrial and marine environments[139]. Connectivity is important for the long-term survival of many species and ecosystems because it helps maintain genetic diversity, populations and metapopulations, allowing species to cope with natural variability and environmental changes such as climate change. Moreover, connectivity helps maintain the integrity of ecosystems and the services they provide to people[140].

The need for well connected systems of protected areas

Even if protected areas are effective at preventing habitat loss and fragmentation within their boundaries, they may become isolated because of land use change outside their boundaries (Figure 7.1)[141]. Forest protected areas, for example, can become "islands in a sea" of agricultural lands. The persistence of many species in such a fragmented landscape (or seascape) depends on functioning connections between protected areas. These connections are also important for species to adapt to changing climates[142]. Climate change is already forcing some species to move to higher altitudes or latitudes with suitable climatic conditions[143]. Thus, as recognised in Aichi Target 11 and Goal 1.2 of the CBD PoWPA, there is a need to create better linkages between protected areas and to better integrate them into the surrounding landscapes and seascapes (see Box 7.1). Well-connected protected area systems are much more likely to better conserve biodiversity conservation in the long term.

> ***Protected areas need to be managed as a coherent network rather than as isolated habitat islands in order to sustain biodiversity, particularly in the face of climate change.*** **(Rands *et al.* 2010)**

Designing and managing connectivity conservation areas

Connectivity conservation applies the concept of ecological networks; these are ideally designed and managed based on the ecosystem approach in order to effectively combine biodiversity conservation and the sustainable use of natural resources[144]. This is achieved through careful land use planning and management that involves protected areas, buffer areas and different types of corridors. These provide structural and functional connectivity between protected areas and other important natural areas in the landscape (Figure 7.2 on page 45)[145]. Interventions include the establishment of larger protected areas and interconnecting ecological corridors. Habitat restoration and sustainable land use in the surrounding matrix also help maintain ecological processes across the network. Connectivity conservation can be implemented in both terrestrial and marine environments, and at different spatial and temporal scales[146]. Connectivity conservation complements other conservation measures such as maintaining and increasing the area and quality of habitats, and controlling threats to species and habitats[147]. Detailed guidance on the successful implementation of connectivity conservation is available from IUCN and a number of other organisations[148].

Figure 7.1 The forests (dark green) of isolated Egmont National Park, New Zealand, are surrounded by pastures (light green). Source: http://earthobservatory.nasa.gov/IOTD/view.php?id=3881

Box 7.1 Summary: Connectivity.

Relevant elements of Target 11	Current status and trends
"well connected systems of protected areas, integrated into wider landscapes and seascapes"	More and more countries apply connectivity conservation approaches and improve the integration of protected areas into wider landscapes and seascapes. However, many protected areas suffer from increasing isolation, a threat that is well documented, especially for forest ecosystems.

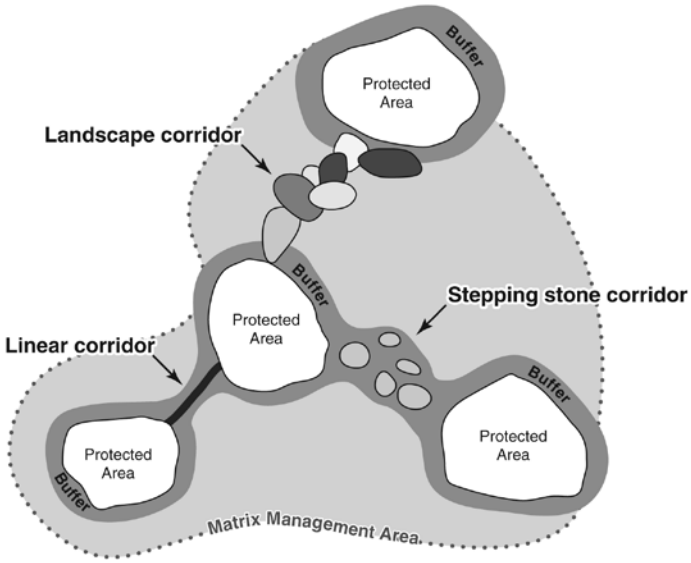


Figure 7.2 Model of an ecological network with protected areas, buffer areas and different types of ecological corridors between protected areas. Source: Mackey *et al.* 2010, adapted from Bennett 2004

