Independent Evaluation Office

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GLOBAL ENVIRONMENT FACILITY

Impact Evaluation of GEF Support to Protected Areas and Protected Area Systems

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FULL REPORT

GLOBAL ENVIRONMENT FACILITY
INDEPENDENT EVALUATION OFFICE

Impact Evaluation of GEF Support to Protected Areas and Protected Area Systems

FULL REPORT

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Cover photo. When communities dependent on forests are involved in protected area management, the impacts of GEF support have greater chances of being sustained; Kibale National Park, Uganda, by Jeneen R. Garcia.

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FOREWORD

The Global Environment Facility (GEF) has been the major source of financial and technical support for countries seeking to conserve their biodiversity and use their biological resources in a sustainable manner. Since 1991, the GEF has, in collaboration with its Implementing Agencies—notably the United Nations Development Programme (UNDP) and the World Bank—provided $4.8 billion in grants and mobilized an additional $17.9 billion in cofinancing from public, multilateral, and private sources to 1,167 projects supporting countries in biodiversity conservation initiatives. These investments have largely supported interventions in nonmarine protected areas (PAs), PA systems, and adjacent landscapes.

This evaluation assesses the impact of GEF investments in nonmarine PAs and PA systems. It defines impact, in accordance with the Development Assistance Committee of the Organisation for Economic Co-operation and Development, as the "positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended." The evaluation analyzes the extent to which the management and governance approaches supported by the GEF have led to the achievement of GEF objectives on biodiversity conservation and sustainable use. It probes into how future support can best contribute to the conservation and sustainable use of biodiversity by assessing the factors and conditions that affect the interaction between human livelihood objectives and biodiversity objectives. It also looks at the extent to which GEF support has promoted human well-being as a key contribution to the effective management of PAs and their immediately adjacent landscapes.

When information was available, the analysis included evidence comparing supported areas with those lacking such support or receiving other types of intervention. The evaluation explored new methods and approaches to assess the impact of GEF support, several of which have been incorporated into other GEF Independent Evaluation Office evaluations. It is so far the most comprehensive global evaluation undertaken on the impact of PAs on biodiversity, in terms of the diversity of methods used and the scope of inquiry.

While the evaluation covers all relevant operations supported by the GEF through all its Agencies, the independent evaluation offices of the GEF and UNDP have undertaken this evaluation jointly.

This is the fourth impact evaluation addressing a specific focal area undertaken by the GEF Independent Evaluation Office. For the UNDP Independent Evaluation Office, this constitutes the first impact evaluation of UNDP programming, and builds on the findings and conclusions of a thematic evaluation focused on the nexus of issues linking UNDP poverty and environmental protection support to countries. The approach paper was approved by the directors of both offices in June 2013. Field visits were conducted from April to early June 2014, but the evaluation considered secondary information collected until the end of September 2015.

The independence of the two evaluation offices precludes any general conflict of interest. Both offices adhere to evaluation policies and codes of conduct that deal with conflict of interest issues. Other specific measures taken to prevent conflict of interest include: (1) consultants responded to the joint team managing the evaluation; (2) a Technical Advisory Group was established comprised of a representative of the World Bank's Independent Evaluation Group and three biodiversity and social science experts; and (3) UNDP evaluators refrained from evaluating GEF projects in which UNDP was not involved, and GEF evaluators did not evaluate UNDP projects outside of the GEF partnership.

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ACKNOWLEDGMENTS

The evaluation was co-managed by Aaron Zazueta, Chief Evaluation Officer of the Global Environment Facility (GEF) Independent Evaluation Office (IEO), and Alan Fox, Evaluation Advisor at the United Nations Development Programme (UNDP) IEO. Core evaluation team members were Jeneen R. Garcia, Anupam Anand, and Inela Weeks. The evaluation Steering Committee was composed of Rob van den Berg, then Director of the GEF IEO; Indran Naidoo, Director of the UNDP IEO; and Juha Uitto, then Deputy Director of the UNDP IEO (and now Director of the GEF IEO).

In addition to the analyses performed by the core team, phases of specific analyses were performed in collaboration with the Global Land Cover Facility at the University of Maryland, the U.S. National Aeronautics and Space Administration, the International Union for Conservation of Nature World Commission on Protected Areas–Species Survival Commission (IUCN WCPA-SSC) Joint Task Force on Biodiversity and Protected Areas, the Institute of Development Studies, and the National Commission for Knowledge and Use of Biodiversity of Mexico (CONABIO).

The Technical Advisory Group included Marie Gaarder, Manager, World Bank Independent Evaluation Group; Kent Redford, independent consultant; Marc Hockings, Professor, University of Queensland; and Dan Weiner, professor, University of Connecticut. A Reference Group consisting of members from the GEF Secretariat, GEF Agencies, and the GEF Scientific and Technical Advisory Panel working in the biodiversity focal area was convened at key stages of the evaluation to provide expert opinion and information, as well as technical feedback and verification. Critical logistical support and information were provided by the GEF focal points; national and local government staff; GEF Agencies; civil society organizations; communities; and other stakeholders in Colombia, Indonesia, Kenya, Mexico, Namibia, Uganda, and Vietnam during the case study missions.

