Protected Planet Report 2016

How protected areas contribute to achieving global targets for biodiversity

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International Union for Conservation of Nature (IUCN) is the world's oldest and largest global environmental organisation, with more than 1,200 government and NGO members and almost 11,000 volunteer experts in some 160 countries. IUCN's work is supported by over 1,000 staff in 45 offices and hundreds of partners in public, NGO and private sectors around the world. www.iucn.org.

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Foreword

At a time when human pressures on the world's species and ecosystems are intensifying, there is also a growing recognition that natural ecosystems make an essential contribution to human health and wellbeing. The integration of environmental sustainability into more than half of the United Nations Sustainable Development Goals clearly reflects this trend. Never has the need to conserve biodiversity and cultural heritage been greater, and more universally accepted, than today. This increased awareness has led to investments in new systems of protection around the world.

Previous Protected Planet Reports, from 2012 and 2014, focused on assessing progress towards the achievement of the Strategic Plan for Biodiversity 2011-2020, in particular Aichi Biodiversity Target 11. By highlighting current research and case studies, this Protected Planet Report assesses how protected contribute to the achievement of 15 of the 20 Aichi Biodiversity Targets and relevant Targets of the Sustainable Development Goals.

The report underscores the importance of protected areas in sustaining the functions and values of natural ecosystems as well as the needs of human society. It highlights the nature-based solutions that protected areas make to critical environmental and societal challenges including climate change, food and water security, human health and well-being, and natural disasters. These functions will become ever more valuable as terrestrial, marine, coastal, and inland water ecosystems outside protected areas become compromised by over-exploitation, habitat loss and degradation.

The 2016 Protected Planet Report is a call to build a better understanding of the value of investing in protected areas managed under a broad range of governance arrangements. This will require a concerted and coordinated engagement by all sectors, including expert organizations, civil society, Indigenous Peoples and local communities, governments, and business. Such a commitment is a fundamental component of success in the search to make protected and other conserved areas core elements of sustainable landscapes.

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Executive Summary

In 2010, the Parties to the Convention on Biological Diversity (CBD), adopted the Strategic Plan for Biodiversity 2010-2020 and its 20 Aichi Biodiversity Targets. It has since been endorsed by multiple Multilateral Environmental Agreements as a global framework for biodiversity. In 2015, the members of the United Nations adopted the 2030 Agenda for Sustainable Development and its Sustainable Development Goals. These constitute two of the most important environment and sustainable development commitments ever made by governments in the international fora, and both recognize the important role of protected areas as a key strategy for biodiversity conservation and sustainable development in the targets they contain, for example, Aichi Biodiversity Target 11, SDG goals 14 and 15. The global protected areas estate is therefore an important contribution to achieving these commitments.

The Protected Planet Report 2016 assesses how protected areas contribute to achieving the Aichi Biodiversity Targets and relevant targets of the Sustainable Development Goals, and highlights current research and case studies as examples of the role protected areas play in conserving biodiversity and cultural heritage.

KEY MESSAGES

- Ensuring a more sustainable future for people and the planet will require greater recognition of the important role that protected areas (PAs) play in underpinning sustainable development. Strengthened communications of the benefits of protected areas across all sectors of society will help to demonstrate the economic and social values of PAs to existing and future generations (Aichi Biodiversity Target 1).
- Making PAs a key part of national and local responses to address harmful incentives to biodiversity (Aichi Biodiversity Target 3), biological invasions (Aichi Biodiversity Target 9), anthropogenic impacts and climate change challenges (Aichi Biodiversity Targets 10, 15) will help to halt biodiversity loss (Aichi Biodiversity Targets 5 and 12), improve food and water security, increase the resilience of vulnerable human communities to cope with natural disasters, and promote human health and well-being (Aichi Biodiversity Target 14).
- PAs also play a key role in enhancing fish stocks and strengthening sustainable management of fisheries (Aichi Biodiversity Target 6), and protected areas in landscapes can promote sustainable production of natural resources in areas under agriculture, aquaculture and forestry (Aichi Biodiversity Target 7). However, although there are a number of good examples demonstrating how protected areas and sustainable production co-exist, there is still limited information on the factors affecting their success or failure.
- Just under 15% of the world's terrestrial and inland waters, just over 10% of the coastal and marine areas within national jurisdiction, and approximately 4% of the global ocean are covered by PAs (Aichi Biodiversity Target 11).
- Nevertheless, PA coverage alone is not a measure of the overall effectiveness of protected area performance or conservation success, and other elements of Aichi Biodiversity Target 11 are equally important. For example, the contribution of other effective area based conservation measures may contribute significantly to the important conservation elements of representativeness and connectivity.
- In terms of the representation element of Aichi Biodiversity Target 11, less than half of the world's 823 terrestrial ecoregions have at least 17% of their area in PAs and only one third of the 232 marine ecoregions have at least 10% of their area protected. Less than 20% of Key Biodiversity Areas are completely protected, and therefore further efforts are needed to expand PA systems to ensure that the global PA estate adequately covers areas important for biodiversity and the provision of ecosystem services to people.

- More Protected Area Management Effectiveness Assessments (PAME) are also needed to better understand the impact and contribution of the world's protected areas. By 2015, 17.5% of countries had completed and reported at least one Management Effectiveness assessment for 60% of the reserves within their protected area estat. Analyses of the broad impact of protection on biodiversity indicates that protected areas have, on average, been successful in reducing habitat loss (Aichi Biodiversity Target 5), have had positive impacts on a broad set of species and have lowered the risk of extinction for species whose most important sites were protected (Aichi Target 12).
- Assessing the full range and value of services and benefits arising from protected areas (Aichi Biodiversity Target 14) will strengthen support to biodiversity financing mechanisms and strategies for protected areas networks (Aichi Biodiversity Target 20), including payments for ecosystem services, allocation of additional government budgets and financing through major development.
- Countries are increasingly integrating PAs in the national biodiversity strategies and action plans (NBSAPs (Aichi Biodiversity Target 17)) to achieve a range of Aichi Biodiversity Targets. A preliminary analysis of 45 revised NBSAPs indicated that protected areas are framed within NBSAPs as part of broad goals and objectives, as key aspects of national targets.
- Welcoming indigenous peoples and local communities into shared governance structures and management of protected areas can be an important strategy to ensure PAs respect and integrate traditional knowledge into governance and management measures (Aichi Biodiversity Target 18).
- Protected and conserved areas will be fundamental for achieving many of the Sustainable Development Goals (SDGs), and protected areas are used to track progress towards the achievement of SDG goals 14 (Life under water) and 15 (Life on land).

Quick guide to this report

Chapter	The contribution of protected areas to	Targets assessed
1	Introduction	
2	Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society	Aichi Biodiversity Targets 1, 2, 3
3	Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use	Aichi Biodiversity Targets 5, 6, 7, 9, 10
4	Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity	Aichi Biodiversity Targets 11, 12
5	Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services	Aichi Biodiversity Targets 14, 15
6	Strategic Goal E: Enhance the implementation through participatory planning knowledge management and capacity building	Aichi Biodiversity Targets 17, 18, 20
7	Sustainable Development Goals	SDG Target 14.5, 15.1 and 15.4.

1. Introduction

Protected areas are critical for maintaining a healthy environment for people and nature. They are essential for biodiversity conservation and vital to the cultures and livelihoods of indigenous peoples and local communities. They also deliver clean air and water, bring benefits to millions of people through tourism, and provide protection from climate change and natural disasters.

Over the past 20 years, there has been a dramatic increase in the number and extent of protected areas established globally, representing a growing recognition of the value of protection as a way to safeguard nature and cultural resources and mitigate human impacts on biodiversity. It is also important to recognize the political commitments made by governments at many levels that have driven these achievements. The Strategic Plan for Biodiversity 2011-2020, with its 20 Aichi Biodiversity Targets, and the 2030 Agenda for Sustainable Development are possibly two of the most important such commitments reached in the past decade. Both commitments aim to conserve and sustainably use marine and terrestrial biodiversity and its derived ecosystem services. This report discusses how protected areas contribute significantly towards a number of the Aichi Biodiversity Targets, and offers a brief overview of their role in implementing relevant targets of the Sustainable Development Goals (SDGs).

1.1. THE PROTECTED PLANET REPORT 2016

Previous Protected Planet Reports, from 2012 and 2014 [1,2], focused on assessing progress towards Aichi Biodiversity Target 11. This Protected Planet Report 2016 goes beyond Aichi Biodiversity Target 11, to assess the contribution of protected areas to the achievement of several additional Aichi Biodiversity Targets.

This report focuses on 15 of the 20 Aichi Biodiversity Targets (*referred to convenience in the texts as Target/s*") for which protected areas have the greatest relevance, and provides examples of how protected areas contribute to the delivery of the Strategic Plan for Biodiversity 2011-2020. This should not be seen, however, as a comprehensive list of all targets for which protected areas have relevance. The 15 selected targets reflect all the Strategic Goals, namely: Targets 1, 2 and 3 (Strategic Goal A, Chapter 2) Targets 5, 6, 7, 9 and 10 (Strategic Goal B, Chapter 3), Targets 11 and 12 (Strategic Goal C, Chapter 4), Targets 14 and 15 (Strategic Goal D, Chapter 5), Targets 17, 18 and 20 (Strategic Goal E, Chapter 6). The final chapter (Protected areas and the Sustainable Development Goals, Chapter 7) highlights how protected areas can contribute towards the implementation and achievement of relevant targets of the 2030 Agenda for Sustainable Development and briefly summarises current knowledge on the agreed indicators that use protected area information.

This report is based primarily on research published in scientific journals, as well as relevant reports produced by national and international institutions. This is augmented by a detailed update of the status of global protected areas within the context of Target 11, based on an analysis of the World Database on Protected Areas (WDPA) by the UNEP World Conservation Monitoring Centre (Chapter 4, Target 11).

The Protected Planet Report 2016 also draws on the *Promise of Sydney*, which was the outcome of the IUCN World Parks Congress 2014, in Sydney, Australia (Box 1.1). The Promise of Sydney makes the vital connection between investment in systems of protected and conserved areas, and inspiring and involving people in fair and equitable governance, thereby enabling a significant contribution towards addressing global development challenges. It is supported by specific recommendations and commitments to accelerate implementation of the Strategic Plan for Biodiversity 2011-2020 and to make significant contributions towards at least 12 of the 17 Sustainable Development Goals.

Box 1.1 The Promise of Sydney

By: Trevor Sandwith (IUCN)

The Promise of Sydney summarises the outcomes of the IUCN World Parks Congress, which convened in Sydney, Australia, from 12-19 November 2014, and was attended by more than 6,000 participants from 160 countries. This once-in-a-decade event developed a road map for protected area conservation to 2025. The Promise of Sydney comprises four components: (i) a Vision, (ii) Recommendations on Innovative Approaches for Accelerating Implementation emanating from the eight congress themes and four cross-cutting themes, (iii) an online platform of Inspiring Solutions reflecting case studies presented at the Congress and (iv) a suite of Commitments made by national governments and other organisations to scale up implementation of the Strategic Plan for Biodiversity 2011-2020. The full text of the Promise of Sydney can be found at: http://www.worldparkscongress.org/about/promise_of_sydney.html.

The Promise of Sydney Vision highlighted the need to:

- **Inspire all people, across generations, geography and cultures, and especially the world's expanding cities**, to experience the wonder of nature through protected areas, to engage their hearts and minds and engender a life-long association for physical, psychological, ecological and spiritual well-being (See Target 1 in Chapter 2);
- **Invigorate efforts to ensure that protected areas do not regress but rather progress**, to scale up protection in landscapes, wetlands and seascapes to represent all sites essential for the conservation of nature, especially in the oceans, and involve all of those who conserve (See Targets 11 and 12 in Chapter 4); and
- **Invest in nature**'s solutions, supported by public policy, incentives, tools and safeguards that help to halt biodiversity loss, mitigate and respond to climate change, reduce the risk and impact of disasters, improve food and water security, and promote human health and dignity (See Targets 14 and 15 in Chapter 5).

1.2. PROTECTED AREAS AND THE CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

In 2010, at the tenth meeting of the Conference of the Parties (COP) of the Convention on Biological Diversity (CBD), parties to the CBD adopted a revised and updated Strategic Plan for Biodiversity 2011-2020, including five Goals and 20 Aichi Biodiversity Targets [3]. The goals and targets comprise both: "*(i) aspirations for achievement at the global level; and (ii) a flexible framework for the establishment of national or regional targets.*" (Figure 1.1). Subsequently to its adoption the UN General Assembly (UNGA) agreed to take the Strategic Plan for Biodiversity 2011-2020 as a universal framework for action on biodiversity and a foundation for sustainable development for all stakeholders, including agencies across the UN System. The governing bodies of the other five Biodiversity-related Conventions, other than the CBD, have also recognized or supported the Plan.

Parties to the CBD agreed to translate this overarching international framework into revised and updated national biodiversity strategies and actions plans (NBSAPs) by 2015. NBSAPs are the principal instruments for implementation of the Convention on Biological Diversity (CBD) at the national level. The CBD Secretariat and its partners support the delivery of indicators to track progress on the Strategic Plan for Biodiversity 2011-2020 and review implementation of the NBSAPs, for example through the Biodiversity Indicators Partnership (Box 1.2). The Strategic Plan for Biodiversity is a flexible framework for action in support of biodiversity and a foundation for sustainable development for all countries and stakeholders.

Strategic Goal A: ***Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society***			
	**Target 1:** Awareness of biodiversity increased		**Target 3:** Incentives reformed
	**Target 2:** Biodiversity values integrated		**Target 4:** Sustainable consumption and production
Strategic Goal B: ***Reduce the direct pressures on biodiversity and promote sustainable use***			
	**Target 5:** Habitat loss halved or reduced		**Target 8:** Pollution reduced
	**Target 6:** Sustainable management of aquatic Living resources		**Target 9:** Invasive alien species prevented and controlled
	**Target 7:** Sustainable agriculture, aquaculture and forestry		**Target 10:** Ecosystems vulnerable to climate change
Strategic Goal C: ***To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity***			
	**Target 11:** Potected areas		**Target 13:** Safeguarding genetic diversity
	**Target 12:** Reducing risk of extinction		
Strategic Goal D: ***Enhance the benefits to all from biodiversity and ecosystem services***			
	**Target 14:** Ecosystem services		**Target 16:** Access to and sharing benefits from genetic resources
	**Target 15:** Ecosystem restoration and resilience		
Strategic Goal E: ***Enhance the implementation through participatory planning, knowledge management and capacity building***			
	**Target 17:** Biodiversity strategies and action plans		**Target 19:** Sharing information and knowledge
	**Target 18:** Traditional knowledge		**Target 20:** Mobilising resources from all sources

Figure 1.1 *The Strategic Plan for Biodiversity 2011-2010 goals and targets*

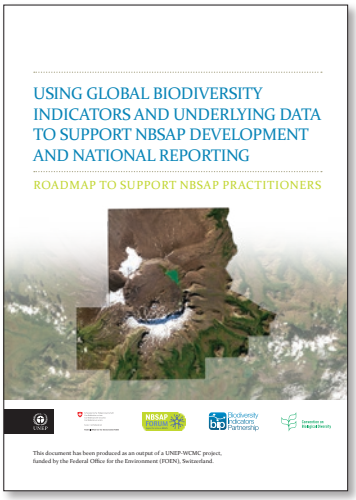
Box 1.2 The Biodiversity Indicators Partnership (BIP)

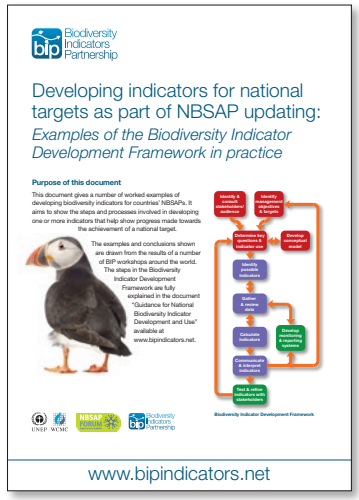
By: The Biodiversity Indicators Partnership Secretariat

The BIP is a CBD-mandated global initiative to promote the development and delivery of biodiversity indicators in support of the CBD. It also supports other Multilateral Environmental Agreements (MEAs), the Sustainable Development Goals (SDGs), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), national and regional governments, and other sectors. The BIP Secretariat is hosted at UNEP-WCMC and was established in 2007.

The BIP partnership brings together 40 international organisations that support the ongoing delivery of indicators to monitor biodiversity trends and track progress towards the Strategic Plan for Biodiversity 2011-2020. There are approximately 50 biodiversity indicators available, and at least one indicator each for 17 of the 20 Aichi Biodiversity Targets. The BIP is currently working on enhancing the indicator suite and identifying potential indicators to fill indicator gaps for Targets 2, 3 and 15.

In addition to indicator development, the BIP coordinates biodiversity reporting at the global scale, communicates information on global biodiversity trends to support decision-making, and delivers indicator-related training at the national level to support National Biodiversity Strategy and Action Plans (NBSAPs). The BIP Secretariat brought together information for the Global Biodiversity Outlook (GBO-4), and annually updates the Targets Passport, an innovative tool that provides quick and accurate information on the progress made towards targets and the baselines from which future progress can be monitored.





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Recognizing the critical and important role of protected areas not only for biodiversity conservation, but also for securing ecosystem goods and services for achieving sustainable development, the 188 Parties to the CBD in 2004 (now 196) committed to a specific set of actions for protected areas known as the Programme of Work on Protected Areas (PoWPA). The PoWPA provides a global framework for establishing comprehensive, ecologically representative, effectively managed and equitably governed national and regional systems of protected areas on terrestrial and inland waters and in marine and coastal environments.

By setting targets for the conservation of biodiversity at all scales and by emphasizing governance diversity, equity and the sharing of costs and benefits in support of human livelihoods, the PoWPA provided the defining framework, or blueprint, for protected areas globally, and inspired a deliberate programme to make progress towards these goals. Target 11 expanded this vision and set ambitious goals to be achieved by 2020, including the mainstreaming of protected and conserved areas into the wider landscape and seascape in relation to development. As the elements of Target 11 encompass the scope of the PoWPA, its implementation is key to achieving other Targets, including 1, 2, 5, 6, 9, 12, 13, 14, 15 and 18. Actions to meet one Target will influence other Targets [4]. Given the cross-cutting nature of protected areas, synergies and trade-offs between different Targets need to be taken into account [5] in order to make progress towards achieving the overall Mission and Vision of the Strategic Plan for Biodiversity 2011-2020.