Our results suggest that existing corridors increase species movement in fragmented landscapes and that efforts spent on maintaining and creating corridors are worthwhile. **(Gilbert-Norton *et al.* 2010)**

Measuring the connectivity of habitats and protected areas

Tracking progress towards Aichi Targets 5 and 11 requires global indicators of fragmentation and connectivity. So far no global indicators exist; however, a wide range of indicators and measures has been proposed in the literature, and preliminary analyses of protected area connectivity are underway[149]. In addition, two global CBD indicators of habitat connectivity – for forests and rivers – are under development[150]. One of the key challenges is the limited availability of high quality habitat data for measuring global changes in connectivity over time. Currently this exists only for specific habitats such as forests. Habitat data is also necessary to assess protected area connectivity because forest habitats, for example, may not be connected even though their associated protected areas are contiguous. Approaches that simply measure the distance between protected areas do not show how well different species can move between them. Another consideration is that different species and ecosystems require varying levels of connectivity, and this is difficult to reflect in a single measure[151].

Wherever possible, it is imperative to establish sizeable buffer zones around protected areas, maintain substantial connectivity, and promote lower-impact land uses near protected areas by engaging and benefiting local communities. **(Laurance *et al.* 2012)**

Current status and trends in connectivity conservation

Connectivity conservation is on the rise, with examples of corridors occurring throughout the world in both terrestrial and marine environments. More and more countries apply connectivity conservation approaches and improve the integration of protected areas into wider landscapes and seascapes[152]. Over 350 large-scale connectivity conservation initiatives are known to exist[153]. These include for example the European Green Belt, the Mesoamerican Biological Corridor, the Yellowstone to Yukon Conservation Initiative in North America, the Great Eastern Ranges Corridor in Australia, the Coral Triangle Initiative in Southeast Asia, and the Regional Network of Marine Protected Areas in West Africa. Many more small-scale initiatives exist but have yet to be inventoried. As a result, it is reasonable to expect that some form of connectivity conservation exists in almost every country.

Connectivity conservation can also focus on improving connections across political borders. Considerable progress has been made in recent years with establishing and strengthening transboundary protected areas (TBPAs)[154]. These areas stretch across political borders within and between countries, and can thus enhance connectivity for species and ecosystems that do not recognise these boundaries[155]. The number of TBPA complexes crossing international borders increased from 59 in 1988 to 227 in 2007[156]. These 227 complexes are made up of 3,043 individual protected areas, covering over 4.6 million square kilometres, 63% of which are in the Americas[157].

Evidence is now needed on how these initiatives improve the connectivity of habitats and protected areas over time. A 2010 meta-analysis of over 70 initiatives found that wildlife corridors significantly increase movement between habitat patches in fragmented landscapes[158]. A global study in 2003 found that half or more of the Mediterranean, temperate broadleaf and mixed forest, and tropical/subtropical dry forest biomes and nearly one quarter of the tropical/subtropical moist forest biome have been fragmented by humans[159]. However, unlike more recent European studies, this study did not assess changes in connectivity over time. In Europe, the continent with the overall highest levels of forest fragmentation, forest connectivity in the period 1990–2006 decreased in several areas, particularly in south-western and north-eastern EU countries (Figure 7.3)[160]. Elsewhere, the connectivity of European forests remained largely stable or even increased slightly. Additional studies such as these are urgently needed for other habitats and regions. These studies should ideally factor in protected areas so that their connectivity can be assessed.