The following people contributed to the evaluation in roles such as carrying out some of the analyses, case studies, and research; and facilitating access to global data sets: Megan Barnes, Barbara Befani, Sumalika Biswas, Gill Bunting, Saurabh Channan, Gloria Cheche, Ian Craigie, Min Feng, Jonas Geldmann, Brian Jones, Malac Kabir, Muhammad Najeeb Khan, Do-Hyung Kim, Tim Lamrock, Jeff McNeely, Katherine A. Melocik, Agrippinah Namara, Susana Rojas, Joseph Owen Sexton, Dan Slayback,

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The GEF IEO and the UNDP IEO are grateful to these institutions and individuals for their contributions to the evaluation, but take full responsibility for its contents.

EXECUTIVE SUMMARY

BACKGROUND

This evaluation assesses the impact of Global Environment Facility (GEF) investments in nonmarine protected areas (PAs) and PA systems on biodiversity conservation and sustainable use.[1] It is the fourth impact evaluation conducted by the GEF Independent Evaluation Office (IEO) addressing a specific focal area. The IEOs of the GEF and the United Nations Development Programme have undertaken this evaluation jointly, with the directors of both offices approving the approach paper in June 2013. The evaluation combines new methods and approaches to assess the impact of GEF support.

The evaluation had three overarching questions:

- What have been the **impacts and contributions** of GEF support (positive or negative, intended or unintended) in biodiversity conservation in PAs and their immediately adjacent landscapes?
- What have been the contributions of GEF support to the **broader adoption** of biodiversity management measures at the country level through PAs and PA systems, and what are the key factors at play?
- Which GEF-supported approaches and contextual conditions, especially those affecting human well-being, are most significant in enabling and hindering the **achievement of biodiversity management objectives** in PAs and their immediately adjacent landscapes?

To answer these questions, data collection and analysis were divided into three components: portfolio analysis, global analysis, and case study analysis. Each component used different methods and units of analysis to account for the multiple scales and interventions by which GEF support was delivered.

1 These include projects that had terrestrial PA components even if they also addressed marine issues. "Nonmarine" is defined as including terrestrial, freshwater, and coastal ecosystems, which have terrestrial components. Projects addressing only marine concerns were excluded from the analysis. Assessing biodiversity protection impacts in marine PAs is also important, and was done as part of the Impact Evaluation of GEF Support to International Waters in the South China Sea and Adjacent Areas. This separation of focus has allowed the GEF Independent Evaluation Office to identify the critical factors that contribute to and hinder the achievement of impact in coastal and marine ecosystems.

- The **portfolio analysis** component included 618 projects in 137 countries, from which 1,292 GEF-supported PAs were identified. In-depth analysis was also undertaken on 191 completed projects.

- The **global analysis component** measured outcomes using forest cover (geospatial analysis of 580 PAs in 73 countries), wildlife populations (88 species in 39 PAs), and Management Effectiveness Tracking Tool (METT) scores (2,440 METT assessments from 1,924 PAs in 104 countries) as indicators.

- The **case study analysis component** included interviews and field visits were carried out in 7 countries across three regions, covering 17 GEF-supported PAs and 11 non-GEF PAs.

The evaluation encountered three main challenges and limitations: substantial information gaps on GEF support, limited time-series data, and difficulties in establishing counterfactuals. To mitigate the gaps and systematic biases in the data sets, the evaluation used a mix of quantitative, qualitative, and spatial methods in data collection and analysis. Evidence was also collected from a mix of sources, combining global data sets, field data, literature reviews, and statistical models. Broader conclusions were drawn only after comparing results from these different types of evidence and methods of analysis. Through the use of mixed methods and triangulation of findings, directions and patterns regarding the extent of the GEF's contribution toward biodiversity conservation were identified, along with its interaction with the larger social-ecological system.

From the start, the evaluation team took a multidisciplinary approach and reached out to different institutions and individuals with the necessary capacities. A technical advisory group was established, composed of a representative of the World Bank Independent Evaluation Group, and three biodiversity and social science experts as peer reviewers of the analyses. A reference group—consisting of members from the GEF Secretariat and GEF Agencies working in the biodiversity focal area—was convened at key stages of the evaluation to provide expert opinion and information, as well as technical feedback and verification. To ensure access to the most up-to-date global data and technology, analyses were performed in collaboration with the Global Land Cover Facility at the University of Maryland, the U.S. National Aeronautics and Space Administration, the International Union for Conservation of Nature World Commission on Protected Areas–Species Survival Commission Joint Task Force on Biodiversity and Protected Areas, and the Institute of Development Studies.

CONCLUSIONS

The evaluation reached the following conclusions.

Conclusion 1: Loss of global biodiversity continues at an alarming rate, driven largely by habitat loss due to multiple development pressures. Since the pilot phase, GEF strategies have increasingly targeted these development pressures beyond PAs.

Conclusion 2: GEF support is contributing to biodiversity conservation by helping lower habitat loss in PAs as indicated by less forest cover loss in GEF-supported PAs compared to PAs not supported by the GEF.

GEF-supported PAs also generally show positive trends in species populations and reduced pressures to biodiversity at the site level.

Conclusion 3: GEF support has helped build capacities that address key factors affecting biodiversity conservation in PAs, mainly in the areas of PA management, support from local populations, and sustainable financing. Sustainable financing of PAs remains a concern.

Conclusion 4: GEF support is contributing to large-scale change in biodiversity governance in countries by investing in PA systems, including legal frameworks that increase community engagement. Through interventions at the PA level, GEF support is also helping catalyze gradual changes in governance and management approaches that help reduce biodiversity degradation.