1.3. DEFINING AND CLASSIFYING THE WORLD'S PROTECTED AREAS

For the purposes of this report, the IUCN protected area definition [6] is used, noting that it is broadly compatible with the CBD definition of a protected area [7] and underpins the World Database on Protected Areas (Box 1.3). According to IUCN, ***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***.

Box 1.3 Data and methods used for protected area coverage analyses in this report

Most indicators and new analyses presented in this report are based on the World Database on Protected Areas (WDPA) and, when appropriate, the overlay of the WDPA with other datasets (e.g. ecoregions). The WDPA is a joint effort between IUCN and UNEP (as UNEP-WCMC) and is the most authoritative and comprehensive database on global marine and terrestrial protected areas. The WDPA is collated from national and regional datasets, in close collaboration with governmental agencies and conservation organisations [8]. It is made publicly available online through www.protectedplanet.net. Currently, the WDPA includes only those protected areas that meet the IUCN definition of a protected area [6].

Protected area coverage statistics for this Protected Planet Report were calculated using the April 2016 version of the WDPA [9]. A total of 217,155 designated protected areas from 244 countries and territories were included (202,467 terrestrial and 14,688 marine). These include all protected areas designated at a national level, those under regional agreements (e.g. Natura 2000 network), and those under regional and international conventions or agreements (e.g Natural World Heritage sites). A total of 6,797 sites were excluded from the analyses. These included UNESCO Man and the Biosphere Reserves (583 sites), protected areas with a status of "proposed" (2,347 sites) or "not reported" (236 sites), and 3,631 sites reported as points without an associated area. UNESCO Man and the Biosphere Reserves (MAB reserves) were removed on the basis that their buffer areas and transition zones may not comply with the IUCN protected area definition. Moreover, most core areas of MAB reserves overlap with existing protected areas. The WDPA is constantly updated as new information and corrections are incorporated, but since this is a dynamic process, it can never be considered to be completely up to date. Nevertheless, since 2014, 85% of the database has been updated, and the aim is to update countries and territories at least every five years and to make concerted efforts to complete data holdings where these are deficient.

All area calculations on coverage presented in Chapter 4 remove overlaps between protected areas (as a result of multiple designations) to avoid double counting. For those protected areas reported in the WDPA as points but which include an area, a buffer equal to the Reported Area was created and used in the analysis. To calculate the total area of the protected area estate in different years the field in the WDPA called *Status Year* was used. *Status Year* refers to the year a specific protected area was designated. Sites that no longer have protected area status are not stored in the WDPA.

In terms of protected area classification, two IUCN standards are used: The IUCN Protected Area Management Categories help classify protected areas based on their primary management objectives [6], while the IUCN Protected Area Governance Types classify protected areas according to who holds authority, responsibility and accountability for them [10]. The relationship between the governance types and management categories is shown in Table 1.1.

The WDPA stores both management categories and governance types as reported by the data provider. Not all countries and territories use the IUCN management category system, and several designations, such as World Heritage Sites, are not reported to the WDPA with such information. In 2016, 33% of protected areas in the WDPA have not been assigned an IUCN management category. Using the available data, IUCN Categories I–IV dominate the world's protected areas (48%), with Category IV (Habitat/ Species Management areas) being the most common form of management (28%). With regard to governance, 84% of protected areas in the WDPA are reported as being governed by governments, 4.5% as private governance, 1.8% as shared governance, and 0.6% as governance by indigenous peoples and local communities. This potential under-reporting of non-government governance types is, in many cases, likely to be a result of national reporting. Efforts are underway to identify areas under these governance types that may not be currently recognized and/or reported by government sources.

Table 1.1 *IUCN's Protected Areas Management Categories and Governance Types. Source: [6,10]*

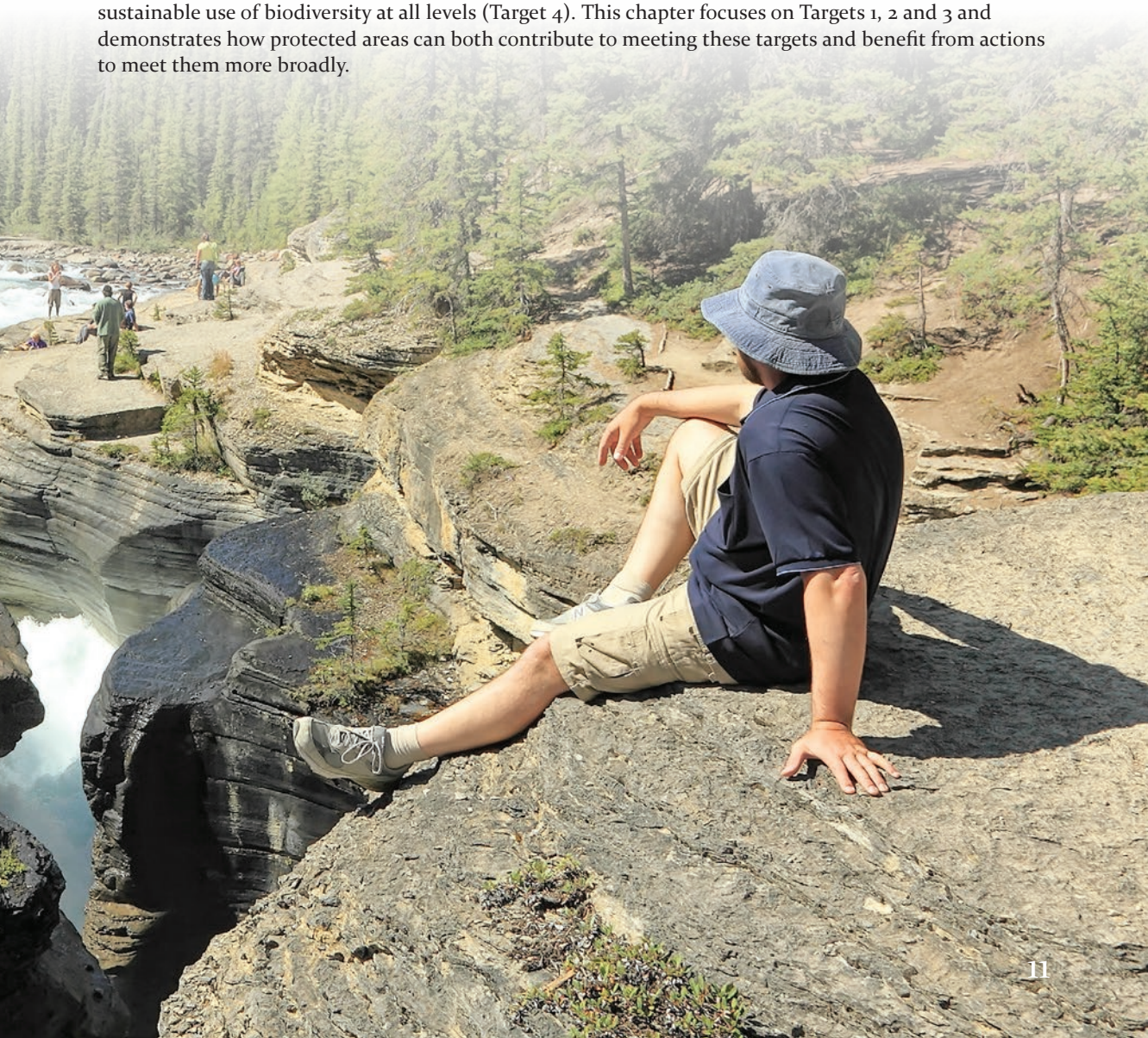
Governance types / Protected area categories	A. Governance by government			B. Shared governance			C. Private governance			D. Governance by indigenous peoples and local communities	
	Federal or national ministry or agency in charge	Sub-national ministry or agency in charge	Government-delegated management (e.g., to an NGO)	Transboundary management	Collaborative management (various forms of pluralist influence)	Joint management (pluralist management board)	Declared and run by individual land-owner	...by non-profit organizations (e.g., NGOs, universities, co-operatives)	...by for-profit organizations (e.g., individual or corporate landowners)	Indigenous peoples' conserved areas and territories – established and run by indigenous peoples	Community conserved areas – declared and run by local communities
I a. Strict Nature Reserve											
Ib. Wilderness Area											
II. National Park											
III. Natural Monument											
IV. Habitat/ Species Management											
V. Protected Landscape/ Seascape											
VI. Managed Resource Protected Area											

The IUCN and CBD definitions of a protected area may not capture other areas that could make a positive contribution to conservation. The existence of these areas is recognized by the (CBD Decision IX/18) [11] inviting parties to "*Recognize the contribution of, where appropriate, co-managed protected areas, private protected areas and indigenous and local community conserved areas within the national protected area system through acknowledgement in national legislation or other effective means*". In addition, Aichi Biodiversity Target 11 also highlights the importance of "...other effective area-based conservation measures", the definition of which is unclear but is the subject of a current Task Force of the IUCN World Commission on Protected Areas (WCPA) and the IUCN Species Survival Commission on Biodiversity and Protected Areas (Box 4.2). To date, there is no globally agreed definition of these areas, and no global database that compiles records of all such sites, so this remains a reporting gap (See Target 11 in Chapter 4).

2. Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

2.1. INTRODUCTION

Strategic Goal A outlines the socio-economic and institutional actions required to address the underlying causes of biodiversity loss. These actions include, for example, raising awareness of the importance of biological diversity and the services it provides (Target 1), integrating biodiversity into sector policies and political planning processes (Target 2), eliminating or reforming incentives that are harmful to biodiversity and creating positive economic incentives for the conservation of biodiversity (Target 3) and fostering sustainable consumption and production patterns for the conservation and sustainable use of biodiversity at all levels (Target 4). This chapter focuses on Targets 1, 2 and 3 and demonstrates how protected areas can both contribute to meeting these targets and benefit from actions to meet them more broadly.



2.2. CONTRIBUTIONS OF PROTECTED AREAS TO GOAL A

Target 1 - By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Protected areas play an important role in raising awareness of the values of biodiversity by directly exposing visitors to nature in ways that they might not otherwise experience. Tourism and recreation are common visitor uses of most protected areas and important contributors to local and national economies [12]. **At a global level, terrestrial protected areas alone attract an estimated 8 billion visits per year [13]. Yellowstone National Park hosts about 4 million visitors every year (National Park Service, www.nps.gov), while the Great Barrier Reef Marine Park attracts an estimated 2.43 million visitors annually [14].** The potential for tourism in protected areas, including National Parks and World Heritage Sites, is growing. The World Tourism Organization estimates that tourism in protected areas will continue to grow by 3.3% annually through 2030 [15]. For example, Parks Canada reported a 6% increase in attendance to National Parks and Marine Conservation Areas between 2010 and 2015 (Parks Canada, www.pc.gc.ca). Thus, tourism, because of its scale and magnitude of influence, is a critical service that has the potential to directly contribute not only to Target 1 but also to a number of those Targets related to conservation, community development and public awareness [15].

In addition to attracting visitors, protected areas provide opportunities to educate visitors through experiences, study, interpretation, visitor centres and publications. Nature-based tourism provides a specific way for people to come into direct contact with nature [16], and protected area tourism offers significant opportunities to educate visitors about the values of biodiversity [17]. Many protected area agencies around the world have developed communication, education and public awareness programmes to enhance the exchange of information on biodiversity [18]. Through such programmes, protected areas have the potential to inspire global conservation action. However, to achieve this goal, strategic communication must be systematically designed, researched and implemented to reflect the shared values and beliefs of beneficiaries, and must be tailor-made to fit the local context, culture and traditions of the target area [19].

Protected areas can also raise global awareness of the benefits of biodiversity through global information exchange, using a variety of techniques and media. The Reef Guardian Program, led by the Great Barrier Reef Marine Park Authority [20], recognises the actions of those who use and rely on the reef for recreation or business to help build a healthier and more resilient reef. The Panorama initiative (www.panorama.solutions), led by IUCN, uses an interactive website to compile and communicate case studies that showcase how protected areas provide solutions to some of the world's challenges. Currently, 150 solutions from all over the world are available to users. These are positive examples of approaches to support learning from proven success in protected areas. Further establishment and reinforcement of society's understanding of the importance of protected areas is required through a more widespread implementation of such initiatives. These may provide a template upon which new initiatives can be founded, focussing on shared human values such as heritage, responsibility, national pride and legacy [21].

Target 2 - By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

While traditionally established to protect our most valuable biodiversity and cultural traditions, protected areas can also generate many other benefits (often measured through natural capital or ecosystem service assessments). Working towards meeting Target 2 will ensure these benefits are better understood and factored into countries' economic plans. This could promote broadening support for protected areas from other sectors and highlight their contribution beyond the Aichi Biodiversity Targets to other social and economic objectives, and to the Sustainable Development Goals (SDGs).

Evidence of the wider benefits of protected areas is growing around the world. **A recent assessment of the benefits of natural and mixed World Heritage sites showed that beyond the sites' outstanding natural and cultural values, they also provided important ecosystem services: 66% of sites were important for water quality and/or quantity services, 52% were important for carbon sequestration, 48% for soil stabilization and 45% for flood prevention** [22], (See Chapter 5). Likewise, WWF's "Marine Protected Areas: Smart Investments in Ocean Health" report [23] estimates the benefits of extending Marine Protected Areas (MPAs) and finds that, even assessing a restricted range of possible benefits (coastal protection, fisheries, tourism, recreation and carbon sequestration), the economic value of the benefits of establishing new MPAs are likely to outweigh the financial costs by a factor of between three and 20, across the scenarios they examined.

Applying more formal accounting approaches, linked to a wider programme of work focussed on the element of Target 2 that requires biodiversity values to be incorporated into national accounts, the UK government has published experimental accounts for six protected areas in England and Scotland. The results were surprising, as exemplified by the case of the Lake District, where the estimated greatest monetary benefits came from air quality regulation (GBP.75m/yr). Recreational benefits, which the park is more commonly associated with, were valued at GBP.44m/yr. The benefits in terms of drinking water supplies and climate regulation were also significant, at GBP.38m/yr and GBP.21m/yr respectively. In this context UNEP-WCMC has recently released guidance on natural capital assessments in the context of green economy planning [24] which helps identify links between a country's natural assets (including protected areas) and other sectors of the economy, and highlights how understanding these links can help justify investment in protected areas and efforts to improve their effectiveness.

Understanding and promoting the wider benefits of protected areas will be increasingly important in the struggle to maintain protected areas in the face of growing populations and resource demands [25]. IEEP and UNEP-WCMC published guidance on "incorporating biodiversity and ecosystem service values into NBSAPs" in 2013 [26]. The ongoing IIED/UNEP-WCMC project Mainstreaming 2.0 builds on this, resulting in guidance showing how NBSAPs can be used to mainstream biodiversity into development and other economic plans.

Target 3 - By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions.

Incentives are an important element of the enabling conditions of the economy that will influence how easily protected area targets can be met and the extent and location of new areas protected.

At the site level this can be seen in examinations of community benefits, which suggest that protected areas that generate direct or indirect benefits for local communities are likely to be more effective [27]. **Subsidy and incentive reform more widely across economies can make it more likely that communities will benefit from protected areas**, as exemplified below. Hence, as with Target 2, meeting Target 3 is more likely to contribute to protected areas, rather than benefit from efforts on protected areas (though it may be the case that identifying pressures on protected areas will help identify incentives harmful to biodiversity).

A study comparing the commercial profits of shrimp farming with the commercial profits of mangrove forests in Southern Thailand [27] showed that the shrimp outperformed the mangroves by a factor of sixteen, illustrating why there is likely to have been significant pressure to convert mangroves to shrimp farms. The study also shows, however, that more than 80% of the commercial profits from shrimp farming were derived from subsidies, and the commercial profits from mangrove forests excluded the wider benefits to society derived from their role in providing a nursery for fish and also storm protection. When the non-subsidised profits from shrimp farming are compared to the sum of the range of benefits of conserving mangroves, the rationale for converting mangroves to shrimp farms disappears, i.e. it is clear the costs far outweigh the benefits.

The scale of perverse incentives – whether explicit subsidies which encourage environmentally damaging behaviour, or implicit subsidies which mean some costs of environmental degradation are not taken into account in market prices – means they are likely to be important drivers of commercial pressures on all natural habitats, including protected areas. At a global level, perverse subsidies across agriculture, fisheries, energy and water have been estimated at about US$1 trillion per year.

On the other hand, there are often significant wider benefits of protected areas (see also Chapter 5). If these benefits could be revealed and rewarded, positive incentives could be better aligned with maintaining protected areas. One example of such a scheme is the FONAG water fund in Quito [28]. Recognising that more than 80% of the water source for Quito is contained within three protected areas, the FONAG fund was set up with the twin aims of providing a clean, regular supply of water for nearly 2 million people living in Quito, and financing existing protected areas critical for the city's water-related services. The water fund is made up of an endowment with contributions from more than 250 sources, including Quito's main water company, The Nature Conservancy (an NGO) and other local businesses. The interest generated on the endowment fund (which was US$690,000 in 2008) is used for conservation projects, which have included, for example, funding 11 community park rangers to support Cayambe Coca and Cotopaxi National Parks, Antisana Ecological Reserve and their buffer zones [29].

2.3. CONCLUSIONS

- Protected areas can contribute to meeting Target 1 by helping people to understand the value of nature.
- Working towards meeting Targets 2 and 3 will support protected areas, by helping promote understanding of their wider benefits and changing economic incentives, so that these benefits are more likely to be rewarded and activities that are harmful to biodiversity (and by extension protected areas) are no longer encouraged (Target 3).
- As pressures on the natural environment increase with population growth and climate change, understanding and promoting the role of protected areas in the wider landscape will be increasingly important to demonstrate the relevance of protected areas to the economy and society, as well as to biodiversity. This will help promote understanding of the real trade-offs and synergies between protected area goals and other socio-economic objectives, rather than relying on market prices where the value of nature tends to be invisible.

3. Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use

3.1. INTRODUCTION

Strategic Goal B focuses on decreasing the direct pressures on species and ecosystems. Key targets reflected under this goal include halting habitat loss and reducing its degradation and fragmentation (Target 5); increasing the use of ecosystem-based approaches, so that overfishing is avoided and recovery plans and measures are in place for depleted species (Target 6); promoting biodiversity on agricultural land and the use of agricultural production methods that foster greater biodiversity (Target 7); and addressing multiple pressures, such as pollution, invasive alien species and other anthropogenic pressures (Targets 8, 9 and 10). This chapter focuses on Targets 5, 6, 7, 9 and 10 and provides examples on how protected areas can contribute to meeting them.

3.2. CONTRIBUTION OF PROTECTED AREAS TO GOAL B

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.

Protected areas conserving natural habitat, including forests, woodlands, grasslands and marine habitats, play an important role in reducing rates of habitat loss, degradation and fragmentation [30]. While a number of factors can influence the rate of habitat loss outside protected areas (e.g. natural resource extraction, human population, national and international policy and law), inside protected areas, a range of different factors are responsible for influencing rates of habitat loss, including management frameworks, zoning, location, enforcement and community involvement, among others.

A global study that used changes in land cover to assess the effectiveness of protected areas in averting conversion from natural habitats to human-modified habitats found that, on average, **protected areas experienced 15.7% less habitat conversion than non-protected areas** [30]. However, the effect was reduced by half to 7.7% when controlling for the more remote and inaccessible locations of protected areas compared to non-protected land. A recent study revealed that **protected areas in the Brazilian Amazon have four times lower deforestation rates than non-protected areas, even when highly accessible** [31]. These results suggest that the characteristics of a protected location are critical to include in impact evaluation, and failing to control for factors that potentially correlate with both protection and deforestation can substantially overestimate avoided deforestation.

A systematic review of 76 studies assessing habitat change in terrestrial systems using satellite remote sensing (63), aerial photos (3), a combination of both (5) and *in situ* data collection (5), showed that, on average, **protected areas are losing forest cover, but that rates of forest loss are lower within protected areas than outside of them** [32]. The effectiveness of protected areas in reducing forest loss varied across regions, with Southeast Asia experiencing the highest losses, both in absolute terms and compared to non-protected areas.

At a global scale, evidence for the maintenance of natural habitats and reduction in habitat loss within protected areas comes primarily from remotely sensed data, through which habitat loss or gain can be more easily observed. While remote sensing can provide information on spatial and temporal domains that are inaccessible to traditional on-site approaches, it cannot equal the accuracy and richness of data collected via *in situ* measurements [33].

This growing body of evidence shows that protected areas can play a major role in achieving Target 5. Success will require proactive identification of sites that most efficiently contribute to the goal.

Target 6: By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

The implementation of marine protected areas (MPAs) has been widely promoted and recognised as a way to achieve marine conservation targets by reducing anthropogenic impacts on, and strengthening sustainable management of, marine ecosystems and associated biodiversity, with some direct and indirect benefits to fisheries documented (e.g.[34].). A synthesis of more than 100 studies of no-take marine protected areas (NTMPA), which are closed to all fishing, showed that protection from fishing leads to rapid increases in the biomass, abundance and average size of exploited organisms within these protected areas [35]. **A more recent analysis of 124 different marine reserves located in 29 countries indicated that, on average, reserves positively affected the biomass, numerical density, species richness and size of organisms within their boundaries** [36], which can lead to spillover of adult species into surrounding areas [37]. MPAs with partial protection can also confer advantages, such as enhanced density and biomass of fish, when compared with areas without restrictions, although the strongest responses occurred in no-take MPAs [38].

While the benefits of marine reserves were found to be far more common than situations yielding negligible or negative impacts, reserve characteristics and context, such as the intensity of fishing in surrounding areas and inside the reserve prior to implementation, played key roles in determining the direction and magnitude of a reserve's response [36]. Despite their importance in helping to offset adverse impacts on threatened species and vulnerable ecosystems, full no-take marine reserves are rare and, where they occur, require sufficient enforcement to ensure restrictions are upheld. The remainder of MPAs are characterised by varying levels of enforcement and a range of management objectives that permit different kinds of exploitation; the conservation and management effectiveness of MPAs therefore varies considerably.

Edgar *et al.* [39] examined the conservation benefits of a global set of 87 MPAs by comparing fish biomass inside and outside of each protected area, concluding that an MPA's success increases exponentially with the accumulation of five key features: no take, good enforcement, length of time since implementation (established for more than 10 years), size (more than 100 km^2), and isolated by deep water or sand. Using effective MPAs that demonstrated four or five of these key features as "unfished" standards, comparisons were made between underwater survey data from effective MPAs with predictions based on survey data from fished coasts; these comparisons indicated that total fish biomass has declined by two-thirds of historical baselines as a result of fishing. **Effective MPAs also had twice as many large (more than 250 mm total length) fish species per transect, a fivefold increase in large fish biomass, and fourteen times the amount of shark biomass as fished areas**. Most (59%) of the MPAs studied had only one or two key features and were not ecologically distinguishable from fished sites. Their research concluded that global conservation targets based on area covered alone will not optimise protection of marine biodiversity, and that a greater emphasis on MPA design, durable management, and compliance enforcement is required to ensure that MPAs achieve their desired conservation value.

The most appropriate tools to manage fish and invertebrate stocks must be identified through effective stakeholder engagement and a strong understanding of local conditions. Directly involving stakeholders, including fishers, in the allocation, design and enforcement of an MPA can increase the likelihood of success, particularly where attention is given to differences in participation, communication, and information sharing [40]. Participatory processes can also increase awareness of the values of biodiversity and empower stakeholders with the means of conserving and using local resources sustainably (Target 1). Successful management strategies arising from such collaboration may include a combination of regulatory tools coupled with strategically placed fishing closures and no-take reserves. **MPAs with multiple levels of protection according to requirements can function as valuable spatial management tools, particularly in areas where exclusion of all activities is not socio-economically nor politically viable** [38].

Target 7: By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

A wide range of production systems can be considered to achieve Aichi Biodiversity Target 7. This includes crops and food systems, rangelands, pastoralist systems, sustainable aquaculture, sustainable forestry, community forest management and non-timber forest products (NTFPs), among many others. Ensuring conservation of biodiversity includes the conservation of agricultural biodiversity, the importance of which is recognised by the CBD through its Agricultural Biodiversity Work Programme (www.cbd.int/agro/whatis.shtml).

Croplands, for example, cover at least 12% of the ice-free terrestrial areas of the world [41], and agricultural expansion is projected to continue in response to the global demand for agricultural products [42,43]. This predicted global crop expansion can seriously threaten areas of importance for biodiversity if effective sustainability standards and policies to avoid impacts are not put in place [42]. Sustainable management of production systems can be a key strategy to meet global food demands while ensuring conservation of biodiversity and even in some cases reducing production costs [43].

Protected areas are a specific type of land use that can allow and promote sustainable production, provided conservation of biodiversity is their main objective. IUCN Protected Area Management Category VI (Table 1.1) specifically recognises this, stating the main objective for a protected area under this category as: "To protect natural ecosystems and use natural resources sustainably, when conservation and sustainable use can be mutually beneficial." [6]. Similarly, IUCN Protected Area Management Category V includes protected areas "... where the interaction of people and nature over time has produced an area of distinct character with significant ecological, biological, cultural and scenic value..." [6]. This latter category can include production systems. **Currently, there are about 7.3 million km² of protected areas reported under IUCN Category V (18% of total area of protected areas with an IUCN Category) and 8.3 million km² of protected areas reported under IUCN Category VI (21% of total area of protected areas with an IUCN Category)**. However, this includes areas where different IUCN Categories overlap, so this is likely to be an overestimation.

In the past decades, there has been a change in the typical protected area model, moving from highly restricted protected areas to a plurality of management and governance models [44] (Box 3.1). Today, sustainable management of production systems can be found under all four of the main governance regimes described by IUCN (See Section 1.3 in Chapter 1). Sustainable practices by indigenous peoples and local communities can have positive effects for both human well-being and wildlife. For example, a study in 2016 compared the strictly protected Tarangire National Park with the Ngorongoro Conservation Area, which allows for sustainable use by the Maasai. The study found that Ngorongoro has seen more positive changes in human well-being and wildlife populations than Tarangire [45]. In the marine waters surrounding Japan, Spain, Madagascar and Kenya, locally managed marine areas are governed by local communities to protect coastal and marine resources.

Box 3.1 Selected examples of protected areas that include sustainable use

The Potato Park in Peru

Located in a known microcenter of origin and diversity of potatoes in the Peruvian Andes, the Potato Park is a locally managed Indigenous Biocultural Territory using the Indigenous Biocultural Heritage Area (IBCHA) model developed by Asociación ANDES. The IBCHA model involves a community-led and rights-based approach to conservation based on indigenous traditions and philosophies of sustainability, and the use of local knowledge systems, skills and strategies related to the holistic and adaptive management of landscapes, ecosystems and biological and cultural assets. The park is based on the Ayllu approach, which is described as a "community of individuals with the same interests and objectives linked through shared norms and principles with respect to humans, animals, rocks, spirits, mountains, lakes, rivers, pastures, food crops, wildlife, etc." (More information on this example and more in Bélair *et al*., 2010 [46].

Harvesting NTFPs in Puerto-Princesa Subterranean River National Park in Philippines

The indigenous communities living in the landscape of Puerto-Princesa Subterranean River National Park in the Philippines have long practised sustainable harvest of non-timber forest products (NTFPs). The park authority permits the collection of wild fruits and hunting as stipulated in the Ancestral Domain Claims. These products are a good supplement to their swidden farming methods and allow then to buy rice and other staples. To minimize pressure on the forests from resource extraction, an agro-forestry project was developed within the Kayasan Ancestral Domain. Project partners planted endemic tree species to provide additional income for indigenous residents, supported installation of irrigation pipelines to develop rice paddies in the lowland, and supported the planting of rattan for sustainable harvest by indigenous residents, which also improved the water-holding capacity of the watershed (More information in [47]).

In recent years, sustainable forest management in protected areas has been increasingly advocated as an effective means to balance conservation, resource use and human well-being. For example, Canada's Boreal Forest Conservation Framework, which allocates land equally between protection and sustainable management, has been endorsed by both industry and aboriginal and conservation organisations [48]. Other studies found that **sustainable use parks in Mexico and Brazil are more effective at preventing deforestation than strictly protected ones** [49,50].

A systematic review of 42 studies on the impact of community forest management (CFM) on the provision of global environmental and local welfare benefits [51] showed that CFM might provide benefits in terms of improved forest condition. However, there is currently insufficient evidence to conclude the effects of CFM on local livelihoods due to various reasons, including limited baseline data, and variable timescales and livelihood measures.

Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated and measures are in place to manage pathways to prevent their introduction and establishment.

Invasive alien species (IAS) are noted as key drivers of ecosystem alteration and biodiversity loss. Protected areas preserve vital components of biological diversity across the globe and maintain the provision of a suite of essential ecosystem services [52]. The impacts of biological invasions can be devastating to the ecological integrity of protected areas and ecosystem services if poorly managed [52]. Therefore, effective management of IAS within the boundaries of protected areas is essential if Target 9 is to be met. Protected areas can significantly influence IAS management practices and efforts to realise Target 9 at multiple scales, including within individual protected area sites, protected area networks, or at an international scale [53].

Protected areas play a crucial role in raising awareness and developing capacity on IAS control at all levels, including protected area employees and managers, PA visitors, local communities and society as a whole [52,54]. This is of particular importance in the prevention of accidental or deliberate species introduction, and the rapid detection of and response to new invasions within protected areas [53]. Due to their credibility within society, protected areas can elicit interest and encourage the participation of sympathetic groups, visitors and communities in IAS prevention and management [52]. Public participation in IAS prevention, and responsive monitoring and management, educates and empowers individuals to contribute towards preserving the ecological integrity of protected areas [52]. For example, visitors can participate in equipment clean-up initiatives; abide by visitor quotas, activity restrictions and seasonal site usage; and participate in citizen science initiatives to identify or remove IAS [52] (Box 3.2). An additional influence is that of protected area managers, who can encourage and support the development of new IAS policies, or the strengthening of existing preventative frameworks and policies, e.g. quarantine laws or ballast water policies [53].

Protected areas are required to develop and subsequently enforce coordinated strategies to address IAS that include prevention, eradication and management, as well as regulation, communication and awareness efforts [56]. Through the development of such strategies, management priorities can be identified [53] (i.e., through the use of tools such as the US Alien Plants Ranking System) and different methods can be trialled within a managed environment. One such example is the management of invasive alien species in Kruger National Park (KNP) in South Africa (Box 3.3).

The development of an effective IAS management strategy within a protected area may set a benchmark and establish best practice methods and guidelines for use within other protected areas or under different contexts. Biological invasions are dynamic in nature, and protected areas also provide an environment that is conducive for testing the adaptive nature of management frameworks and the modification of priorities in response to such dynamism [52,54].

Box 3.2 Management of Lionfish within National Marine Sanctuaries

The lionfish (*Pterois volitans* and *Pterois miles*) is a venomous, predatory fish, noted for its associated impacts on sensitive marine ecosystems such as coral reefs. First observed in South Florida in the 1980s, the invasive Indo-Pacific lionfish has since dramatically extended its range of invasion throughout the east coast of the United States, the Caribbean and areas in the Gulf of Mexico [55]. Ecosystem impacts associated with this invasive species include: a reduction of forage fish biomass, active competition with native reef fish species, changes to prey species community structures and consequent trophic cascades, and increased likelihood of algal phase shifts through the removal of herbivorous species [55]. In addition, lionfish populations can also influence visitor experiences and tourist popularity through aesthetic values, fewer opportunities to observe healthy ecosystems with abundant wildlife and increased risk of injury through envenomation.

In response, NOAA has developed the NOAA *National Marine Sanctuaries Lionfish Response Plan (2015-2018)* to identify critical actions required in specific MPAs. The plan advocates National Marine Sanctuaries (NMS) as pivotal areas for research, education and adaptive management in response to emerging threats [54]. This plan has been adapted for individual NMS based on their differing situations and requirements.

Lionfish population control efforts include the identification of priority areas requiring control, permitting for removals in no-take areas (awarded after training workshop attendance), lionfish derbies, "eat lionfish" campaigns and changes to Florida state law (e.g. a ban on the import of live lionfish and breeding for the aquarium trade) [54]. The plan also includes the dissemination of knowledge and education on lionfish to its users, staff and the general public, primarily through outreach and training workshops, lionfish derbies, non-native species guides, and social media updates. The research and monitoring results and evaluation of control efforts within the FKNMS can provide a set of best practice guidelines that can be distributed regionally or globally to aid protected area managers in decision making.

Invasion of *Pterois volitans* in the Gulf of Mexico

Source: McCreedy *et al.* 2012 and Johnston *et al.* 2015 [54,55]

Box 3.3 Invasive alien species in Kruger National Park (KNP) in South Africa

By: Llewellyn Foxcroft, South African National Parks (SANParks) & Shyama Pagad (IUCN SSC Invasive Species Specialist Group)

Kruger National Park (KNP) has, over the course of the last few decades, aimed to develop a comprehensive, integrated invasive alien species management plan. Some components have been developed in response to particular needs (e.g. ornamental invasive alien plants, and a management plan for specific species of high concern, such as *Parthenium hysterophorus*), while some aspects have been conceptually developed and are in the early stage of implementation (e.g. monitoring). Surveillance and large-scale distribution monitoring has largely relied on presence data captured by rangers during patrols using the CyberTracker system, free software that was customised to KNP's needs. This has provided a database of spatially explicit records from across the park, to be used in developing area- and species-specific management plans.

Invasion of *Parthenium hysterophorous* in the southern Kruger National Park.

The KNP management plan objective for invasive alien species management is "to anticipate, prevent entry and where feasible and/or necessary control invasive alien species in an effort to minimize the impact on, and maintain the integrity of, indigenous biodiversity". This objective is broken down into several sub-objectives, under the headings Strategy and Support, Prevention, Control, Research and Awareness, with specific activities included under each. The development of these explicit objectives assisted in improving awareness across a range of institutional levels, from managers in the field, to senior executive managers. In 1997, the Working for Water programme, a national poverty relief programme that aims to minimise water loss to invasive species and restore the natural capital of invaded land, was initiated in KNP. A large part of the programme's success is due to the integration of ecological needs and social imperatives. While the majority of the work has focused inside the KNP, efforts have also been made to reduce invasions adjacent to and upstream of the park in key areas.

In response to the growing appreciation of ecosystems as inherently complex and dynamic, an adaptive management paradigm has evolved, including a concept of "thresholds of potential concern". These thresholds highlight specific points of concern (e.g. potential invasion of a new species), triggering management action, monitoring and feedback to the KNP Conservation Management Committee until a satisfactory outcome is achieved.

Target 10: By 2015 the multiple anthropogenic pressures on coral reefs and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

Protected areas provide an effective method for minimising anthropogenic pressures, such as deforestation, unsustainable harvesting, etc. at localised sites [57]. Indirect threats acting at broader scales, such as climate change or ocean acidification, are exacerbated by anthropogenic activities, further threatening vulnerable ecosystems.

The management strategies that directly influence human pressures are critical components of protected area design. These strategies vary greatly, from strict nature reserves that control or limit human activity (such as IUCN Management Category Ia sites) to protected areas that allow sustainable natural resource use in line with traditional resource management systems (such as IUCN Management Category VI sites) [6]. If designed and managed effectively, protected areas can increase the resilience of vulnerable ecosystems to such global stressors (Figure 3.1).