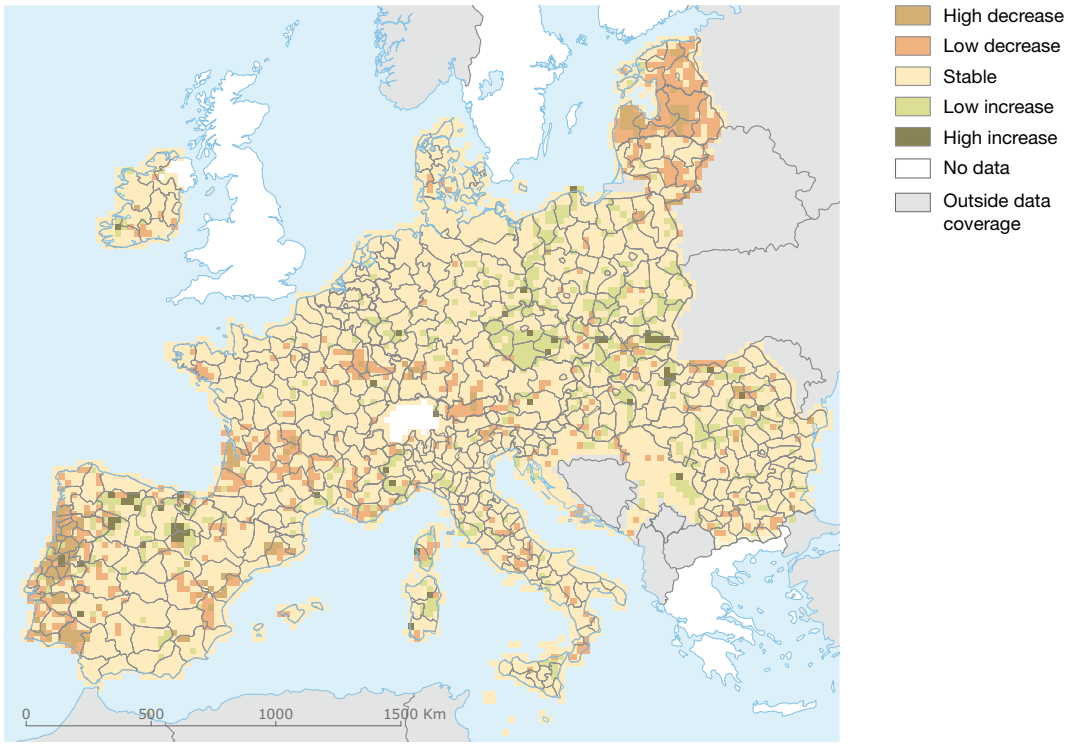


Figure 7.3 Change in forest connectivity in the European Union from 1990 to 2006. Source: adapted from Estreguil and Caudullo 2010 as shown in EEA 2010b (Copyright: Joint Research Centre (JRC))

The future for connectivity conservation

There is an increasing interest in connectivity conservation in science, policy and practice. A growing number of Multilateral Environmental Agreements (e.g. CBD, Convention on Migratory Species, and Ramsar Convention) now stress the need to develop better linkages between protected areas and the wider landscape or seascape. Many connectivity conservation initiatives are demonstrating how this can be achieved at different scales. For example, Australia's National Wildlife Corridors Plan is the first of its kind at continental scale to recognise ecological processes at local, landscape and broader scales[161]. The plan also empowers communities, an important consideration for conservation connectivity efforts in the future, particularly because so many indigenous and local communities live within the buffers and corridors surrounding protected areas.

Connectivity conservation initiatives benefit from a long-term vision for biodiversity conservation and sustainable development that is shared by all relevant stakeholders, integrated approaches to land use planning and management, and a supportive enabling environment including appropriate institutional and legal frameworks. Although the conservation of biodiversity is at the centre of connectivity conservation, the concept also holds promise for producing a range of other benefits, including for carbon storage, climate change adaptation and mitigation[162]. Finally, connectivity conservation initiatives have been very successful at catalysing partnerships across political and sectoral boundaries, which is an important prerequisite for the integration of protected areas into wider landscapes and seascapes[163].

CONSERVING MIGRATION CORRIDORS FOR MARINE MAMMALS

The tropical waters of the Wider Caribbean Region, Southeast and Northeast Pacific are important feeding, mating and calving grounds for 32 species of marine mammals. They also serve as important "stop-over points" and migration corridors on the long-ranging north-south migration routes of cetaceans in both the Atlantic and Pacific, thus providing critical connectivity between habitats in distant waters.

The *Spain-UNEP Partnership for Protected Areas in support of LifeWeb* assists countries in the region with the transboundary conservation of these important migration routes. Project activities include mapping of critical habitats, migration routes and socio-economic information on relevant human activities. The resulting maps help inform broad-scale spatial planning and management of marine protected areas. The project also aims to develop management plans for important marine areas and to support transboundary cooperation.