Conclusion 5: While sharing important characteristics with governments and other donors, GEF support allows adaptability and higher likelihood of broader adoption in cases where it pays particular attention to three key elements in combination: long-term engagement; financial sustainability; and creation of links across multiple approaches, stakeholders, and scales.

OPPORTUNITIES AND RECOMMENDATIONS FOR ACHIEVING GREATER IMPACT

In addition to having identified areas of strength in GEF support to PAs, the evaluation also identified five areas of opportunity with corresponding recommendations that will help achieve and demonstrate greater impact of GEF projects. Some of these areas are straightforward, and thus recommendations are specific. But in other cases, the challenges are complex, with no one solution and with several dimensions that need to be tackled simultaneously. In these cases, some specific actions that could be initially taken are presented. All were found to be critical for developing better ways to address the challenges driving biodiversity degradation, and to assess the extent to which the GEF is supporting approaches that create global environmental benefits.

Recommendation 1: Ensure best targeting of GEF support by using geospatial technology combined with the latest scientific criteria for site selection. The GEF must continue to pursue best methods to ensure that its support is targeted toward globally significant sites with high biodiversity values, and that support extends to more of these sites. As it has consistently demonstrated, the GEF must also continue to adopt the most rigorous scientific criteria in selecting areas for investment, integrating new and more appropriate criteria such as climate change vulnerability as they are developed.

Going forward, the GEF should consider the following:

- Include not only biodiversity values as criteria, but also increasingly important considerations such as climate change vulnerability and ecological impacts of climate change. Geospatial information and technology can be used when prioritizing and approving projects.
- Use recently developed technologies that are capable of integrating multiple sources of data and types of criteria (e.g., key biodiversity areas, species richness,

climate change vulnerability), and that allow for more systematic and rigorous analysis for allocating investments in areas important for global environmental benefits.

Recommendation 2: Mitigate unequal distribution of costs and benefits to local communities. At the project level, during design and implementation, the GEF needs mechanisms to ensure that future projects reach full compliance with its social safeguards. The GEF needs to expand benefit sharing across a wider cross-section of affected local populations and better mitigate the unequal distribution of costs and benefits of PA management interventions, such as those arising from geographical and socioeconomic differences among and within communities adjacent to PAs. The aim should be to reduce local pressures on biodiversity stemming from adverse local socioeconomic conditions.

Recommendation 3: Coordinate with mandates beyond environmental sectors to address large-scale drivers. The GEF should invest more in interventions that enable dialogue and joint decision making not only among multiple stakeholders in and around PAs, but also stakeholders representing different sectors and operating at different scales, which tend to have conflicting development priorities and management objectives with regard to biodiversity conservation. At a minimum, these would be stakeholders involved in environmental protection, natural resource use, economic development, and infrastructure development; this would be especially important for those involved in mining, agriculture, energy, tourism, and security, among others.

Recommendation 4: Streamline project reporting requirements. The GEF should ensure that basic information on its support to PAs (where, what, and when) is available historically and into the future. At the same time, it needs to reduce the reporting burden on projects, countries, and Agencies by adopting a mixed methods approach to results monitoring that draws on geospatial technology, global databases, and locally gathered information.

The GEF needs to ensure that basic information on GEF support to PAs (where, what, and when) historically and into the future is available. At the same time, the GEF needs to reduce the burden on projects, countries, and Agencies by adopting a mixed-methods approach to results monitoring that draws on geospatial technology, global databases, and locally gathered information. Some of this information would still need to be generated by projects, but more attention should be given to opportunities where use of remote sensing information and other global databases is appropriate.

This streamlining of project reporting requirements is likely to be a complex process that will take time and consultation with the various GEF partners. The following are specific actions that could be taken in the short term. In combination, they could reduce reporting requirements, while making the data more useful to meet monitoring objectives at the global, country, and PA levels:

- Through documents submitted at project approval and completion, ensure that existing databases within the GEF Secretariat include, at the minimum, basic

information on GEF support to PAs (where, what, and when).

- Institutionalize the use of geospatial technology for project and portfolio monitoring when applicable.

- Streamline METT reporting requirements to focus on information that can be used in conjunction with existing global data sets and geospatial data to perform meaningful analyses on management effectiveness and biodiversity impacts at the global level. At the same time, support countries in adapting the METT to make it more appropriate to their capacities and information needs. This will help build country capacity in monitoring parameters they find useful for improving biodiversity conservation management within their own context, while providing key information for comparison and analysis at the global level.

- Establish long-term partnerships with country institutions that already have biodiversity and socioeconomic monitoring as their mandate. This will allow results of GEF projects within a country to be monitored consistently and analyzed periodically before, during, and beyond the life of a project. Local and national databases developed through these partnerships can then feed into global databases. The focus should initially be on countries with the largest biodiversity System for Transparent Allocation of Resources (STAR) allocations and established capacities.

- Establish partnerships with research institutes or agencies that specialize in biodiversity data management and can regularly provide geospatial information or other global information relevant to GEF support to biodiversity, including data on PA attributes and locations, species range maps, forest change data, and population time-series data.

Recommendation 5: Create a program for learning what works, for whom, and under what conditions The GEF partners—including the IEO, the Secretariat, the Scientific and Technical Advisory Panel, and the Agencies—should jointly develop and implement a program that will generate evidence on what works, for whom, and under what conditions.