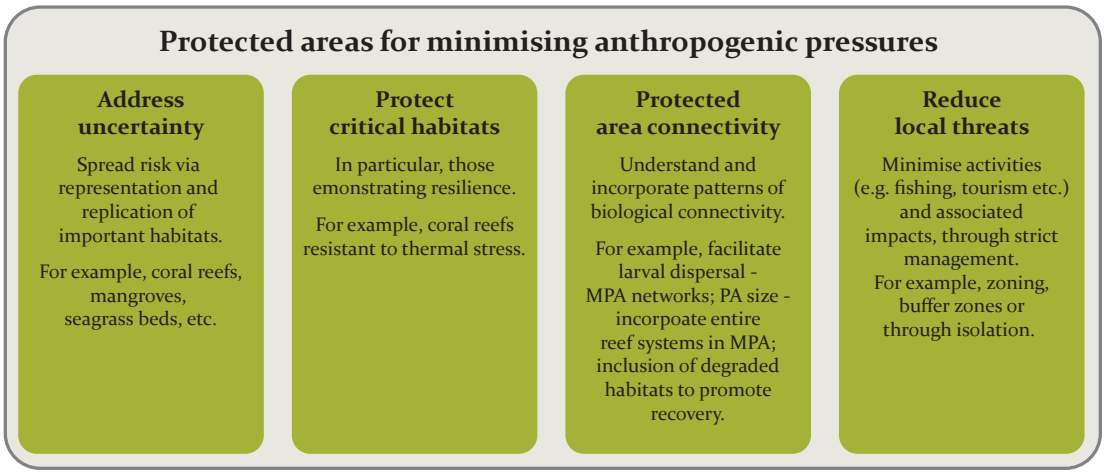


Figure 3.1. *Key design principles of protected areas for enhancing ecosystem resilience [39,58–60]. Coral reef ecosystems in MPAs are used as an example.*

Protected area management strategies employ a suite of planning tools, zone management schemes, models and techniques to address threats and mitigate associated impacts, for example the establishment of multiple-use buffer zones around core limited-use zones and the use of cumulative or environmental impact assessments [57]. As such, **decreasing human pressure through protected areas allows for the maintenance or recovery of ecological function and natural resilience to global stressors**.

Coral reef ecosystems are highly dynamic in nature, and under natural conditions have considerable capacity to survive in light of disturbances [61]. However, **increased stress from anthropogenic activities undermines this natural resilience, which exacerbates the vulnerability of reef ecosystems to the impacts of climate change** [62]. Consequently, this can result in increased vulnerability of coral reef ecosystems to bleaching or phase shifts towards algal-dominated systems [61], which have completely different ecological structures and functions. An example of a mechanism employed in protected areas to help maintain the resilience of coral reef ecosystems to climate change is **the strict management of reef fisheries to allow the recovery of herbivore populations**. Certain groups of herbivores (e.g. bio-eroders, grazers and scrapers) have been found to help break down dead coral and reduce the development of algal turfs [58], thus providing a suitable substrate for the recruitment and settlement of coral species – the survival of which may have previously been threatened [58] (Box 3.4).

Box 3.4 Adaptive management of the Great Barrier Reef: A globally significant demonstration of the benefits of networks of marine reserves

A comprehensive review of the benefits obtained from the large-scale network of marine reserves occupying the Great Barrier Reef documented that the relative frequency of outbreaks of coral-eating crown-of-thorns starfish (Acanthaster planci) (the major cause of coral mortality on the Great Barrier Reef) was 3.75 times higher in areas open to fishing than in no-take reefs. The cover of coral was also markedly higher in no-take zones than in zones in which reef fish and sharks are fished. This suggests that the expanded network of marine reserves with stricter management of fishing activities provides a critical and cost-effective contribution to enhancing the resilience of the Great Barrier Reef ecosystem.

Source: McCook L, *et al.* [63]

An analysis of a global database containing the results of more than 8,500 live coral cover surveys collected over the period of 1969-2006 found that, on average, **coral cover within marine protected areas (MPAs) remained constant, while coral cover on unprotected reefs declined** [64]. These findings suggest that protected areas can provide a number of important opportunities for helping to mitigate both direct anthropogenic impacts and indirect impacts resulting from climate change. Among these are: monitoring (involving local government units and volunteer organizations), evaluation and communication of results to raise awareness and educate, demonstration of best practice measures for management, and provision of site-based information that can help inform national or international decision making and mitigation targets [65].

3.3. CONCLUSIONS

- Protected areas do contribute towards achieving Target 5 by providing *de facto* protection, but the full contribution of protected areas to this target will be far from realized if new protected areas are constrained to the same kinds of locations that protected areas currently occupy. Remote sensing-based monitoring methods need to be integrated with field observations to maximise monitoring effectiveness.
- To optimise protection of marine biodiversity, and thus meet Target 6, the design and establishment of representative networks of marine protected areas is needed, as well as durable management. In addition, enforcing compliance is required to ensure that MPAs achieve their desired conservation value.
- There are a number of good examples of how biodiversity conservation and sustainable production can co-exist (Target 7), but data on the factors affecting their success or failure is limited. Developing well-designed and carefully implemented studies on the benefits of activities in Category V and VI protected areas can generate an empirical evidence base for measuring their effectiveness.
- Under Target 9, protected areas can act as early warning mechanisms for biological invasions and provide ideal opportunities to establish and trial early detection and rapid response IAS management strategies that can also be utilised by other protected area managers or landscape managers through a knowledge and information sharing platform, e.g. to inform managers on the pathways of introduction of IAS.
- Identifying vulnerable ecosystems and designing management strategies that are directly associated with the impact of human pressures (Target 10) allows for the maintenance or recovery of ecological function and natural resilience to global stressors.

4. Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

4.1. INTRODUCTION

Strategic Goal C addresses efforts to conserve ecosystems and species in both terrestrial and marine environments. Such efforts include addressing both quantitative and qualitative aspects of Target 11, including coverage and ecological representation, as well as ensuring effective and equitable management of protected areas, safeguarding important places for biodiversity and developing well-connected protected area systems integrated into the wider landscape and seascape. This goal also relates specifically to conserving species by preventing extinction of known threated species and improving and sustaining their conservation status (Target 12).

4.2. CONTRIBUTION OF PROTECTED AREAS TO GOAL C

Target 11: 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 landscape and seascape.

This target describes a suite of elements that a protected area global network should aspire to, indicating that progress towards meeting the target can only be achieved if the full range of elements are taken into account.

Coverage of terrestrial and inland water areas

There are 202,467 terrestrial and inland water protected areas recorded in the World Database on Protected Areas (WDPA), covering 14.7% (19.8 million km²) of the world's extent of these ecosystems (excluding Antarctica) (see Figure 4.1 and Box 1.3 for methods). This remains an underestimate, as not all of the world's terrestrial and inland water protected areas are as yet captured in the WDPA. Of the protected areas currently recorded in the WDPA, approximately 1% were designated since 2014, demonstrating that the world's protected area estate continues to grow. However, the total area reflected in the WDPA has fallen overall compared to the 15.4% reported in 2014, as a result of changes to the dataset. Designations change over time, including both increases and decreases in size, and in some cases, protected areas may be degazetted or no longer qualify for inclusion in the WDPA (Box 4.1). Consequently, to attain 17% of terrestrial coverage, an additional 3.1 million km² would need to be protected.

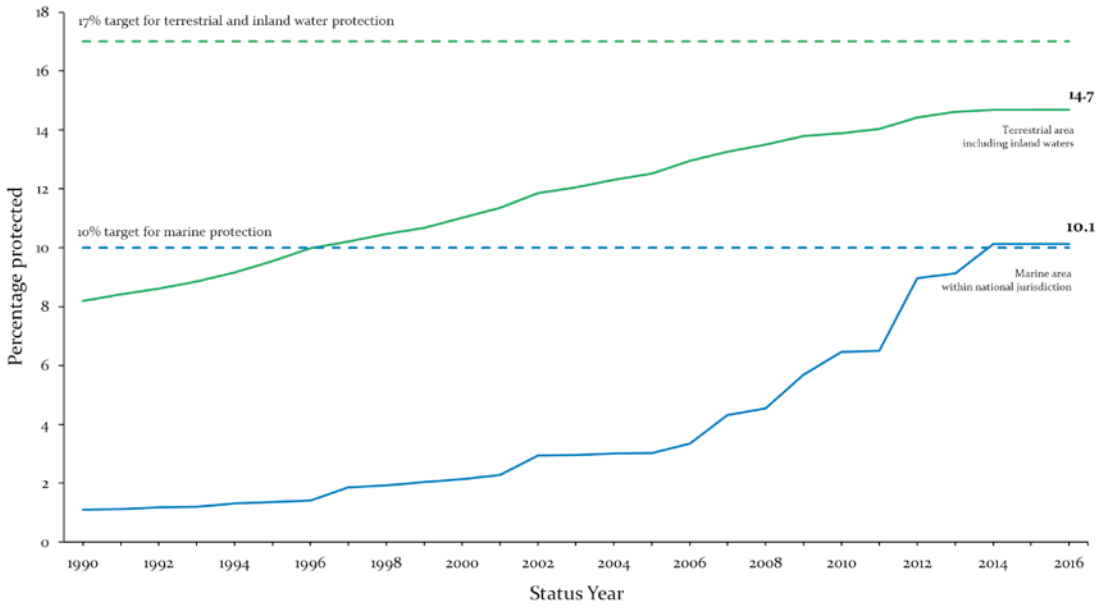


Figure 4.1. *Percentage of all terrestrial and marine areas (0-200 nautical miles) covered by protected areas by year of designation of all designated protected areas included in the WDPA as of April 2016. The year totals only include designated protected areas and are extracted from the protected area status year reported to the WDPA. Protected areas with no reported status year are included in the 1990 baseline. Figures for earlier years are different from those reported in previous reports, because the WDPA is a snapshot of protected areas at a given point in time, not a temporal database on protected areas growth. When a site is degazetted, it is no longer stored in the WDPA. Sites removed from the WDPA in the last two years are no longer included in the analyses.*

Box 4.1 Changes in protected areas coverage over time

The number of protected areas and their extent in countries is constantly changing, as boundaries change and areas are added or removed. Distinguishing between real changes in protection and the artefacts and lags in updating data is crucial to understanding coverage statistics. It can take from several months to several years for changes in protected areas on the ground to be reflected within protected area databases. For example, during the period between the 2014 and 2016 Protected Planet Reports, an additional 7,711 sites were added to the WDPA. Large marine protected areas, such as the Pacific Remote Islands Marine National Monument, designated in 2006 but expanded in 2014 to over 1 million km^2, have been added to the WDPA since 2014, contributing to the 10.2% mark.

Since 2014, many sites were removed from the database following discussion with the data providers. For example, one site was removed from the WDPA in 2015 due to the expiration of its legal status and was responsible for 50% of the decrease in reported coverage in terrestrial protected areas shown in this report.

Changes that may affect protected area coverage statistics include:

Changes in protected areas on the ground

- A new protected area is designated.
- The protection status of a given geographic space is upgraded, downgraded or removed through national legislation. This may or may not result in the sites' boundaries changing and in the management of the sites and activities permitted in the sites also changing.
- The protection status has not changed but boundaries are updated to expand or reduce the extent of a protected area.
- An existing protected area is merged with another protected area or one large protected area is split into several smaller ones.

Changes in the WDPA

- A national database is updated, leading to a complete update of the WDPA.
- A data provider requests the removal or addition of a site or number of sites from the WDPA.
- A site is removed from the WDPA after discussion with the data provider.

Protected area downgrading, downsizing and degazettement has been studied through an area of research known as PADDD [66–68]. Although this research is fundamental to understanding some of the most important dynamics in protected areas, PADDD does not measure changes at a global level in a systematic and spatially explicit way, nor does it measure positive changes in protected areas. While it has been possible over the decades to assess the national, regional and global coverage of protected areas at given points in time, the lack of a global protected area database that comprehensively assesses positive and negative changes in the protected areas estate has led UNEP-WCMC to start building such a database from historical versions of the WDPA.

The most extensive coverage achieved at a regional level is for Latin America and the Caribbean, where 4.85 million km² (24%) of land is protected. Half (2.47 million km²) of the entire region's protected land is in Brazil, making it the largest national terrestrial protected area network in the world (Figure 4.2).

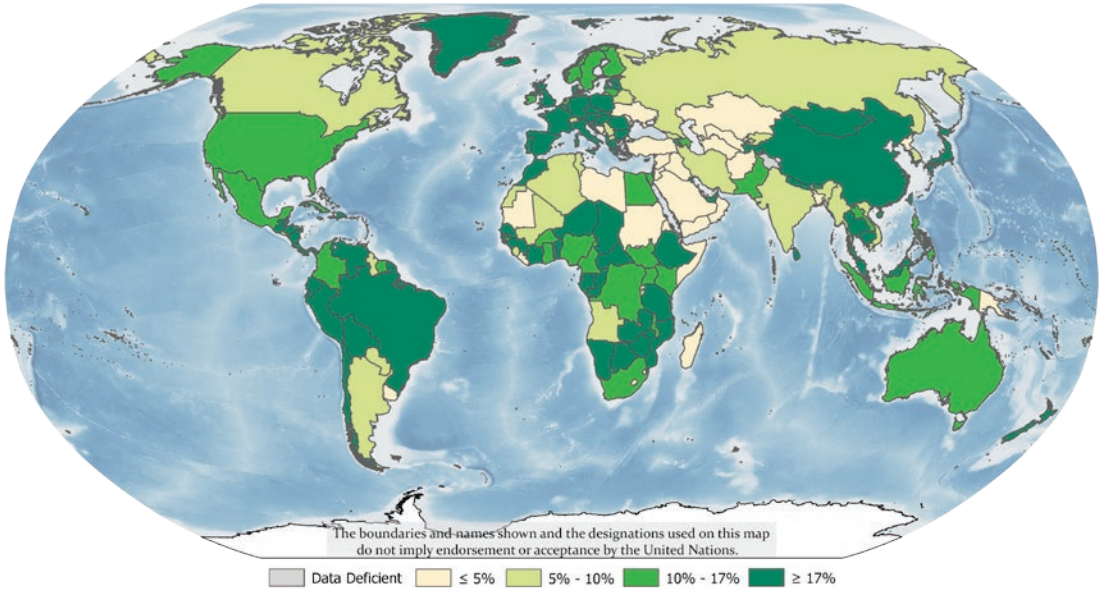


Figure 4.2. *Percentage of the terrestrial and inland waters covered by protected areas, by country and territory as of April 2016. Differences between these statistics and those reported by governments through, for example, CBD National Reports are expected, due to the application of differing methodologies to calculate protected area coverage (see Box 1.3 for the methodology used in this report) and time lags in reporting. Country profile pages will be available on www.protectedplanet.net.*

Marine protected areas

There are 14,688 Marine Protected Areas (MPA) recorded in the World Database on Protected Areas (WDPA), covering 4.12% (14.9 million km²) of the global ocean and 10.2% of coastal and marine areas under national jurisdiction (see Figure 4.1 and Box 1.3. for methods). Since 2014, marine protected area coverage in areas under national jurisdiction increased by 1.8% (equivalent to 2.6 million km²). However, this growth is localized, with a strong focus on the waters off Australia, New Zealand, the United States, the United Kingdom and Spain (Figure 4.3).

The progress in growth in the MPA network, resulting from a combination of new sites being created, existing sites being expanded and a number of large sites being announced, will contribute even more to an increase in the total protected area coverage. The United Kingdom and Spain, in particular, have designated more than 30 and 50 sites respectively. In the United States, the existing Pacific Remote Islands Marine National Monument, originally designated in 2006, was expanded in 2014 to over 1 million km². The UK government in its 2015 budget committed to proceed with the designation of an MPA around the Pitcairn Islands which would have an area greater than 800,000 km². In New Zealand, the Kermadec Ocean Sanctuary Bill would establish a 620,000 km² fully protected marine sanctuary that would cover an area of approximately 15% of New Zealand's the Economic Exclusion Zone (EEZ – from the shoreline to 200 nautical miles). Once passed, this bill would significantly enhance the existing protection of this area. In late 2015, Palau passed the Palau National Marine Sanctuary Act, which will preserve 80% of its EEZ as a no-take area protected from all exploitation. The Marine Sanctuary will be fully functioning by 2020. Malta has designated eight new MPAs with a total area of 3,450 km². In late 2015, Chile announced that it would be creating a new 297,000 km² MPA called the Nazca-Desventuradas Marine Park and that it was also beginning negotiations to designate a 720,000 km² MPA around Rapa Nui/Easter Island.

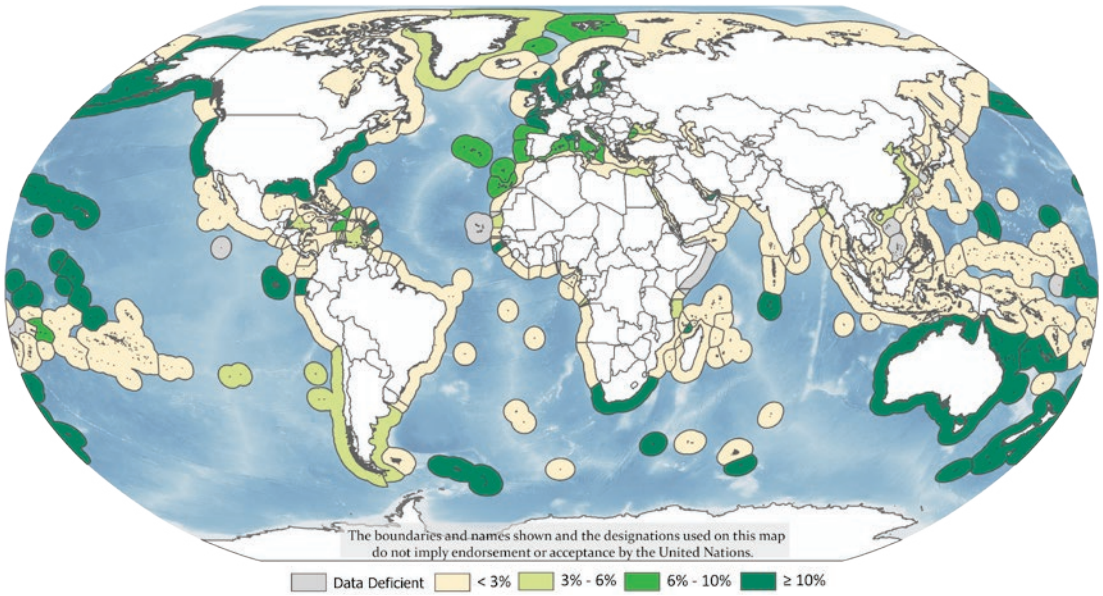


Figure 4.3. *Percentage of the marine areas within national jurisdiction (0-200 nautical miles) covered by protected areas as of April 2016, Cambridge, UK: UNEP-WCMC. Differences between these statistics and those reported by governments through, for example, CBD National Reports are expected due to the application of differing methodologies to calculate protected area coverage (see Box 1.3 for the methodology used in this report). Country profile pages will be available on www.protectedplanet.net*

In areas beyond national jurisdiction (ABNJ) (generally >200 nautical miles), MPAs make up only 0.25% of total ABNJ area, showing no change since 2014. In June 2015, the United Nations General Assembly agreed to a negotiation process to develop an "international legally binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction" [69]. Negotiations will address a range of topics related to the conservation and sustainable use of marine biological diversity of ABNJ; marine genetic resources, including on the sharing of benefits; and measures such as area-based management tools, including MPAs, EIAs and capacity building and the transfer of marine technology.