8. SUMMARY AND CONCLUSIONS

Protected areas are not only critically important for biodiversity conservation, but also vital for sustainable development. Protected areas provide humanity with fundamental ecosystem services such as water, food, fuel, medicines and carbon storage. They are places for humans to contact the natural world for their physical, mental and spiritual health. As this report demonstrates, countries and communities, NGOs and businesses are already working closely together to make protected areas work for both people and the biodiversity and ecosystem services on which people depend. But considerable further progress is required in order to meet international protected area targets and ensure that protected areas fully act as natural solutions for our future.

Summary of progress

The global protected area network is evolving and progress has been made in relation to the requirements of Aichi Target 11 – particularly in relation to overall coverage of protected areas. From 1990 to 2010, global protected area coverage has increased from 8.8% to 12.7% in terrestrial areas (including inland waters) and from 0.9% to 4% in marine areas under national jurisdiction. The percentage of terrestrial ecoregions meeting the 17% target has increased from 21% to 33%, and the percentage of marine ecoregions meeting the 10% target from 3% to 13%. An increasing number of studies show that protected areas make a critical contribution to habitat and species conservation, and thus to Aichi Targets 5 and 12, in particular when habitat and species trends are compared inside and outside protected areas. However, limited progress has been made with protecting important sites for biodiversity, with half of the best described sites still entirely unprotected[164].

The global protected area network is also diversifying rapidly in terms of its management and governance arrangements. Available information suggests that nearly half the world's protected area estate is within sustainable-use areas and protected landscapes / seascapes, and nearly a quarter is managed by non-governmental actors or under co-management arrangements, often with indigenous peoples or local communities. Management effectiveness assessments cover an increasing proportion of the global protected area network and provide critical information for further improvement. Finance mechanisms such as the GEF and CBD LifeWeb Initiative are already working closely with governments and a wide range of other partners to increase the available funding for protected areas. However, many studies show there is still a substantial shortfall in funding relative to needs across the world but especially in developing countries[165].

Progress has also been made with initiatives that seek to improve the connectivity within protected area networks. Over 220 transboundary protected area complexes and 350 large-scale connectivity conservation initiatives exist, connecting and integrating thousands of individual protected areas into wider landscapes and seascapes. However, protected area connectivity has not yet been assessed at the global level.

> ***The preparation of over 100 PoWPA action plans in a span of 15 months is a remarkable achievement. This is the first step towards achieving Target 11 and showcases the commitment of Parties.***
> **(CBD Secretariat 2012)**
> **These action plans are available at:**
> **http://www.cbd.int/protected/implementation/actionplans/**

Over 100 countries have submitted national action plans for implementation of the CBD Programme of Work on Protected Areas (PoWPA) and over 90 countries have identified national protected area targets[166]. Preparation of revised National Biodiversity Strategies and Action Plans (NBSAPs) should integrate PoWPA action plans and provides an opportunity for countries to prioritise ecoregions and important sites for biodiversity and ecosystem services in the expansion of their protected area systems.

Summary of challenges

Despite evident progress, the global protected area network does not yet meet the requirements of Target 11. The global network is not yet ecologically representative because hundreds of the world's 1,055 terrestrial and marine ecoregions have limited or no protection. Moreover, many important sites for biodiversity and ecosystem services, and many threatened species, remain entirely unprotected[167]. The majority of protected areas are not sufficiently resourced, or effectively and equitably governed and managed: less than a third of all protected areas have a management plan, and only a quarter of the assessed protected areas have sound management[168]. Further efforts are also needed to improve the connectivity of protected areas, their integration into wider landscapes / seascapes, and the sharing of their costs and benefits.

With regard to the 17% terrestrial and 10% marine targets, it is difficult to estimate how much additional protected area is needed globally (see Box 8.1). Regardless, additional protection should focus on improving the ecological representativeness of the global network and target important sites for biodiversity and ecosystem services. Well known priority sites include Alliance for Zero Extinction sites (AZEs) and other Key Biodiversity Areas such as Important Bird Areas (IBAs). It has been estimated that expanding the global protected area network to cover all of the partially protected and unprotected AZEs (459) and IBAs (8,106) would increase protection to just above the 17% terrestrial target[169]. Marine Key Biodiversity Areas and Ecologically and Biologically Significant Areas (EBSAs) represent similar priority sites in the marine environment.