An evidence base can be built by drawing on a mix of methods and approaches appropriate to the types of interventions and contexts in which GEF support is being delivered. This evaluation has identified three critical areas in which the GEF has extensive experience over time, and in which better knowledge would significantly enhance the support the GEF provides to countries:

- How to more fully and equitably address local livelihood needs in ways that contribute to or do not undermine biodiversity conservation and sustainable use

- How to catalyze the changes needed for biodiversity conservation and sustainable use to take place at a large scale

- How to support biodiversity conservation and sustainable use in ways that produce multiple environmental and socioeconomic benefits

ABBREVIATIONS AND ACRONYMS

BMCT	Bwindi Mgahinga Conservation Trust
CBD	Convention on Biological Diversity
CONANP	National Commission of Natural Protected Areas (Comisión Nacional de Áreas Naturales Protegidas)
CSO	civil society organization
GEF	Global Environment Facility
ICB	Institutional Capacity Building
ICEMA	Integrated Community-Based Ecosystem Management
IEO	Independent Evaluation Office
IUCN	International Union for Conservation of Nature
METT	Management Effectiveness Tracking Tool
NAMPLACE	Namibia Protected Landscape Conservation Areas
NGO	nongovernmental organization
OPS	overall performance study
PA	protected area
PAMSU	Protected Areas Management and Sustainable Use
SGP	Small Grants Programme
SPAN	Strengthening the Protected Area Network
SINAP	National System of Natural Protected Areas (Sistema Nacional de Áreas Protegidas)
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USAID	U.S. Agency for International Development
WWF	World Wildlife Fund

CHAPTER 1

EVALUATION APPROACH AND METHODS

OBJECTIVE AND KEY QUESTIONS

This evaluation assesses the impact of Global Environment Facility (GEF) investments in nonmarine protected areas (PAs) and PA systems.[1] This evaluation adopts the Organisation for Economic Co-operation and Development's Development Assistance Committee definition of impact as the "positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended" (OECD DAC 2002). The evaluation analyzes the extent to which the management and governance approaches supported by the GEF have led to the achievement of GEF objectives on biodiversity conservation and sustainable use. The evaluation probes into how future support can best contribute to the conservation and sustainable use of biodiversity by assessing the factors and conditions that affect the interaction between human livelihood objectives and biodiversity objectives. In addition, it looks at the extent to which GEF support has promoted human well-being as a key contribution to the effective management of PAs and their immediately adjacent landscapes. When information was available, the analysis included evidence comparing supported areas with those lacking such support or receiving other types of intervention. It adopts a multidisciplinary, mixed-methods approach to assess the complex nature of GEF interventions and address data gaps.

The evaluation had three overarching questions:

- What have been the **impacts and contributions** of GEF support (positive or negative, intended or unintended) in biodiversity conservation in PAs and their immediately adjacent landscapes?
- What have been the contributions of GEF support to the **broader adoption** of biodiversity management measures at the country level through PAs and PA

1 These include projects that had terrestrial PA components even if they also addressed marine issues. "Nonmarine" is defined as including terrestrial, freshwater, and coastal ecosystems, which have terrestrial components. Projects addressing only marine concerns were excluded from the analysis. Assessing biodiversity protection impacts in marine PAs is also important, and was done as part of the Impact Evaluation of GEF Support to International Waters in the South China Sea and Adjacent Areas. This separation of focus has allowed the GEF Independent Evaluation Office to identify the critical factors that contribute to and hinder the achievement of impact in coastal and marine ecosystems.

systems, and what are the key factors at play?

- Which GEF-supported approaches and contextual conditions, especially those affecting human well-being, are most significant in enabling and hindering the **achievement of biodiversity management objectives** in PAs and their immediately adjacent landscapes?

EVALUATION SCOPE

The assessment of the impacts of GEF support on global biodiversity encompasses many complex aspects. An important challenge in this regard was to set an appropriate scope to ensure that findings would be specific enough to be meaningful, yet representative enough to have relevance across the global reach of GEF work in this sector. The final approach paper reflects the decision to focus on PAs that included terrestrial, freshwater wetlands, and coastal ecosystems, but that excluded purely marine ecosystems. For the purpose of this evaluation, these are referred to as "nonmarine PAs." They were selected because more information was available for assessing changes in biodiversity over the long term, and for comparing GEF-supported areas with areas that did not receive support. A total of 618 projects involving nonmarine interventions in PAs and PA systems comprise the evaluand.[2] Both biodiversity focal area and multifocal area projects are considered in the evaluation. While the evaluand spans the period of GEF support from 1991 to April 2015, projects included in most of the analyses have been completed or are well under implementation, and were therefore designed or completed before formulation of the GEF-5 (2010–14) Biodiversity Strategy 1 and the GEF-6 (2014–18) Program Directions. Nonetheless, there has been sufficient continuity in the strategies and the support provided by the GEF (see chapter 4) to warrant examination of the extent to which GEF support since 1991 has contributed to the GEF's current strategies and to draw lessons relevant to these future directions. Field visits were conducted from April to early June 2014, but the evaluation considered secondary information collected until the end of September 2015.

GEF support to biodiversity conservation has historically been complex in nature, with different types of interventions delivered at multiple scales, and often through several projects over time. As such, assessing the impact of interventions on biodiversity presents evaluative challenges related to multiple causal chains interacting across geographic and administrative scales that are often mismatched. There are also differences in time scales between the implementation of GEF-supported interventions, and the corresponding responses in human behavior and natural systems. As a consequence, attribution of outcomes to GEF-supported interventions is difficult. The effect of other actors that contribute to the same outcomes further complicates attribution. Moreover, these factors typically produce nonlinear effects in the interacting ecological and social systems (Mayn 2001; Zazueta and Garcia 2014).