Areas of particular importance for biodiversity and ecosystem services

Determining whether protected areas cover the most important sites for biodiversity is critical for ensuring the long-term protection of nature. This section focuses on adequate representation using Key Biodiversity Areas (KBAs).

Key Biodiversity Areas (KBAs) are sites that contribute significantly to the global persistence of biodiversity, including Important Bird and Biodiversity Areas, Alliance for Zero Extinction sites, and similar networks [70] (Box 4.2). They have been used to assess progress towards this element of Aichi Biodiversity Target 11 [2,71] and have been influential in informing protected area designation and conservation action [72]. In 2016 only 19.2% of identified KBAs are completely covered by protected areas (Figure 4.4). **Despite showing positive growth since 1990, the protection of KBAs seems to have halted in the past decade, only increasing by 1% since 2006**.

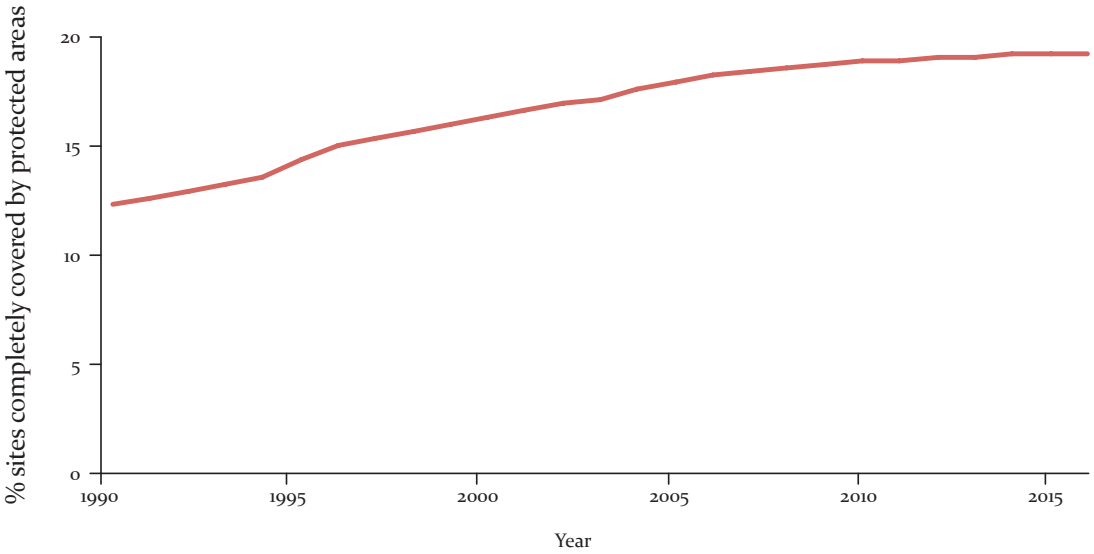


Figure 4.4. *Percentage of Key Biodiversity Areas completely covered by protected areas by year of designation of all designated protected areas included in the WDPA in April 2016. Source: Analysis by BirdLife International of 14,595 Key Biodiversity Areas in the World Database of Key Biodiversity Areas.*

Although efforts will be made to expand the World Database on Key Biodiversity Areas, it does not yet include important areas for all taxonomic groups, for example, Important Plant Areas (IPAs). The Global Strategy for Plant Conservation (GSPC), agreed under the CBD, sets a number of targets, to be met by 2020, that consider the protection and sustainable use of plants through protected areas. For example, the GSPC Target 5 states: "*At least 75% of the most important areas for plant diversity of each ecological region protected with effective management in place for conserving plants and their genetic diversity*." **A recent report on the state of the world's plants [73] revealed that 1,771 IPAs have been identified to date, but very little is known about their conservation status**. In Europe, for example, one in four European IPAs currently has no legal protection, many have no active management plan and a significant number are threatened.

Key Biodiversity Areas are sites of importance for biodiversity but not necessarily priorities for biodiversity conservation [70]. In some countries Systematic Conservation Planning (SCP) principles and tools have been applied to identify priorities for biodiversity conservation [74–77]. These can be used to inform where to prioritize the placement of conservation areas, by undertaking spatial conservation prioritization analysis or conservation assessments [78]. SCP has been used in South Africa [79], the Zambezi river basin [80] and the Great Barrier Reef [81].

Box 4.2 IUCN WCPA-SSC Joint Task Force on Biodiversity and Protected Areas

By: Stephen Woodley (IUCN) and Penny Langhammer (IUCN WCPA)

A Task Force on Biodiversity and Protected Areas was jointly established by the IUCN World Commission on Protected Areas and the IUCN Species Survival Commission. The Task Force has two objectives: to understand the drivers of successful biodiversity outcomes in protected areas, on land and sea, and to develop a new global standard for the identification of Key Biodiversity Areas (KBAs).

On the first objective, the Task Force completed several key global analyses of drivers of biodiversity outcomes in protected areas. The role of funding, social and economic drivers, governance and planning in the delivery of positive outcomes for biodiversity in protected areas was assessed though a number of scientific studies and technical reports (see section on management effectiveness in this chapter for more information).

On the second objective, "*A Global Standard for the Identification of Key Biodiversity Areas*" **was approved by IUCN Council Decision C/88/25 in April 2016, following a global consultation process involving hundreds of experts**. The new KBA standard builds on existing approaches to identify important sites for biodiversity, most notably Important Bird and Biodiversity Areas, but can now be applied to all taxa and levels of biodiversity. The standard can be used by national constituencies to identify sites that contribute significantly to the global persistence of biodiversity in terrestrial, inland water and marine environments. Quantitative thresholds underpinning each criterion will help to ensure that KBA identification is objective, transparent and rigorous, as well as repeatable in different places and over time. KBAs can support efforts by governments and civil society to strategically expand and effectively manage protected areas under Target 11 and to halt species extinction under Target 12.

Target 11 recognizes the critical and important role of protected areas, not only for biodiversity conservation, but also for securing ecosystem services for human well-being [82]. However, **there is currently no global indicator to assess the extent to which areas of importance for ecosystem services are being protected**. (Benefits deriving from protected areas are discussed in Chapter 5, Target 14).

Ecological representation of protected areas: terrestrial realms, biomes and ecoregions

At the global scale, there are eight biogeographic terrestrial realms and 14 biomes that together contain 827 ecoregions [83]. Table 4.1 shows that, in 2016, 43% of the world's ecoregions have at least 17% of their terrestrial area protected, showing no change since 2014. Notably, **10% of the world's terrestrial ecoregions have more than half of their area protected, while 6% of the ecoregions have less than 1% of their terrestrial area protected**. In the past, protected areas have often been located in places where there is no conflict with other human needs, rather than where they are important for biodiversity [84]. There is consequently a need to prioritize efforts to protect under-represented areas of importance.

Table 4.1. *Protected area coverage of terrestrial realms, biomes and ecoregions (not including polar regions).*

	Protected area coverage (Number of units and percentage)		
Scheme	**Less than 1%**	**At least 17%**	**At least 50%**
Terrestrial realms	0	3 (43%)	0
Terrestrial biomes	0	6 (43%)	0
Terrestrial ecoregions	53 (6%)	350 (43%)	85 (10%)

Source: *Realms, biomes and ecoregions from Olson et al. (2001) [83].*

Ecological representation of protected areas: Marine realms, provinces, ecoregions and pelagic provinces

Marine waters, with regions extending from the coast (intertidal zone) to the 200 meters depth contour, have been classified into 12 large realms, 62 provinces and 232 ecoregions, covering all coastal and continental shelf waters of the world [85]. Beyond 200 metres depth, the surface pelagic waters have been biogeographically classified into 37 pelagic provinces [86].

In 2016, an assessment of protected area coverage shows that **36% of the world's marine ecoregions have at least 10% of their area protected, an increase of 2% since 2014**. Interestingly, 13% of the world's marine ecoregions have more than half of their area protected, and 22% of marine ecoregions have less than 1% of their area protected. The largest marine protected areas are concentrated in the Eastern Indo-Pacific (21% protected), Temperate Australasia (19% protected) and Temperate Northern Atlantic (17% protected) realms. **Beyond 200 meters depth, only 8% of pelagic provinces have at least 10% of their area included in protected areas, and 49% have less than 1% of their total areas protected**.

Table 4.2. *Protected area coverage of marine realms, provinces, ecoregions and pelagic provinces (excluding polar regions).*

	Protected area coverage (Number of units and percentage)		
Scheme	**Less than 1%**	**At least 10%**	**At least 50%**
Marine realms	0	3 (50%)	0
Marine provinces	4 (6%)	28 (45%)	7 (11%)
Marine ecoregions	51 (22%)	84 (36%)	29 (13%)
Pelagic provinces	18 (49%)	3 (8%)	0

Source: Realms, provinces and ecoregions from Spalding *et al.* (2007) [85]. Pelagic provinces from Spalding *et al.* (2012) [86].

Ecological representation of species

In 2013, protected area coverage of approximately 25,000 species listed on the IUCN Red List of Threatened Species, ecoregions and important sites for biodiversity were assessed [87]. The results showed that fewer than half of species in most of the groups included (mammals, birds, amphibians, marine bony fishes, cartilaginous fishes, warm water reef-building corals, seagrasses and mangroves) had a sufficient proportion of their distributions covered by protected areas. Only birds (56%) and corals (78%) had more than half of their species adequately covered by protected areas. Results indicated that, overall, species ranges are insufficiently covered by protected areas, and that more than 17% of the land and 10% of the sea might need to be covered by protected areas to achieve adequate representation of species, ecoregions and important sites for biodiversity.

Effectively managed protected areas

Protected Area Management Effectiveness (PAME) assessment methods are used in many parts of the world. PAME evaluations can be defined as "*the assessment of how well protected areas are being managed – primarily the extent to which management is protecting values and achieving goals and objectives*" [88]. Management effectiveness is comprised of three main components: (1) design and planning issues; (2) appropriateness of management systems and processes; and (3) delivery of PA objectives [89].

Since the mid-1990s, various methodologies have been developed for assessing PAME, many of which have now been collated together into the Global Database for Protected Area Management Effectiveness (GD-PAME). As of January 2015, the GD-PAME contained the results of 17,739 PAME assessments, representing 9,037 protected areas from around the world [90]. **The current information contained within the GD-PAME indicates that only 17.5% of countries have achieved the 60% PAME assessment target of the CBD Programme of Work on Protected Areas (CBD Decision X/31)** [90,91]. While it has been recognized that PAME data, is useful for local adaptive management, the causal links that may influence biodiversity outcomes in protected areas requires rigorous scientific impact evaluations.

A recent study [92] showed that, on average, 11% more species and 15% more individuals are found at sites sampled inside 359 terrestrial protected areas, compared to those outside, after accounting for elevation, slope, suitability for agriculture, and other factors affecting species richness and population abundance (Figure 4.5). Unsurprisingly, protected areas within natural or recovering land uses were often found to have higher levels of biodiversity than protected areas containing human-dominated land uses; however, even within some human-dominated land uses, species richness and abundance are higher at sites inside protected areas (Figure 4.6). Without better information on management intent and process, it is difficult to quantify effectiveness, although the positive impact of protection observed in Gray *et al*. (2016) [92] indicates that protected area management (whether preventing losses, increasing numbers of individuals, or retaining pre-existing biodiversity gradients) has, on average, been successful for a taxonomically broad set of species.

Figure 4.5. *Effects of terrestrial protected areas on (a) species richness and (b) total abundance, at sites inside (filled circles) relative to sites outside (open circles) protected areas. Source: Gray et al. (2016) [92].*

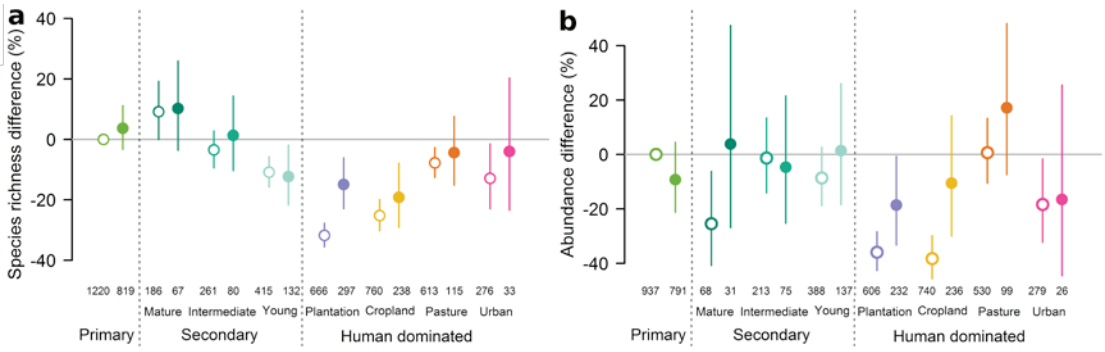


Figure 4.6. *Effects of protection on two biodiversity measures across eight land use types. (a – b) Sites outside (open circles) and inside (filled circles) protected areas in different land uses (colours: from left to right: primary vegetation; mature, intermediate, and young secondary vegetation; plantation; cropland; pasture; urban). Error bars show 95% confidence intervals. The number of sites in each type of land use and protection is given underneath each data point. Source: Gray et al. (2016) [92].*

The IUCN WCPA-SSC Joint Task Force on Biodiversity and Protected areas (Box 4.2) conducted a global analysis to investigate the drivers and causal links that may influence biodiversity outcomes in protected areas [93]. The results showed that the social and economic context is fundamental for protected areas success. Sites are successful when they are supported by, and are beneficial to, local communities. In addition, successfully managed sites need to be sufficiently funded, free from corruption, and have staff with adequate capacity for management. Ecological factors such as park size, fragmentation and connectivity are fundamentally important in the long term, but are often superseded by short-term social and economic factors. The IUCN Green List of Protected and Conserved Areas (Box 4.3) provides a set of criteria that define standards of good performance for protected areas.

Box 4.3 IUCN Green List of Protected and Conserved Areas

By: Marc Hockings (IUCN WCPA)

The IUCN Green List of Protected and Conserved Areas (GLPCA) is a global programme to improve the performance of Protected and Conserved Areas and help deliver conservation benefits for people and nature. The fundamental premise of the programme is that it will be able to recognize success in achieving conservation outcomes, as well as measure progress in, and impact of, equitable governance and effective management of Protected Areas.

The GLPCA programme is designed to assist national governments and their community partners in conservation to meet global targets for biodiversity conservation, especially the quality elements of the CBD Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets, in particular Target 11.

At the heart of the GLPCA programme is a set of criteria that define standards of good management that protected areas must meet to achieve Green List status. The GLPCA Standard has been developed by IUCN with the expertise of the WCPA and a coalition of professionals from a wide range of thematic areas.

The draft standard and procedures for the GLPCA were developed and pilot tested in eight countries between 2010 and 2014, and 24 protected areas were listed on the provisional IUCN Green List at the World Parks Congress in Sydney in November 2014.

The GLPCA has entered a new development phase that will run from mid-2015 until the end of 2018. During this phase, the lessons from an evaluation of the pilot phase are being incorporated, and implementation is being expanded to more than 20 countries.

For more information see:
www.iucn.org/about/work/programmes/gpap_home/gpap_quality/gpap_greenlist

Equitably managed protected areas

Understanding and addressing social equity in protected areas is important for ethical and moral reasons, and it is increasingly recognised that governing and managing natural resources equitably is instrumental to achieving more effective conservation outcomes [94]. Conversely, interventions that negatively affect social equity can undermine conservation goals and promote conflict between local people and protected area managers [95].

Equity has three highly interlinked and mutually supportive dimensions: 1) recognition (respect for stakeholder knowledge, norms and values, 2) procedure (inclusiveness of rule and decision making), and 3) distribution (distribution of costs and benefits). There is also a contextual dimension to equity, affected by surrounding conditions that influence actors' ability to participate and to gain recognition and benefits [96,97] or enabling conditions [98].

Drawing on existing research on equity from other conservation mechanisms (e.g. Payments for Ecosystem Services (PES) and Reducing Emissions from Deforestation and Forest Degradation (REDD+), an Equity Framework for assessing equity in protected area governance and management has been proposed. Under this framework, equity principles have been identified for each dimension of equity against which management of protected areas can be assessed (for full details see Franks and Schreckenberg, 2016 [98]).

Existing social, governance and management assessments of protected areas may provide a starting point for advancing and assessing equity [99], although these tools are limited in their consideration of all dimensions of equity. However, despite recent advances, no agreed and standardised methodology exists for tracking progress towards this element of Target 11, and this remains a priority for further work.