The multiple elements of Target 11 and limited information available represent a key challenge for tracking global progress. For example, we know very little about the global protection status of important sites for ecosystem services, and vulnerable ecosystems such as inland waters and islands. It is also challenging to track the rapid expansion of the marine protected area network. Data quality in the World Database on Protected Areas (WDPA) still varies across the world. For instance, many of the 207,000 protected areas in the WDPA do not have boundary information (15%), date of establishment (23%), management category (23%) or governance type (57%) assigned[170].

Comprehensive information on habitat and species trends is available from relatively few protected areas. Similarly, management effectiveness assessments have been compiled from only 6,700 protected areas, and the data of many of these assessments are not available for analysis[171]. Hence we still have only limited knowledge about the relative effectiveness of different management and governance approaches in protected areas. Together, the WDPA and ICCA Registry currently include information on 760 indigenous peoples' territories and community conserved areas (ICCAs), which represent only a fraction of the total number of ICCAs worldwide. As consensus does not yet exist on what constitutes "other effective area-based conservation measures", it is difficult to assess progress with these measures. As a result, there are no global indicators as yet to track progress towards either the full range of elements of Target 11, or the target in its totality.

Box 8.1 How much additional protected area is needed?

Even without considering ecological representativeness, it is estimated that an additional 6 million square kilometres of terrestrial and inland water areas, and an additional 8 million square kilometres of marine and coastal areas will have to be *recognised as protected* to meet the quantitative element of Target 11 (see Chapter 2). These estimates increase substantially if ecological representativeness is factored in. For example, simulations by the Organisation for Economic Co-operation and Development (OECD) suggest that a further 10 million square kilometres would need to be *recognised as protected* to achieve the 17% terrestrial target in the world's 65 large-scale biogeographic units[172], a 66% increase over our estimate. The area required would increase even further if Target 11 is to be met in each of the world's 1,055 terrestrial and marine ecoregions. However, "recognised as protected" is used above because it is likely that we are already closer to the quantitative target than we think: the WDPA does not yet include all the world's protected areas, and Target 11 also includes "other effective area-based conservation measures", which remain only vaguely defined and for which there is no global data at present. It should be noted that the 17% terrestrial target and 10% marine target are still far below what many scientific studies show is necessary to meet desirable global conservation goals for biodiversity and ecosystem services in the long term[173].

Priority actions required to accelerate progress towards Target 11

Important actions highlighted throughout this report can be summarised in the following key recommendations:

1. Accelerate the targeted expansion of the global protected area network in terrestrial, inland water and marine areas, and include priority ecoregions and sites in revised NBSAPs:
   a) Increase protected area coverage in ecoregions with limited or no protection to improve ecological representativeness
   b) Increase protected area coverage of important sites for biodiversity and ecosystem services, including Alliance for Zero Extinction sites and other Key Biodiversity Areas
2. Improve understanding of the benefits of protected areas for conservation of biodiversity and ecosystem services, and maintain those benefits through enhanced planning, governance, management, protection and collaboration with relevant stakeholders, conventions and agreements
3. Expand management effectiveness assessments to include more protected areas, data on biodiversity outcomes, and social costs and benefits of protected areas; improve management based on these assessments and make the data available for analysis
4. Strengthen the involvement and capacity of local communities and other stakeholders in protected area establishment and management, and recognise and support the governance of ICCAs and private protected areas
5. Assess funding needs for implementation of Target 11 and the PoWPA goals and secure sustainable funding for protected area establishment and management through a variety of mechanisms, including government budgets and donor resources as appropriate
6. Improve the connectivity of protected areas and their integration into surrounding landscapes and seascapes.