To address these challenges, the evaluation adopted a framework to help identify the key contributions of GEF-supported interventions in relation to the interactions with

2 Based on GEF Project Management Information System data as of April 22, 2015.

other elements, processes, and conditions affecting biodiversity in PAs.

THEORY-BASED FRAMEWORK FOR ASSESSING IMPACT

A theory-based evaluation designs its questions around an intervention's theory of change, or the logic or chain of causality of how the intervention is expected to lead to the desired impacts (Fitz-Gibbon and Morris 1996; Weiss 1972). An intervention's theory of change consists of a series of propositions or assumptions of how an intervention will affect change. Theories of change are not always made explicit during project design, requiring their subsequent reconstruction by evaluators. Within the context of the evaluation of GEF support, van den Berg and Todd (2011) and Garcia and Zazueta (2015) emphasize the need to go beyond project boundaries to assess how the GEF has made an impact in the larger scheme of things, and to identify both positive and negative unintended consequences of GEF-supported interventions. The theory of change is used in this evaluation as a heuristic to help focus evaluation inquiries into the complex processes with which GEF support engages.

Based on a review of the literature, the evaluation team's previous field experience, and consultation with biodiversity scientists, the evaluation adopted a theory of change (figure 1.1) to trace the extent to which GEF support contributes to conditions that lead to an improved biodiversity conservation by restoring, stopping, or reducing the loss of biodiversity.[3] The theory of change adopted in this evaluation draws from recent approaches to biodiversity conservation, such as the Aichi Biodiversity Targets, which point to the need to integrate social and ecological dimensions.[4]

The evaluation's theory of change assumes that improvements in biodiversity conservation will take place when:

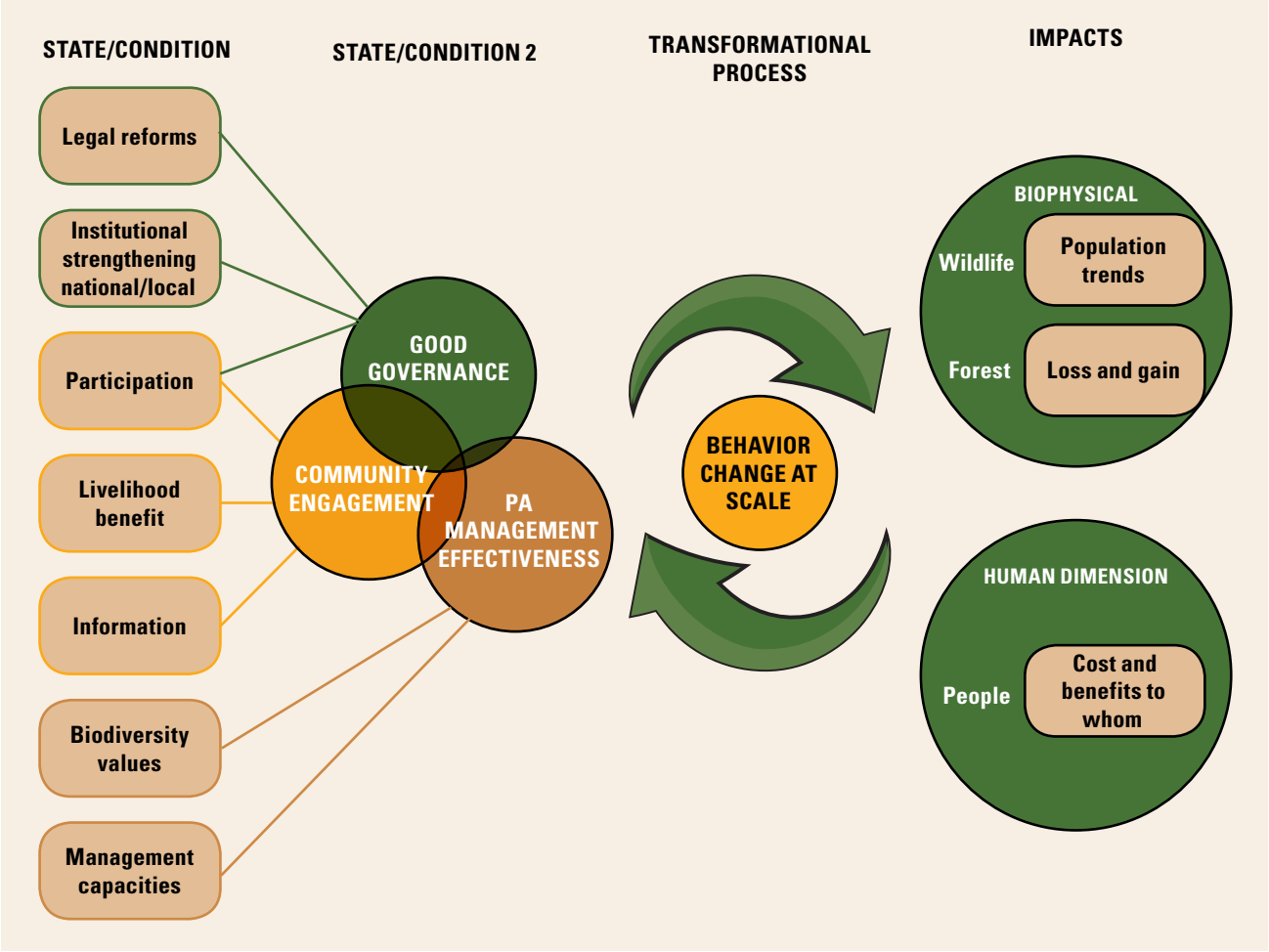
- adequate and appropriate capacities for PA management are in place and operational;
- local communities in or around PAs are engaged in decision making and natural resource management activities that meet conservation and livelihood goals;
- a robust PA governance system is in place that ensures compliance across scales, and which can influence drivers stemming from larger scales, as well as pressures operating at the local level.