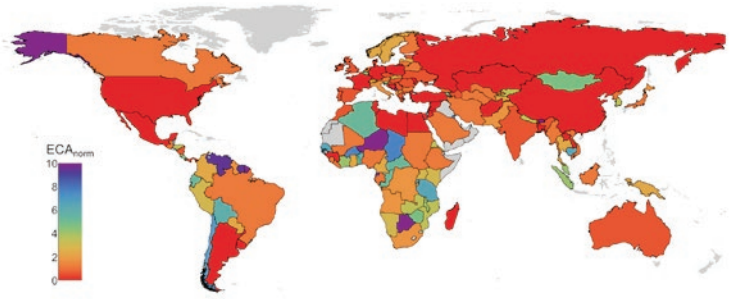
Well-connected systems of protected areas integrated into the wider landscape and seascape

Connecting protected areas within landscapes and seascapes, and including protected areas within broader development planning, including spatial planning, is an integral part of achieving Target 11. Many connectivity initiatives have been established [100], and new protected areas are increasingly being considered as part of the wider landscape. However, identifying places where protected areas are providing essential ecosystem services and where there are social and economic benefits from incorporating green infrastructure within development plans is challenging. Guidelines to define and describe areas where connectivity conservation is practiced are being developed [101]. These will provide a basis for the consistent and orderly identification and spatial delineation of the different types of areas of connectivity conservation (ACCs) globally, and could also provide a basis for estimating the connectivity conservation implementation progress for Aichi Biodiversity Target 11.

Progress towards developing indicators to quantify the connectivity element in Target 11 is being made, and a recent study [102] provides the first global assessment of the connectivity of the terrestrial protected area network (Box 4.4).

Box 4.4 Connectivity of the global network of protected areas

A recent study by Santini et al. (2016) [102] used graph theory to compare connectivity across national- and continental-level protected area networks, providing the first insight into the functioning of networks at this scale. The study measured connectivity in terms of the amount of "reachable" area, as this takes into account the dispersal abilities of the species as well as the area of each habitat patch. Thus, for a given species, this metric can compare the importance of having a single large habitat patch or several small patches. To provide results relevant to most terrestrial vertebrates, the study calculated the extent of reachable protected area in each network across a range of dispersal distances (i.e. from short-range ~200m to long-range ~ 100km). The results showed that the extent of protected area that species with such dispersal abilities could reach was typically much smaller than the extent of protected area in the network as a whole, suggesting there is considerable room for improving landscape connectivity. Further analyses highlighted the need to account for transboundary connectivity.



Percentage of reachable area (ECA norm) for the protected area networks within countries for the lowest dispersal distance considered (177 m) in the study as an example. The results are adjusted by country area so they are comparable. Countries with no reported protected areas and/or not considered in the analysis are coloured grey. For the sake of low-value discrimination, all values higher than 10% have the same colour (violet).

The analysis also highlights a wide variation in connectivity among regions. For example, the reachable protected land in the African network is determined mostly by connectivity within large protected areas, with modest increases in connectivity with dispersal ability because of the large distances separating protected areas. In contrast, connectivity in Europe is more dependent on (and enhanced by) dispersal ability, because the individual protected areas are smaller but also closer to each other. North and South America show the highest connectivity levels considering both the protected land that can be reached by moving within and between protected areas.

Source: Santini, L., Saura, S. and Rondinini, C. 2016 [102].

Defining other effective area-based conservation measures

Target 11 calls for the global goal of at least 17% terrestrial and 10% marine coverage of conservation to be achieved through a combination of protected areas and other effective area-based conservation measures (often referred to as OECMs). Moreover, **OECMs must contribute to both the quantitative and qualitative aspects of Target 11. Following a request by Parties to the CBD, IUCN's World Commission on Protected Areas (WCPA) has convened a task force to provide guidance on how to identify and report on OECMs** (see examples in Box 4.5). Preliminary guidance is expected by December 2016, with final guidance expected in 2018.

Once CBD parties begin identifying and reporting on OECMs, UNEP-WCMC, in collaboration with IUCN and UNEP, intends to collate these data within the WDPA. This will allow their contributions to Target 11 to be measured for the first time. In the long term, OECMs could have the potential to contribute greatly to elements such as representativeness and connectivity, and to contribute to conservation in important places such as KBAs, especially in cases where protected areas are not an option.

Box 4.5 Examples of potential OECMs

These are examples of broad types of areas that could potentially be considered OECMs. They are the subject of ongoing discussion within the Task Force, and the findings are not yet definitive.

- An area that meets the IUCN definition of a protected area, but the governing authority rejects its designation as a protected area.
- An area that meets the IUCN definition of a protected area, but where the relevant government does not currently recognize it as a protected area.
- Secondary voluntary conservation, i.e. biodiversity conservation is a management objective, but is not the primary objective.
- Ancillary conservation, i.e. biodiversity conservation is not a stated management objective, but is a result of other management actions.

Source: IUCN WCPA Task Force, pers. comm. 2016

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.

Progress towards this target is measured through monitoring trends in abundance and extinction risk, especially of threatened species. Abundance trends for more than 16,000 populations of vertebrate species are available through the Living Planet Index produced by the World Wildlife Fund and the Zoological Society of London [103] (Box 4.2). Extinction risk trends are available through the Red List Index produced by IUCN [104]. A global study has shown that extinction risk was lower and increased more slowly for species whose most important sites were protected, compared to those with fewer or no important sites protected [71,105]. **Some species would almost certainly be extinct without targeted conservation interventions within protected areas** [106–108]. However, the impact made by protected areas in reversing negative trends and avoiding extinctions is likely to be underestimated, due to spatial and taxonomic bias in population monitoring within and outside sites [109].

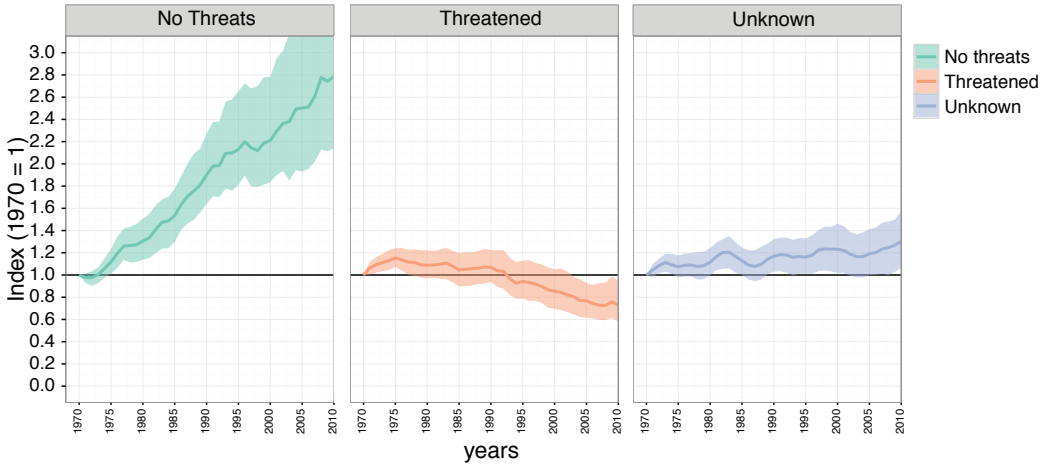
Protected areas have the potential to contribute substantially to preventing many more extinctions and reversing negative population trends [110]. However, this potential is far from being fully realized. Recent studies have shown that the current global network of terrestrial protected areas still falls short of adequately representing biodiversity [87,111,112]. **The majority of protected areas have seen ongoing declines in plant and animal populations, although at lower rates than in surrounding areas** [32,113,114] (Box 4.6).

Appropriate siting of protected areas, where they can avert biodiversity loss, determines their potential contribution to achieving species persistence [84]. Effective protected area management is fundamental to ensuring that the full potential is realized [115].

Box 4.6 Protected areas – global trends in vertebrate species populations

By: Robin Freeman and Louise MacRae (ZSL)

The Living Planet Index (the average abundance of vertebrate populations relative to a baseline population size in 1970) can be used to estimate how populations within protected areas have changed over time. By 2010, global populations of terrestrial species had declined by, on average, 39% since 1970, though populations inside terrestrial protected areas had only declined by 18% over the same period [116]. However, there is significant variation in the trends of protected populations [113]. The figure below compares the trends of vertebrate populations in protected areas that do and do not face threats. Populations that are recorded as not threatened have increased by ~150% since 1970 (1,475 populations of 800 species) and populations facing threats have declined by about 35.7% since 1970 (856 populations of 556 species). While protected areas have positive impacts on vertebrate populations, without improved active management of threats such as illegal hunting and deforestation within and outside protected areas, these declines are likely to continue, suggesting that Target 12 is unlikely to be achieved.



Living Planet Index of protected vertebrate populations

In conclusion, protected areas can have positive impacts on species extinction risk and population trends, but they need to be properly sited and managed to realize their full potential. In addition, protected areas are necessary but insufficient to achieve Target 12. Combining strategic siting and effective management of protected areas to protect range-restricted and imperiled species, with national and international sustainability policies designed to maintain large-scale processes and wide-ranging species, is necessary for the full achievement of Target 12 [117].

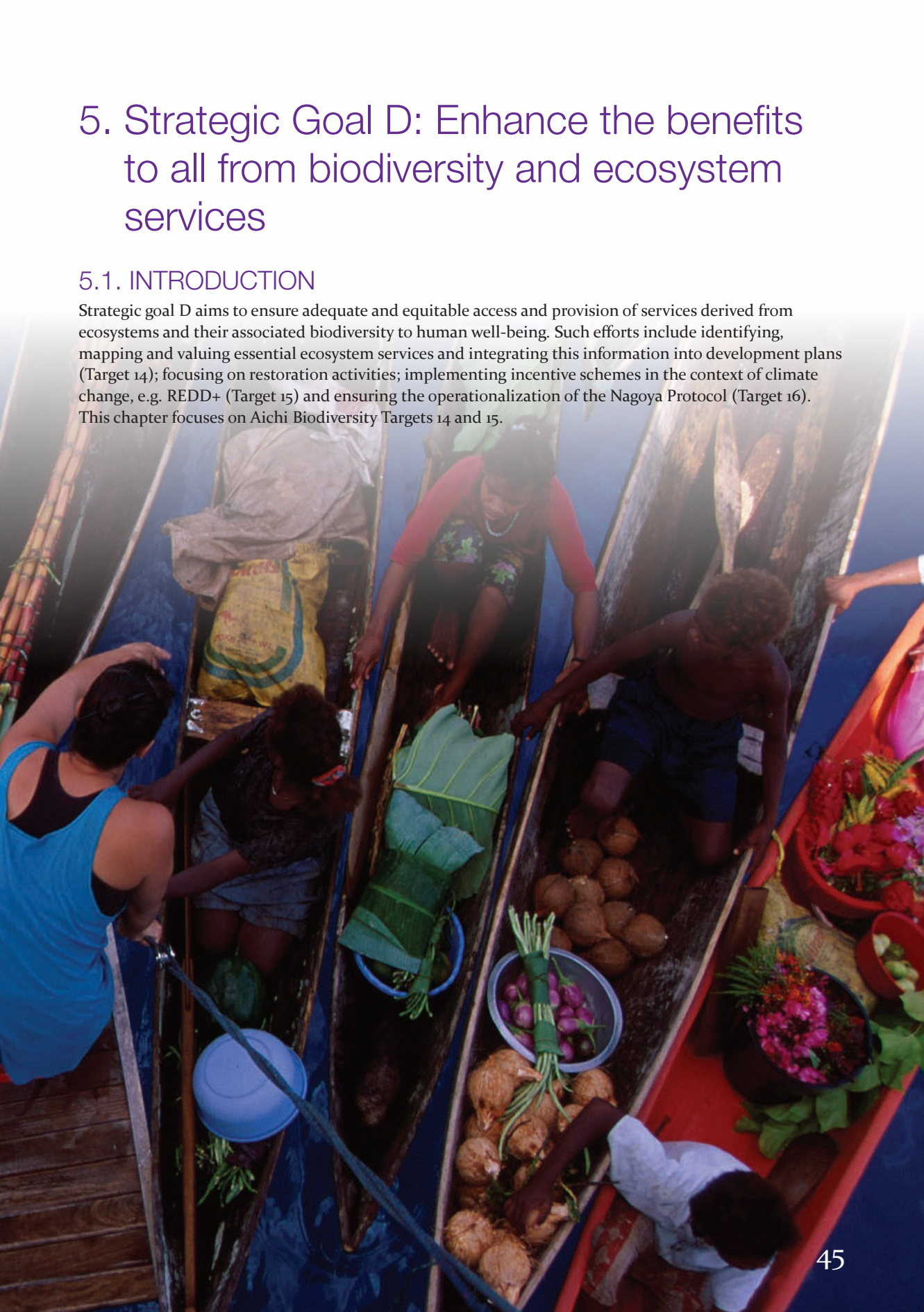
4.3. CONCLUSIONS

- The world continues to make significant progress in achieving increasingly higher levels of marine protection. Marine Protected Areas now cover approximately 4.12% of Earth's oceans. For national jurisdiction, the total area covered is 10.2%, compared to the 8.4% that was reported in 2014. Most of this increase is a result of large protected areas being designated in Australia, New Zealand, the United States, the United Kingdom and Spain.
- Despite the continued growth in the protected area estate globally, the protected area network does not yet meet the requirement of ecological representativeness stipulated in Target 11. At present, 350 (46%) of the world's 823 terrestrial ecoregions outside the Antarctic mainland meet the 17% target, and 84 (36%) of the 232 marine ecoregions have at least 10% of their area protected, an increase of 2% since 2014.
- Just under 15% of the world's terrestrial and inland waters, excluding Antarctica, is under protection. The most extensive coverage achieved at a regional level is for Latin America and the Caribbean, where 4.85 million km^2 (24%) of land is protected.
- It is likely that the area under protection in both land and sea will increase further as formal recognition is extended to areas governed by private entities, local communities and indigenous peoples. New studies suggest that "Other Effective Area Based Conservation Measures", once defined and recognized, may contribute significantly to Aichi Biodiversity Target 11.
- There is a need to enhance protection of areas of importance for biodiversity through the establishment and targeted expansion of formal protected areas. Currently, only 19.2% of Key Biodiversity Areas are completely covered by protected areas.
- By 2015, 17.5% of countries had completed and reported at least one Management Effectiveness assessment for 60% of the reserves within their protected area estate (Aichi Biodiversity Target 11). Without better information on management intent and process it is difficult to quantify effectiveness; however, the positive impact of protection indicates that protected area management (whether preventing losses or increasing numbers of individuals) has, on average, been successful for a taxonomically broad set of species.
- An Equity Framework for assessing equity in protected area governance and management has been proposed. Under this framework, equity principles have been identified for each dimension of equity against which management of protected areas can be assessed.
- Evidence shows that protected areas have the potential to contribute substantially to preventing many extinctions and reversing negative population trends, if they are appropriately located where they can most effectively avert biodiversity loss. Effective protected area management is fundamental in ensuring that this full potential is realized.

5. Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services

5.1. INTRODUCTION

Strategic goal D aims to ensure adequate and equitable access and provision of services derived from ecosystems and their associated biodiversity to human well-being. Such efforts include identifying, mapping and valuing essential ecosystem services and integrating this information into development plans (Target 14); focusing on restoration activities; implementing incentive schemes in the context of climate change, e.g. REDD+ (Target 15) and ensuring the operationalization of the Nagoya Protocol (Target 16). This chapter focuses on Aichi Biodiversity Targets 14 and 15.



5.2. CONTRIBUTION OF PROTECTED AREAS TO GOAL D

Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

Although protected areas are generally associated with biodiversity conservation, these areas can maintain healthy, fully functioning ecosystems that provide a wide range of essential ecosystem services, such as food and water provision, cultural services that strengthen economic prosperity, social well-being and quality of life [118].

It is estimated that one-third of the world's 100 largest cities draw a substantial proportion of their drinking water from forest protected areas [119] (Box 5.1). Efforts to conserve, connect and potentially restore areas within both protected areas and adjacent lands can increase the availability and reliability of high-quality water sources and safeguard downstream water supplies for agricultural use [120]. For example, in the Dominican Republic, the Madre de las Aguas Conservation Area protects the source of 17 rivers that provide water for domestic and irrigation purposes to over half of the country's population [120]. Furthermore, a study on water provision from protected areas to downstream communities concluded that **nearly two-thirds of the global population is living downstream of the world's protected areas as potential users of freshwater provided by these areas** [121]. Despite the importance of protected areas for conserving both freshwater biodiversity and ecosystems that provide water, protected area networks have in the past been established mainly for terrestrial conservation [122]. As a result, freshwater ecosystems are among the most threatened and degraded on Earth [123]. Ensuring that freshwater ecosystems are better represented and better connected in protected area systems is a necessary contribution to the achievement of Target 14, as well as Target 11 [124].

Box 5.1 Water provision in the global natural World Heritage network

An analysis was undertaken to provide a baseline overview of global water provision in the natural World Heritage network. Out of 222 natural and mixed sites, 163 World Heritage Sites were found to provide a positive water balance, with a yield of 638 mm on average per year. The distribution of water yield was found to vary greatly based on the distinctive geographies of the World Heritage Sites, which range from tropical rainforests to arid deserts. Sites generating the greatest quantities of water were located largely in the tropical and subtropical regions of the world. Such sites are described as having the potential to act as natural "water towers", providing essential water supplies to local communities [22]. For example, Durmitor National Park in Montenegro provides surrounding communities with essential water supplies and has also generated revenue of about €112,000 for surrounding communities through the bottling and sale of spring water from the park [22].

Source: Osipova et al. 2014 [22]

Healthy ecosystems can also contribute to enhanced food security. For example, the strict management of pesticides can promote pollination for agricultural purposes, while the maintenance of fish nurseries and feeding grounds can allow fish stocks to recover from fisheries depletion [125].

Protected areas also play an important role in improving human health and mental well-being (e.g. [126,127]). For example, it has been estimated that **physical activity within protected areas managed by Parks Victoria in Australia has resulted in health cost savings of about AU$200 million** [118]. By preventing deforestation and restoring natural vegetation, **protected areas can reduce the number of edges through which pathogens, vectors and hosts can interact, thereby lowering the risk of transmitting infectious diseases such as malaria, Ebola and SARS** [128]. In recent years, protected areas have been increasingly utilised by the pharmaceutical industry for bio-prospecting activities aiming to discover and derive new medicinal drugs. For example, more than 400 medicinal plants have been collected to date from Langtang National Park in Nepal [118].