Priority actions required to improve our ability to track progress

The need for additional and improved protected area information, analyses and indicators has been stressed throughout this report. Key recommendations include:

1. Enhance national reporting to the datasets that are being used to track global progress towards Target 11:
   a) World Database on Protected Areas (WDPA)
   b) Global database on management effectiveness
   c) ICCA Registry
2. Support efforts to improve the data in the WDPA through expert review and inclusion of more boundary information, dates of establishment, management categories, governance types, and non-governmental protected areas
3. Better integrate the WDPA with other relevant datasets and indicators, such as the global database on management effectiveness, IUCN Red List of Threatened Species, World Bird Database, Red List Index and Living Planet Index, to develop more relevant indicators on biodiversity trends inside and outside protected areas
4. Support the identification of important sites for biodiversity and ecosystem services, including Alliance for Zero Extinction sites and other Key Biodiversity Areas, so that global progress in their protection can be assessed
5. Support further development of existing global datasets and indicators to provide better information, for example on the protection of inland waters, islands and marine areas (including no-take areas)
6. Provide further guidance on elements of Target 11 such as “other effective area-based conservation measures”, “equitably managed” and “well connected” so that relevant datasets and indicators can be developed
7. Also support the development of datasets and indicators on other elements of Target 11 relating to the management, governance, financing and connectivity of protected areas, for which limited information is available at present.

Looking ahead to the Protected Planet Report 2014

The next edition of this report is planned to be published in time for the IUCN World Parks Congress and the CBD COP 12 in 2014. It will provide updated information on existing protected area indicators but also seek to include new indicators on the effectiveness and connectivity of protected areas. As a more comprehensive set of indicators comes together, in future editions we are planning to include a more complete overview of progress on all elements of Target 11. To implement these plans we are interested in further developing the partnership that supports the Protected Planet Report initiative and invite interested parties to work with us.

We would welcome your feedback on this first edition of the Protected Planet Report and invite you to contact us at: protectedareas@unep-wcmc.org

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Acronyms

AZEs	Alliance for Zero Extinction sites
BIP	Biodiversity Indicators Partnership
CBD	Convention on Biological Diversity
CEPF	Critical Ecosystem Partnership Fund
COP	Conference of the Parties
EEZ	Exclusive Economic Zone
EU	European Union
GEF	Global Environment Facility
IBAs	Important Bird Areas
ICCAs	Indigenous peoples' territories and community conserved areas
IPAs	Indigenous protected areas
IUCN	International Union for Conservation of Nature
MDGs	Millennium Development Goals
MPAs	Marine protected areas
NBSAPs	National Biodiversity Strategies and Action Plans
NGOs	Non-governmental organisations
PADDD	Protected area downgrading, downsizing, and degazettement
PoWPA	Programme of Work on Protected Areas
SNSs	Sacred natural sites
SSC	Species Survival Commission
TBPAs	Transboundary protected areas
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNEP-WCMC	United Nations Environment Programme World Conservation Monitoring Centre
WCPA	World Commission on Protected Areas
WDPA	World Database on Protected Areas

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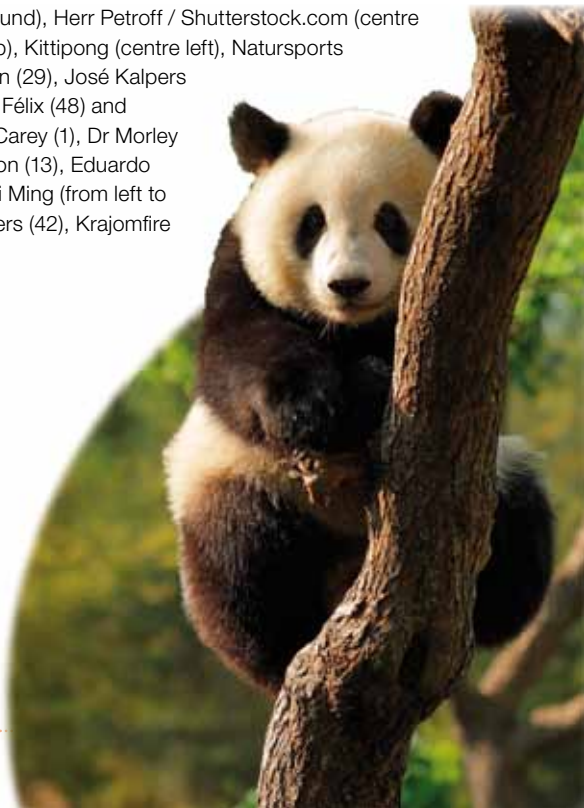

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