The task of the evaluation is to analyze the extent to which these three conditions are leading to biodiversity conservation, and assess the contributions that GEF support has made to bring about these conditions, as well as assess other consequences of

3 The theory of change adopted by the evaluation is based on the general framework developed by the GEF Independent Evaluation Office during the course of the Impact Evaluation of GEF Support to International Waters in the South China Sea and Adjacent Areas and is currently being used in other Office evaluations. Additionally, the starting point for the present evaluation's theory of change is a model developed by the Office as part of the GEF Fifth Overall Performance Study (OPS5) delineating the chains of causality contained in Objective 1 of the GEF-5 biodiversity focal area.

4 These targets are spelled out on the Convention on Biological Diversity website, https://www.cbd.int/sp/targets/.

FIGURE 1.1 FRAMEWORK FOR ASSESSING THE IMPACT OF GEF SUPPORT TO PROTECTED AREAS AND PROTECTED AREA SYSTEMS



GEF support. The theory of change centers its analysis on the extent to which GEF support contributes to these three main conditions.

- The first condition pertains to the extent to which GEF support has targeted PAs in zones of high biodiversity value and has strengthened management capacities, which have ultimately resulted in improved management effectiveness.
- The second condition pertains to the extent and effects of GEF-supported activities targeting people in and around PAs, and the related social systems.[5] The effects of GEF support in this regard are examined in terms of the nature of the interactions taking place between local communities and the PA—e.g., information sharing, community engagement in biodiversity management, the distribution of the costs and benefits of conservation, and the extent to which these

5 Social systems are any systems within the human dimension, such as economic, political, or cultural.

affect people's support for biodiversity conservation.

- The third condition pertains to the ways in which GEF inputs target the governance systems that establish roles and responsibilities across sectors and ensure compliance in biodiversity uses across scales, including local users and larger-scale users. This includes an assessment of the extent to which GEF support has helped build effective PA systems. It also considers the policies and institutional arrangements that must be in place to address the large-scale drivers affecting biodiversity outcomes both in PAs and their adjacent landscapes, where GEF also supports the mainstreaming of biodiversity conservation. Large-scale drivers are understood to be mainly anthropogenic factors and processes with causes and effects beyond the local scale—e.g., the expansion of extractive industries in high biodiversity areas. The framework assumes that actions to ensure the sustainable use and conservation of biodiversity must take place at different scales of the social-ecological systems that are targeted.[6] Thus, drivers and institutions at larger scales are also considered part of the system the evaluation looks at, as they affect the actions taken by local people, PA management, and other relevant agents.

GEF support is intended to assist countries in meeting their commitments to the global environmental conventions. While PA projects often generate some livelihood benefits, they are not expected to directly support national economic development strategies. In this vein, some GEF projects supporting PAs—particularly those initiated in the early replenishment phases—were not designed to address large-scale factors or support livelihood benefits. Thus the evaluation does not hold GEF support accountable in the case of such omissions. Nevertheless, given that these large-scale drivers and livelihood issues are important factors affecting biodiversity conservation, they were also considered in the evaluation to assess any unintended and indirect effects of GEF support.

Impacts on biodiversity were assessed in this evaluation through changes in wildlife population trends and trends in forest cover changes. Transformational processes involve the adoption of GEF-supported interventions at scale—such as through mainstreaming, replication, and scaling-up—thus also extending the reach of these interventions. As signified by the recursive arrows in figure 1.1, the framework assumes a positively reinforcing cycle—i.e., as more inputs are provided, the greater the likelihood that interventions are more broadly adopted, the more likely the conditions leading to transformative biodiversity impacts are achieved; these visible positive effects in turn catalyze more support to provide inputs. However, the arrows also signify that all elements interact and influence each other in iterative ways, which may result from feedback loops, response time lags to interventions, and other complex system dynamics. Underlying all these interactions are both project-related and contextual factors that

6 Social-ecological systems are "linked systems of people and nature" (Stockholm Resilience Centre 2015). This term, coined by Berkes and Folke (1998), emphasizes that humans must be seen as part of—not apart from—nature, and that the delineation between social and ecological systems is artificial and arbitrary.

contribute to or hinder progress improvements in biodiversity conservation and sustainable use, which the evaluation seeks to uncover.

EVALUATION COMPONENTS

The evaluation had three major analytical components: portfolio analysis, global analysis, and case study analysis; these correspond to the three main sources of evidence used to derive the evaluation findings. Each component used different methods and units of analysis to account for the multiple scales and interventions by which GEF support was delivered. The global and case study analysis components included, among others, assessments of changes in biodiversity and factors affecting biodiversity and management effectiveness outcomes. Where available, existing global databases were used for the analyses. However, part of the evaluation involved the construction of databases—particularly on information specific to GEF-supported PAs—as information in the GEF Project Management Information System database was not tailored to answer the evaluation questions. The evaluation also drew on supplementary information sources, such as peer-reviewed literature, news articles, and local monitoring data.