Despite the numerous examples available, assessing the precise benefits derived from protected areas remains a challenge, and therefore the economic value of protected areas is often underestimated. Determining the value of ecosystem services delivered by protected areas has previously been hampered by a lack of tools and methods to provide robust site-scale information without requiring considerable financial or technical resources. Various toolkits have been developed recently to address this gap (e.g. [129,130] etc.), including The Toolkit for Ecosystem Service Site-based Assessment [131], a rapid, low-cost, participatory valuation tool designed for use by non-experts to assess the value of ecosystem services at a particular site in both terrestrial and wetland habitats. The TESSA toolkit has been applied at a wide range of sites, including the pampas grasslands of South America, community-owned forests in Fiji, wetland nature reserves in the UK and national parks in Nepal (Box 5.2).

Box 5.2 Toolkit for Ecosystem Service Site-based Assessment (TESSA)

By: Jenny Birch (Birdlife International)

TESSA can be used to improve understanding of the value of protected areas to society by comparing the ecosystem services provided under different land-use or management options. The results identify the winners and losers under particular land-use options, and the potential impacts of protected area establishment or degazettement on provided services. For example, TESSA has been used to estimate the net benefits of Shivapuri-Nagarjun National Park (SNNP), Nepal, and to guide future management decisions about the distribution of these benefits.

The Shivapuri-Nagarjun National Park (SNNP) covers an area of 15,900 ha in the central region of Nepal. The park is mostly forested and is a major source of water for the rivers of the Kathmandu Valley. The surrounding area is a mosaic of terraced rice paddies, hill slope agricultural plots, degraded forest and built-up residential areas. Using TESSA, ecosystem services provided by the park and their distribution to different stakeholders was compared with a plausible alternative state of the site, represented by the cultivated land and degraded forest surrounding the park.

The results revealed the value of the park, the trade-offs involved and the need to address how benefits can be more equitably distributed among stakeholders. For example, protection of SNNP has substantially increased the annual ecosystem service flow, including a 74% increase in the value of greenhouse gas sequestration, 60% increase in carbon storage, 94% increase in nature-based recreation, and 88% increase in water quality. The overall net benefit of the park (excluding water quality, which was not valued economically) was estimated as $11.0 million per year, suggesting that conservation and ecosystem service provision were congruent at the site-level. However, the benefits were not distributed equitably, with downstream water users and the global community benefitting at the cost of local communities' access to resources.

Protected areas are an established concept, with well-developed laws and policies, management and governance strategies, knowledge, staff and capacity. Thus, protected areas can efficiently maintain healthy ecosystems to provide a wide range of ecosystem services and offer greater provision security than unmanaged, unregulated areas open to rapid degradation and change [127]. Protected areas also provide ideal opportunities to develop and demonstrate the use of methods and tools, the results of which can aid education and improve knowledge of conservation benefits to local communities and the general public. Moreover, integrating all the information from valuation of the role of protected areas in terms of water supply, regulation and quality can be used to inform decisions by governments about natural resources.

Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks have been enhanced, through conservation and restoration, including restoration of at least 15% of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

Carbon emissions from deforestation and forest degradation account for a large proportion of global carbon emissions. To reduce these emissions from land cover change, it is therefore necessary to protect and restore natural habitats. In particular, conserving ecosystems such as forests, soils, freshwater and coastal wetlands is an effective way to enhance carbon storage and sequestration [132,133]. Protected areas are often the best opportunity to preserve these valuable ecosystems within terrestrial and aquatic networks [134]. **A recent study estimated that terrestrial protected areas currently account for approximately 20% of the carbon sequestered by all land ecosystems** [133].

There is considerable evidence that restoration efforts within protected areas can aid mitigation efforts, by re-establishing habitats with the potential to store and sequester carbon that would otherwise be emitted or retained within the atmosphere [135]. Many national strategies use protected areas, amongst other options, as an approach for reducing emissions from deforestation and degradation (REDD+) – a strategy that aims to create a financial value for the carbon stored in forests, thus offering incentives for developing countries to reduce carbon emissions [136]. Assessing where areas of high carbon value overlap with sites of high biodiversity is an area of research that could prove useful in terms of meeting Target 15.

In 2015, the common vision for the Amazon Biome was highlighted in the Declaration on Protected Areas and Climate Change, which calls for recognition of the role of protected areas in climate change mitigation and adaptation and proposes integrating protected areas into climate planning and financing strategies [137]. By highlighting the strong scientific evidence for the role of protected areas in addressing climate change, it should also encourage the protected areas community to work more closely with the United Nations Framework Convention on Climate Change (UNFCCC) in the future [138].

Well-managed protected areas also play a critical role in mitigation and adaptation strategies to reduce the ecological and social vulnerability of local communities to the impacts of climate change, for example in West Africa (Box 5.3).

Box 5.3. Protected Areas Resilient to Climate Change (PARCC) in West Africa

PARCC West Africa, was a GEF-funded project, implemented by UNEP-WCMC, that focused on assessing the impacts of climate change on protected areas (PAs). The main objective of the project was to develop strategies and tools to increase the resilience of PAs to climate change, and build capacity in the region to implement these new approaches.

In the project, resilience of protected areas was defined as their ability to cope with climate change impacts in ways that maintain their essential functions and capacity for adaptation. A key aspect of protected area resilience is the capacity to retain biodiversity, which in the project was assessed in terms of the expected turnover of species in the future, taking into account both species' biological traits and spatial distributions.

After developing new regional climate projections for West Africa, the vulnerability of species and PAs to climate change was assessed through two complementary methodologies: Species Distribution Models and Traits-based Vulnerability Assessments. An analysis of the connectivity of the West African PA network also highlighted the importance of specific PAs and links between PAs. Based on these findings, systematic conservation planning was used at the national and regional level to help inform conservation priorities in the design of new PAs. Finally, adaptation strategies and policy recommendations were developed for climate adaptation and management at the national and regional level, as well as guidelines for managers of individual PAs in the face of climate change.

The results of the PARCC project have been integrated into the Protected Planet website, the web interface of the World Database on Protected Areas (WDPA), allowing access to all project outputs and the results of the vulnerability assessments for each individual West African protected area (http://parcc.protectedplanet.net).

The UN Framework Convention to Combat Desertification (UNFCCD) and the CBD both recognize that protected areas can play a key role in national strategies to combat desertification. Desertification is the degradation of land in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities [139]. **In 2014, 9% of the world's drylands fell within protected areas [140], many of which contain endemic species**. Through the regeneration and maintenance of vegetated ecosystems, protected areas can provide a buffer to i) desertification via vegetation-reduced wind speeds, hence reducing rates of aeolian topsoil removal, and ii) extreme climatic events and natural hazards such as flash floods (wetlands, floodplains) and landslides (forests) [141].

While the global protected area network alone is not sufficient for global climate change mitigation, it is clear that many protected areas act as effective carbon stores, while also maximizing provisioning ecosystem services that simultaneously support human well-being and enhance ecosystem resilience [142]. But these benefits depend on areas being well-managed and well-connected.

5.3. CONCLUSIONS

- While many of the benefits described above can arise from any natural ecosystem, protected areas are championed as efficient, successful and cost-effective tools for achieving the provision of essential ecosystem services under Target 14.
- Assessing the full range and value of services and benefits arising from protected areas remains fairly localized. Utilising and scaling-up of the growing suite of toolkits will be pivotal in enabling more accurate global assessments in the future.
- Protected areas contain significant global stores of carbon and can act as nodes for restoration efforts that further reduce the impacts of climate change (Target 15). Identifying and integrating areas of high carbon value into protected area planning will enable more targeted and effective protected area network design in the future.
- Protected areas act as buffers and barriers to processes such as desertification, a problem exacerbated by climate change and human pressures.

6. Strategic Goal E: Enhance the implementation through participatory planning, knowledge management and capacity building

6.1. INTRODUCTION

Strategic goal E aims to ensure that national biodiversity strategies and action plans have been developed and adopted as policy instruments so that they can be actively implemented (Target 17), promote traditional knowledge and local practices of indigenous and local communities that are relevant for conservation and sustainable use of biodiversity (Target 18), improve and share knowledge and biodiversity information (Target 19) and mobilize financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020. This chapter focuses on Targets 17, 18 and 20.

6.2. CONTRIBUTION OF PROTECTED AREAS TO GOAL E

Target 17: By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

As part of the Strategic Plan for Biodiversity 2011-2020, countries have submitted revised National Biodiversity Strategies and Action Plans (NBSAPs). Since COP-10, 101 Parties have submitted NBSAPs. Of these, 87 Parties submitted revised versions, 11 Parties submitted their first NBSAPs; 2 Parties submitted both their first NBSAP and a revised version; and 1 Party submitted an Action Plan to 2020 for enhancing implementation of its Strategy adopted before COP-10 (CBD, pers. comm. 2016).

A preliminary analysis of 45 revised NBSAPs indicated that protected areas are framed within NBSAPs as part of broad goals and objectives, as key aspects of national targets meant to translate the Aichi Biodiversity Targets into a national context, or as indicators useful for monitoring progress towards these targets. Several countries have developed robust protected areas strategies, including: Belarus, Benin, Cameroon, the Dominican Republic, Estonia, the Gambia, Georgia, Jordan, Kyrgyzstan, Mali, Moldova, Myanmar, Nepal, Nigeria, Niue, Peru, Serbia and the Seychelles. Box 6.1 provides an example of how, in the revised NBSAP of the Gambia, protected areas have been considered as having an overarching role in achieving a number of Aichi Biodiversity Targets.

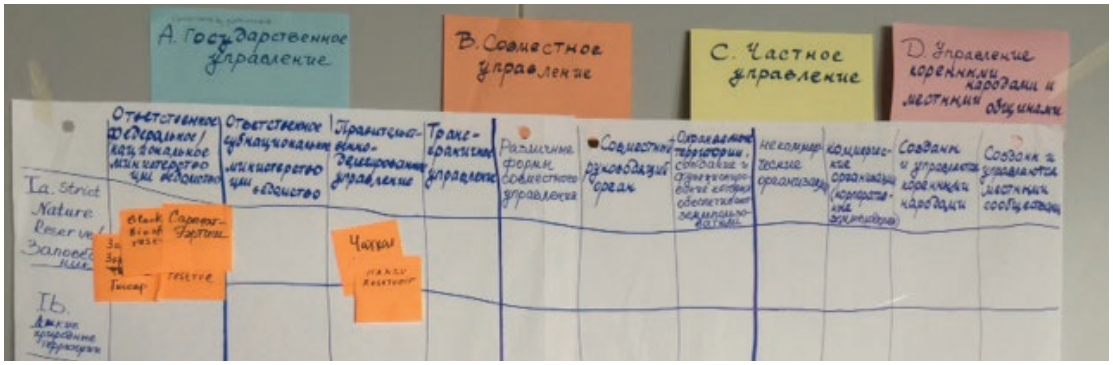
Box 6.1. The Gambia's revised NBSAP and protected areas

The Gambia's revised NBSAP (2015-2020) includes the adoption of **20 national biodiversity targets, gathered under five strategic goals**, which are aligned with the Strategic Plan for Biodiversity 2011-2020. These national targets will be implemented through a series of priority actions, many of which relate to protected areas and the elements of Aichi Biodiversity Target 11. Such actions include creating additional ecologically representative protected areas and ICCAs (Indigenous peoples' and community conserved territories and areas), and developing or updating management plans for existing protected areas.

The use of protected areas and OECMs will contribute to the implementation of several of the Gambia's national targets. For example, the protection of spawning and nursery grounds for fish and other aquatic species will be aided by the establishment of three new MPAs (**Target 6**). In addition, a 50% increase in the designation of wetlands is one aspect of maintaining the integrity and functioning of vulnerable ecosystems impacted by climate change (**Target 10**), while creating and managing connectivity corridors, and creating new protected areas in Highly Sensitive Ecological Zones, will help to protect known threatened and rare species (**Target 12**). The integration of conservation into the wider landscape through a "bio-rights" programme will help to provide alternative livelihoods for communities living adjacent to protected areas and reduce pressure on biodiversity (**Target 14**). Furthermore, the establishment of new protected areas and the expansion of existing ones will assist in maintaining ecosystem resilience and promote the contribution of biodiversity to carbon stocks (**Target 15**). Finally, some form of protected area, or other effective area-based conservation measure, could constitute some of the "legal and other measure[s]" being implemented to protect and preserve indigenous knowledge, innovations and practices, especially those essential for the conservation and sustainable use of biodiversity, while ensuring an equitable sharing of benefits (**Target 18**).

The Gambia recognizes the vital importance of biodiversity, and the ecosystem services it provides, to national development and poverty eradication, and thus the importance of protected areas and other effective area-based conservation measures in contributing to the well-being of its people.

Source: CBD Secretariat, pers. comm. 2016



Since the approval of the Strategic Plan for Biodiversity 2011-2020 in 2010, the Secretariat of the CBD has promoted its implementation through many capacity-building processes. For example, in order to facilitate the achievement of Aichi Biodiversity Targets 11 and 12, from August 2015 to September 2016, the CBD Secretariat, in collaboration with partner organizations, is reaching out to Parties through a series of regional capacity-building workshops to collect information on the status of the different elements of Aichi Biodiversity Targets 11 and 12, as well as focused actions for implementation that Parties will undertake in the next five years. To date 94 countries from Africa, Asia Pacific, Latin America and Caribbean, Central and Eastern Europe have identified 1485 priority actions (1347 actions for Target 11 and 138 actions for Target 12) addressing the elements of both targets. A preliminary analysis of the actions reveals that, *when implemented*, they will contribute to Aichi Biodiversity Targets 5, 6, 7, 9, 10, 12, 13, 14, 15, 18 and 20 directly, and 1, 2 and 19 indirectly. The Subsidiary Body on Scientific, Technical and Technological Advice at its twentieth meeting adopted recommendations to facilitate the implementation of these identified actions for consideration by the COP at its forthcoming 13th meeting (Box 6.2).

Box 6.2: Recommendations of the CBD Subsidiary Body on Scientific, Technical and Technological Advice for implementation of Aichi Biodiversity Target 11

The CBD Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), is an open-ended intergovernmental scientific advisory body that provides advice to the Conference of the Parties (COP) of the CBD and its other subsidiary bodies relating to the implementation of the Convention.

At its twentieth meeting, SBSSTA looked at the progress of implementation of Aichi Biodiversity Target 11, and agreed on several recommendations to the thirteenth meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP13) to be held in Cancun, Mexico, on 4 - 17 December 2016:

- **Implement actions in NBSAPs and address gaps identified through CBD regional workshops**. SBSSTA invited parties to implement actions identified in national biodiversity strategies and action plans (NBSAPs) and other relevant strategies and to address any gaps identified through the regional capacity-building workshops on achieving Aichi Biodiversity Targets 11 and 12 that were organised by CBD in 2015.
- **Support networks at the regional and sub-regional level, to build capacity and share knowledge**. SBSTTA also invited Parties, relevant partners, regional agencies and bilateral and multilateral funding agencies, to enable support networks at the regional and sub-regional levels, to increase capacity and sharing of technical guidance, best practices, tools, lessons learned and monitoring efforts.
- **Align GEF projects with national actions identified through NBSAPs and CBD regional workshops**: The Global Environment Facility (GEF) and its implementing agencies were invited to align the development and implementation of projects relating to protected areas and other effective area-based conservation measures in its sixth and seventh replenishment cycles with the national actions identified in NBSAPs and through the regional capacity-building workshops on achieving Aichi Biodiversity Targets 11 and 12. This could facilitate monitoring and reporting of the results of those projects and their contribution to the implementation of the National Action Plans for the achievement of Aichi Biodiversity Targets 11 and 12 and other related targets.

Source: CBD 2016 [143]

Target 18 By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

Throughout human history, indigenous peoples and local communities have managed biological resources for a multitude of reasons, including subsistence, respect for nature, and cultural and spiritual purposes. This local resource management predates modern notions of "protected areas" by millennia, and persists into the present day.

Indigenous peoples and local communities often manage their natural resources according to traditional knowledge passed down through generations. Areas conserved by indigenous peoples and local communities are referred to collectively as "indigenous peoples' and community conserved territories and areas" (ICCAs). ICCAs can often be considered protected areas (although some cannot, and others are not considered protected areas in line with the wishes of their custodians). The transfer of traditional knowledge, innovations and practices within ICCAs is one direct way in which protected areas contribute to Target 18.

In countries where there is a strong legislative and policy framework surrounding ICCAs, they have been shown to cover and conserve large areas. For example, in Namibia, where community-governed areas can be granted formal recognition, ICCAs span over 164,000 km² [9].

Lessons garnered from communities' conservation practices within their own territories can be applied to other protected areas, and engagement of local communities can improve conservation outcomes [144] (Box 6.3). **Indigenous peoples and local communities "*are often best placed to economically and optimally manage the local ecosystem, including protected areas*"** [145]. As such, their participation in formal protected areas is often vital for effective conservation.

Box 6.3: Protected areas and indigenous territories in the Amazon biome

The Amazon biome is widely recognised for integrating protected areas and indigenous territories, which are designated for reasons of indigenous peoples' rights that go well beyond, but often encompass, conservation. Since 2005, the combined area of protected areas and indigenous peoples' territories within the Amazon has grown by more than 500,000 km² (rising from 3.07 million km² to 3.62 million km²) – with indigenous territories contributing over half of the total area in 2016. As a result, the conservation network draws on a diverse background of traditional knowledge, innovations and practices. However, not all indigenous territories have had their rights respected, and not all of their territories have been duly recognized, demarcated and enforced. Consequently, the Amazon biome is suffering from increasing pressures. Protected areas, together with indigenous territories and other community conserved areas, are threatened by development projects, often resulting in their downgrading, downsizing or degazettement, usually without offsetting or compensation efforts [146]. To guarantee the role of indigenous territories as critically important for both people and nature, it is critical to fully recognize the rights of indigenous peoples and local communities in all Amazon countries, including the recognition of indigenous territories, community conserved areas and the sub-national political entities of the region.

Source: Charity *et al.* (2016) [137]

Many formal protected areas benefit, or could benefit, from traditional knowledge, innovations and practices. This is reflected in IUCN's principles of good governance for protected areas, which emphasise the need for engagement with all stakeholders and rights holders [10].

Target 20: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent on resources needs assessments to be developed and reported by Parties.