Portfolio analysis component

Three main methodological approaches were used in conducting the portfolio analyses (table 1.1). First, the GEF database was analyzed to determine the extent of nonmarine GEF support to PAs and PA systems, and thus identify the set of projects that would be part of the evaluation's scope. A total of 618 projects in 137 countries were identified. From these 618 projects, a database of 1,292 PAs supported by the GEF was created, which served as the reference for analyses in the other components. Second, an analysis was done to assess how the GEF's approach to biodiversity conservation and sustainable use has evolved over time through support to PAs and their adjacent landscapes.

A third, more in-depth, analysis was undertaken on a subset of projects included in the Fifth Overall Performance Study (OPS5) conducted by the GEF Independent Evaluation Office (IEO). Using standardized forms, terminal evaluations reported between 2005 and 2012 were analyzed for progress toward impact at project completion. Progress toward impact includes environmental outcomes, broader adoption of GEF-supported initiatives by stakeholders, and socioeconomic outcomes linked to

TABLE 1.1 INDICATORS AND METHODS USED FOR THE PORTFOLIO ANALYSES

Outcome indicator	Methodological approach	Unit of analysis (max *n*)
Extent of support to nonmarine PAs and PA systems (evaluand)	• Filtering of PMIS data • Review of project documents	Project (618)
Evolution of GEF approach to biodiversity conservation	• Filtering of PMIS data • Review of project documents	Project (833)
Progress toward impact	• Review of terminal evaluations	Project (191)

NOTE: PMIS = Project Management Information System.

191 projects involving nonmarine PAs and PA systems.

Global analysis component

Three indicators were used to measure outcomes at the global scale: forest cover, wildlife populations, and Management Effectiveness Tracking Tool (METT) scores.

The first indicator was assessed through analyzing change in forest loss. Spatial data sets developed by the International Union for Conservation of Nature (IUCN) and the United Nations Environment Programme (UNEP) World Conservation Monitoring Centre (the 2014 World Database on Protected Areas) and by Hansen et al. (2013) were used to match GEF-supported PAs with polygons that could be spatially analyzed.[7] The PAs analyzed were filtered from the GEF database of 1,292 PAs using the minimum threshold for forest cover present in 2000. The results report forest cover loss and gain for 2001–12, as data are only available for this period. Therefore, only projects that began implementation in 2008 or earlier were considered for this analysis to allow a five-year window for any effects of GEF support to be measurable through remote sensing. A total of 580 GEF-supported PAs in 73 countries met these criteria. From this analysis, a spatial database on forest cover loss and gain in more than 30,000 GEF and non-GEF PAs, and in their respective 10-km and 25-km buffer areas, was created as part of the evaluation.

Forest cover loss in GEF-supported PAs was compared to (1) countrywide aggregate loss that included both protected and non-protected forest areas, (2) loss within their 10-km buffer area, and (3) loss in the non-GEF PAs and their 10-km buffers within the same country and biome (table 1.2).

Forest cover gain in GEF-supported PAs was compared to that in non-GEF-supported PAs. Forest cover loss in GEF-supported PAs was also compared by biome and country. Differences in forest loss rates before, during, and after GEF support were also compared, with the filtering criteria for each analysis reducing the sample size to less than 300 PAs. In Mexico, where there were fewer data gaps on where GEF provided support, propensity score matching using 30-m forest loss pixels as the dependent variable was conducted to allow attribution of reduced deforestation to GEF support.

To compare differences in wildlife population trends before, during, and after GEF support, the World Wildlife Fund's (WWF's) 2014 Living Planet Index data set was used to match GEF-supported PAs with wildlife monitoring time-series data covering the period 1970–2010 (McLellan et al. 2014). Links between GEF interventions and biodiversity outcomes were made using information collected from project documents. The species population time-series data used in the analysis consisted of species abundance measures for a single population for a minimum of three years collected with consistent methods within a PA. Similar to the forest cover analyses, only projects that began in 2008 or earlier were considered for this analysis. A total of 88 cases of species population time-series data from the Living Planet Index were matched with the objectives of 29 GEF projects implemented in 39 PAs.

7 World Database on Protected Areas: http://www.protectedplanet.net; accessed April 2016.

TABLE 1.2 INDICATORS AND METHODS USED FOR THE GLOBAL ANALYSES

Outcome indicator	Method of analysis	Unit of analysis (max *n*)	Unit of comparison
Forest cover	• Remote sensing and GIS analysis • Mixed effects modeling • Propensity score matching	• Protected area (580) • 30-m forest loss pixel in 10 Mexico PAs (35,351)	• Nonsupported PA in same country and biome • 10-km buffer area • Country and biome trends • Trends before and after GEF support
Wildlife populations	• Linear regression • Generalized additive models and calculation of second derivatives of the fitted model • Principal components analysis • Tree analysis (regression trees and random forests)	• Species population time-series cases by PA (58)	• Trends before and after GEF support
METT score	• Linear regression • Mixed and fixed effects modeling	• Protected area (1,924)	• Change over time

NOTE: GIS = geographic information system.

The METT is an instrument to monitor progress toward more effective PA management over time. It consists of 32 indicators addressing different aspects of PA management. A total of 2,440 METT assessments from 1,924 PAs in 104 countries were used to assess management effectiveness in GEF-supported PAs. These included only PAs supported from 2004 onwards, as METT assessments were not required before then. To measure change in METT scores over time, 275 PAs in 75 countries with at least two METT assessments over time were included in the analysis. The reliability of the METT as a monitoring tool was also analyzed. METT assessments were collected from the GEF Secretariat biodiversity focal area and results-based management teams, and from the GEF Agencies, and catalogued. A database of METT assessments for GEF-supported PAs was created as part of the evaluation.