Mobilising resources to implement the full suite of Aichi Biodiversity Targets is a significant task. The OECD Development Assistance Committee reports that total bilateral official development assistance (ODA) commitments to biodiversity averaged an estimated US$5.6 billion per year (2011 to 2013), accounting for only about 4.5% of total ODA commitments. Furthermore, less than half of this amount (less than 2% of bilateral aid commitments) was committed to projects whose principal aim was biodiversity, which suggests that biodiversity is currently relatively low on the priority list in terms of uses of ODA resources. While this is not the only source of international finance for protected areas – for example **between 1991 and 2015, the GEF directly invested US$3.4 billion in 137 countries and leveraged an additional US$12.0 billion in co-financing towards non-marine interventions in protected areas, protected area systems and their adjacent landscapes – the estimated resource needs for a representative and well-managed protected area system are much higher, about US$34-79 billion per year** [71,147]. Filling the finance gap to meet all of the Targets will require scaling up financing from all sources, public and private, domestic and international.

The low levels of funding allocated for biodiversity conservation remains a universal concern. The advent of the Sustainable Development Goals provides a further opportunity to demonstrate the links between investments in protected areas and wider sustainable development objectives (see Chapter 7).

This approach to mainstreaming biodiversity is at the heart of the UNEP BIOFIN initiative, which aims to support countries in their financial planning to meet NBSAPs. Presently working with 30 countries, BIOFIN aims to identify gaps in financing to meet the Targets, including Target 11, and develop mechanisms to fill those gaps. The BIOFIN workbook cites research from Belize that identified current sources of protected area finance, including central government allocations (US$1.9 million), extra budgetary funding (US$2.4 million), local fees and concessions (US$3.8 million) and grants and other sources (US$2.6 million), and developed a strategy to increase revenues across these and other sources, recognising that finance needs were expected to double over the coming decade.

While the BIOFIN approach is relatively detailed, IIED and UNEP-WCMC's NBSAPs 2.0 project (which also focuses on the Targets as a whole rather than protected areas specifically) has produced a number of introductory guides that guide thinking about ways to embed biodiversity goals in development plans and build the business case to show the wider relevance of meeting them across different sectors.

Many of the other Targets offer direct and indirect opportunities for resource mobilisation for protected areas. For example, correcting perverse incentives through Target 3 could reduce resource needs for protected areas by reducing pressures to convert them to other uses. Similarly, improving the recognition of the wider benefits of protected areas, through Target 2, will help other sectors understand how they benefit from protected areas, thereby increasing their willingness to invest in them.

One way these connections could arise would be through the development of innovative finance mechanisms, such as payments for ecosystem services, fiscal reforms or the integration of biodiversity into climate change mitigation/adaptation investments. These mechanisms are designed to capture the impacts and dependencies of other sectors on biodiversity, or a willingness to pay for positive conservation outcomes, and therefore have the potential to contribute to the resilience of protected areas financing.

6.3 CONCLUSIONS

- Countries are making significant progress towards mainstreaming of protected and conserved areas into the wider landscape and seascape in relation to development. However, further work is required to identify and implement a specific set of actions for protected areas.
- Protected areas that respect and integrate traditional knowledge into governance and management measures are a key mechanism for the attainment of Target 18. This can be achieved by welcoming indigenous peoples and local communities into shared governance structures and management of formal protected areas, and by respecting, supporting and appropriately recognising the leadership and knowledge embedded in protecting their own areas and territories.
- The low levels of funding allocated for biodiversity conservation remains a universal concern. Assessing the full range and value of services and benefits arising from protected areas will strengthen support to, biodiversity financing mechanism and strategies for protected areas networks, including payments for ecosystem services, allocation of additional government budgets and financing through major development projects.

7. Protected areas and the Sustainable Development Goals

7.1 INTRODUCTION TO THE SUSTAINABLE DEVELOPMENT GOALS

On 25 September 2015, the United Nations General Assembly adopted a resolution, "Transforming our world: the 2030 Agenda for Sustainable Development" [148]. The 2030 Agenda is a "*plan of action for people, planet and prosperity, peace and partnership*" which all countries and stakeholders will implement collaboratively. The 2030 Agenda includes 17 Sustainable Development Goals (SDGs) and 169 specific targets that will guide decisions over the next 15 years.

The 2030 Agenda for Sustainable Development explicitly recognises that social and economic development depends on the sustainable management of natural resources. Biodiversity considerations are reflected across more than half of the Goals and targets, for example linking ecosystem health to human well-being (Goal 3), the delivery of clean water and sanitation (Goal 6), sustainable cities and communities (Goal 11), climate action (Goal 13) and sustainable management of life below water and life on land (Goals 14 and 15). The emphasis on the interlinkages between social protection, economic development and environmental health makes the 2030 Agenda truly integrated and supportive of better investment in natural resource management.

The SDGs complement the Aichi Biodiversity Targets well and are mutually reinforcing [149] (Box 7.1). This chapter highlights how protected areas can contribute towards the implementation and achievement of relevant targets of the 2030 Agenda for Sustainable Development and briefly summarises current information on the agreed indicators that use protected area information.

Box 7.1. The 17 Sustainable Development Goals and the Targets

The 17 Sustainable Development Goals set ambitious end points to achieve sustainable development by 2030. These include, inter alia, ending poverty and hunger, providing quality education and gender equality, ensuring clean water and energy for all, sustainable use of natural resources, reducing inequality, achieving sustainable cities and protecting life on land and in the seas.

Biodiversity conservation is explicitly considered as central to achieving these goals. The Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets therefore reinforce and complement the 2030 Agenda. A recent review of the links between the Aichi Biodiversity Targets and the 2030 Agenda for Sustainable Development [149] shows that all 20 Targets have links to the targets of the SDGs. At least 35 of the SDG agreed indicators across all but one goal have a direct relationship with the Aichi Biodiversity Targets, and 77% of these are considered to have a moderate to strong relationship with the SDGs.

Source: https://sustainabledevelopment.un.org and UNEP (2015) [149]

7.2 THE ROLE OF PROTECTED AREAS IN ACHIEVING THE SUSTAINABLE DEVELOPMENT GOALS

Protected areas deliver benefits that extend beyond their boundaries. They play a key role in achieving health, livelihoods and well-being; strengthening ecosystem restoration and resilience (Aichi Biodiversity Targets 14 and 15); and promoting positive contributions to local economies and reducing poverty (Aichi Biodiversity Target 2). Protected areas deliver natural solutions to numerous global challenges [110,118,120,150,139], including storing and sequestering carbon to mitigate climate change [133,151], helping communities and protected area managers cope with the increasing risk of natural disasters [141], and offering opportunities to engage women in management of protected areas (Box 7.2).

Box 7.2. Considering gender-related issues within protected areas and the delivery of SDGs.

By: United Nations Environmental Programme-Gender and Social Safeguards (GSSU)

"Inter-connectedness" is the essence of the SDG 2030 Agenda. It is widely accepted that poverty is multidimensional and that environmental changes are driven by society. Gender-related characteristics (including one's sex, age, marital status, sexual orientation and self-gender identity) interact with other features such as race, income level, literacy, nationality and geographical location. Decisions and the ability to make choices in life are shaped by gender. Therefore, gender defines the social relations and power balance between the sexes. This is why gender equality is a key central factor to consider in the achievement of any development goal. An environmental gender perspective entails focusing on women's and men's social roles and their relationship with each other and with natural resources [153]. **If gender is not taken into account in the delivery of the SDGs, environmental projects, policies and programmes can aggravate existing inequalities and produce inadequate long-term results. This is equally true in relation to protected areas**.

While the establishment of protected areas is an important strategy to conserve biodiversity, it is inevitably not gender-neutral. The interaction of people with the environment is influenced by gender roles and norms. The nexus between protected areas and gender could be two-fold:

First, women and men do not have the same opportunity to voice their concerns and influence decisions. Evidence suggests that countries with higher parliamentary representation of women are more likely to ratify environmental agreements and more likely to set aside areas of protected land [153]. Excluding women from participating in decision making in sustainable community forestry, for instance, can contribute to ineffective protection of forests. Staff at the Jaú National Park in Brazil carried out a gender appraisal in 1997. Several questions specific to the region were incorporated into the standard appraisal. One question addressed to women, "When was the last time you cooked...?" yielded a wealth of information about game and fish consumption. This question was followed by a list of possible animals or aquatic products. Since women are responsible for food preparation and distribution, the data provided by women about consumption, variety and frequency by season are far more complex and thorough than the information provided by men. In addition, some men, as hunters or fishermen, were reluctant to answer the questions for fear of retaliation [154]. Thus, biodiversity conservation can benefit from existing local knowledge and experience by involving both men and women in decision-making at all levels.

Second, men and women may not be able to benefit from protected areas equally, based on their different decision-making power and societal roles. Generally, women have lower levels of ownership of and access to land. Insecurity in regards to land tenure has an effect on how much time women and men are willing to spend on sustainable development practices [155]. Ensuring that both women and men benefit through financial returns from ecotourism, land taxation relief, etc., is likely to enhance protection and conservation of natural resources within protected areas.

Protected areas are essential for sustainable development and therefore are a fundamental mechanism to help meet many of the SDGs. Table 7.1 shows some selected examples that emphasize their role.

Table 7.1. *Selected examples of how protected areas (PAs) contribute to the Sustainable Development Goals.*

Sustainable Development Goal	Protected area contribution (selected examples)
	More than 1.1 billion people depend on PAs for a significant percentage of their livelihoods [128].
	The European Natura 2000 network supports important agricultural practices and agro-ecosystems, representing 38% overall of the total area included in Natura 2000 [156].
	Physical activity within Victorian Parks in Australia has resulted in health cost savings of about AU$200 million. The Langtang National Park in Nepal is home to 411 species of medicinal plants [126].
	PAs provide a significant proportion of the drinking water for a third of the world's 105 largest cities [119].
	Terrestrial PAs are estimated to receive about 8 billion visits per year globally, generating approximately US$600 billion/year in direct in-country expenditure and US$250 billion/year in consumer surplus [13].
	Between 2000 and 2005, unprotected humid tropical forests lost about twice as much carbon to deforestation as the same area of protected forest [151]. The flood prevention value of Mantadia National Park in Madagascar was valued at US$126,700 in 1997 (when per capita GDP was $207) [126].
	Conserving 20-30% of global oceans in marine PAs could create 1 million jobs, sustain fish catch worth US$70–80 billion/year and provide ecosystem services with a gross value of roughly US$4.5–6.7 trillion/year [157].
	In many of the world's major biomes, PAs represent a significant land use – PAs cover almost 21% of the world's major inland water types, 20% of the world's natural forests, 19% of the world's mountain area, 17% of the world's island area, and 13% of the world's dryland area [2].The Living Planet Index (LPI) in terrestrial PAs has declined by less than half the rate of decline of the LPI across all terrestrial areas globally [116].

Protected areas will also make an important contribution to the Sustainable Development Goals through the Promise of Sydney. The Promise of Sydney, which was the main outcome from the IUCN World Parks Congress 2014, held in Sydney in 2014 (Box 1.1), considers a number of actions that will contribute to the implementation of the Strategic Plan for Biodiversity 2011-2020, as well as at least 12 of the Sustainable Development Goals (Table 7.2).

Table 7.2. *Specific recommendations and commitments from Promise of Sydney to accelerate implementation of the Strategic Plan for Biodiversity 2011-2020 and to make significant contributions towards at least 12 of the 17 Sustainable Development Goals*

Achieving SDGs 6, 14, 15 through Parks	Protected Area Progression	Increase of investment to achieve /maintain conservation outcomes
	Priority Locations	Situate PAs in priority areas to reduce biodiversity loss and prevent extinction
	Quality Protected Areas	Greater emphasis on effectively achieving both biodiversity conservation and social outcomes rather than percentage targets
	Performance Standards	Increased professional capacity and greater efforts to develop, apply and verify IUCN Green List of Protected Areas Standards
Achieving SDGs 4, 5, 10, 12, 16 through People	Protected Area governance	Stronger, more supportive legal and policy frameworks recognizing and including areas conserved by private actors, indigenous peoples and local communities
	Human Rights Agreements	Strengthen agreements to respect human rights and embrace equitable sharing of costs and benefits of protected and conserved areas.
	Resource exploitation	Establish clear limits of unsustainable natural resource exploitation - "no-go" policies and non-regression principles
	Awareness	Comprehensive programme to connect urban communities, young people and other groups to nature
Achieving SDGs 2, 3, 6, 11, 13 through Planet	Mainstream Protected Areas	Include in development strategies; promote as natural solutions to climate change through their values, functions and services
	Improve health and wellbeing	Strengthen policy and practice to promote role of nature and address universal right to nature
	Support human life	Strengthen land, water and marine spatial planning to enhance role and impact of PAs on food, water and livelihoods
	Development	Incorporate role of PAs for achieving SDGs in environment, governance and land-use planning frameworks; integrate PA values into economic accounting.

7.3. PROTECTED AREA INDICATORS FOR THE SUSTAINABLE DEVELOPMENT GOALS

As with the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets, the SDGs are to be implemented at a national level, with each government deciding how to best incorporate these global targets in national planning processes, policies and strategies. Global trends in achieving the goals will be assessed through a suite of indicators developed by the Inter-Agency and Expert Group on SDG Indicators (IAEG-SDGs) and agreed by countries [158]. It is recognized that baseline data for several of the targets remain unavailable, and support for strengthening data collection and capacity building to develop national and global baselines where they do not exist will be extremely important in measuring progress towards achieving these goals indirectly.

While protected areas have indirect relevance to the implementation of actions to achieve many of the SDGs, three specific protected area indicators have been agreed by the IAEG-SDGs using the World Database on Protected Areas (WDPA) to track progress towards Goals 14 and 15 (Table 7.3). These indicators combine global data on protected areas and Key Biodiversity Areas (KBA) to assess the extent and trends in protected area coverage over time for KBA (see Target 11 in Chapter 4) that are completely covered by protected areas.

Table 7.3. *SDG indicators agreed by the Inter-Agency and Expert Group on SDG Indicators (IAEG-SDGs) that use data from the World Database on Protected Areas (WDPA) and the World Database of Key Biodiversity Areas (WDKBAs).*

Sustainable Development Goal	SDG Target	SDG Indicator
Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development.	14.5 By 2020, conserve at least 10% of coastal and marine areas, consistent with national and international law and based on the best available scientific information.	14.5.1 Coverage of protected areas in relation to marine areas
Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.	15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements. 15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development.	15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type 15.4.1 Coverage by protected areas of important sites for mountain biodiversity

The first baseline analysis for these three indicators [159] reveals that the percentage of marine, freshwater, terrestrial and mountain KBAs completely protected increased dramatically between 1990 and 2000, but growth has slowed down since 2006 (Figure 7.1, see also Target 11 in Chapter 4). This growth has been more pronounced in the marine realm, where protection has increased by 25% in the past 15 years. KBAs in mountains have the highest coverage, with one in five sites completely protected. Terrestrial and marine KBAs have a similar level of protection, with 19.3% of sites completely covered by protected areas, while this proportion is lower in freshwater KBAs, with 16.6%. For all four subsets, the level of protected area coverage of KBAs is higher in developed than in developing regions.

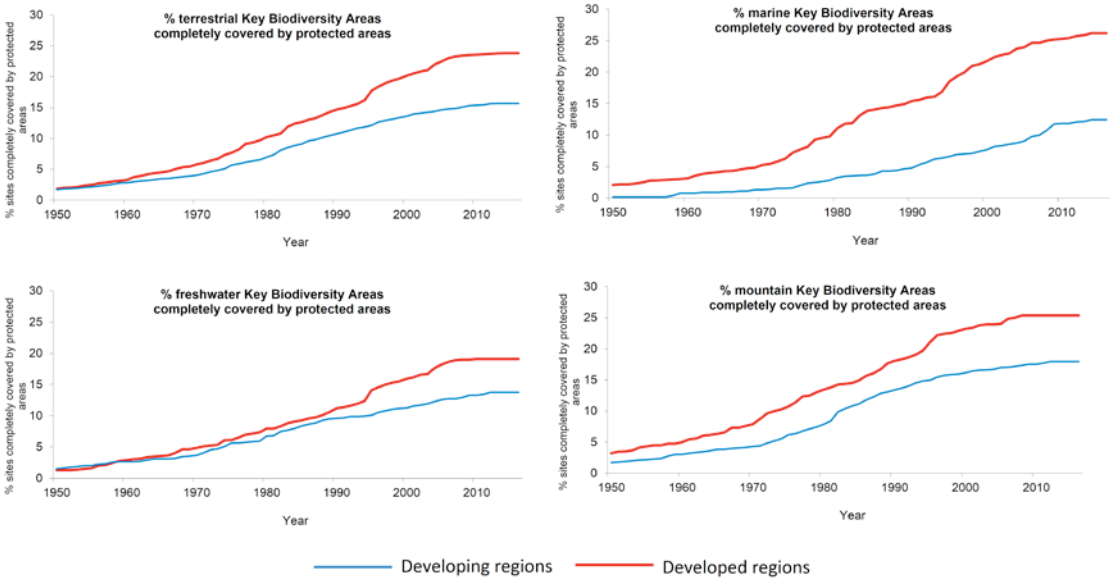


Figure 7.1. *Trends in percentage of important sites (Key Biodiversity Areas) for terrestrial, freshwater, marine and mountain biodiversity in developed and developing regions that are completely covered by protected areas. Source: BirdLife International, IUCN and UNEP-WCMC 2016 .*

7.4. CONCLUSIONS

- The Sustainable Development Goals and the Aichi Biodiversity Targets are complementary and mutually supportive. National and regional development strategies should consider these links to enhance implementation of actions that target sustainable development and biodiversity conservation simultaneously.
- Protected areas have played and will continue to play a key role in the achievement of the Sustainable Development Goals. There are many examples highlighting the important role of protected areas beyond their primary role of achieving biodiversity conservation. They can contribute to most of the SDGs, specifically to poverty reduction, water delivery and food security, climate change mitigation and adaptation, and sustainable consumption and production.
- Currently three protected areas indicators are used to track progress towards the achievement of SDGs 14 and 15. These show that, despite the growth of protected areas in the past decade (Target 11 in Chapter 4), important sites for terrestrial (19.3%), freshwater (16.6%), marine (19.3%) and mountain (20%) biodiversity are completely covered by protected areas.

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