For all three indicators, publicly available global data sets were used to assess the effect of contextual and project-related variables on the outcomes using mixed effects and exploratory models.

Case study analysis component

While global data provided breadth in the analysis through average values on forest cover and wildlife populations in GEF-supported PAs, field visits and review of the peer-reviewed literature provided information on the effects of GEF's multiscale approach, and the mechanisms at work between the interventions, the larger social-ecological system, and the observed outcomes (table 1.3). Interviews and field visits were carried out in seven countries across three regions, covering 17 GEF-supported PAs and 11 non-GEF PAs. Interviews and focus group discussions explored trends and causal factors for environmental stress reduction, management effectiveness, and interactions between PAs and the adjacent communities. Standardized forms to organize information collected at both the PA

TABLE 1.3 INDICATORS AND METHODS USED FOR THE CASE STUDY ANALYSES

Outcome indicator	Method of analysis	Unit of analysis (max *n*)	Unit of comparison
Environmental stress reduction	• Analysis and synthesis of qualitative data • Qualitative comparative analysis • Remote sensing and GIS analysis	• PA (17)	• More and less successful PAs • Similar nonsupported PAs
Management effectiveness (PAs and PA systems)	• Analysis and synthesis of qualitative data • Qualitative comparative analysis	• PA (17) • PA system (4)	• More and less successful PAs • More and less functional PA systems • Nonsupported PAs and PA systems
Types of community interactions with PA	• Analysis and synthesis of qualitative data	• PA (17)	• More and less successful PAs • Similar nonsupported PAs

NOTE: GIS = geographic information system.

and PA system levels were used to ensure comparability. A two-day workshop was held among consultants after the field visits to compare findings, harmonize scores, and fill in gaps. Qualitative comparative analysis was used as a systematic way to identify combinations of factors leading to some of the observed outcomes.[8]

Countries for case studies were selected according to the following criteria developed jointly with key stakeholders: (1) presence of species or ecosystems within the country with high global biodiversity significance; (2) importance of biodiversity to local economies (whether direct or indirect); (3) stability of country, where access was possible and relatively safe; (4) existence of PAs without GEF support; and (5) long-term and extensive GEF engagement—as shown by the number of completed GEF-supported biodiversity projects and a high amount of GEF investment—to allow for the assessment of cumulative impacts over time. Both GEF- and non-GEF-supported PAs were visited to identify and compare factors affecting the extent of biodiversity outcomes. The PAs selected included a mix of those considered to be more or less successful in terms of the extent to which conditions assumed to lead to biodiversity conservation were present.

While extensive effort was made to select comparable PAs within each country and across regions using objective criteria, lack of comparable information was a key limitation, and the final PAs were selected based on the expert opinion of GEF project task team leaders and relevant government agencies within each country. Also, while some PAs were classified as less successful, all PAs had achievements and challenges to resolve. Nevertheless, this distinction helped mitigate the potential bias of selecting only best cases. All information on specific PAs was used cautiously in the analysis, as differences among PAs and the information available for each PA were carefully considered.

Detailed remote sensing analyses were conducted to assess forest loss at the visited

8 Qualitative comparative analysis is a theory-driven approach that bridges the gap between qualitative and quantitative methods by assessing multiple combinations of factors using Boolean algebra rather than conventional statistics.

PAs using data for the period 1990–2012.[9] Other analyses were also done with remote sensing data up to 50-cm resolution to identify drivers of deforestation in specific areas.

MITIGATING METHODOLOGICAL CHALLENGES AND LIMITATIONS

Given the global scope of the evaluation, as well as the long period of GEF support and the complex nature of the interventions, the evaluation encountered several methodological challenges. These challenges included having to create usable databases out of differently formatted, incomplete, and sometimes inconsistent data from various sources, which needed to be standardized, validated, and matched. This challenge was anticipated in the approach paper and was addressed by the GEF and UNDP IEOs by pooling resources and sharing management of the evaluation. While the comprehensive use of global and GEF-related databases helped mitigate some challenges and allowed the evaluation to address some issues confidently, large data gaps remained that were beyond the scope of the evaluation—and that limited the extent to which the evaluation questions could be answered. The three main challenges in assessing impact were substantial information gaps on GEF support, limited global time-series data, and difficulties in estimating the counterfactuals.

Substantial information gaps on GEF support

The main challenge in the evaluation was the lack of information on which PAs GEF had supported, how long and when GEF support took place, and what type and extent of support was provided. In many cases, project documents did not provide the names of the supported PAs; in some cases where they were named, no polygons could be found for the PAs, making it impossible to measure forest cover using remote sensing analysis. As much PA-related information as possible was gathered from project documents, METT archives of GEF Agencies, and field interviews. However, there were differences in responsiveness and availability of information among countries and institutions; therefore, the spatial distribution of analyzed PAs may be skewed toward these countries and institutions, and may underrepresent those for which less information could be obtained. On the other hand, since GEF support is itself not equally distributed across the globe, higher-capacity countries that have received most of the support may also have the greatest amount of information available.

Limited global time-series data

The number of GEF-supported PAs documented and available for analysis was further constrained by the global time-series data available for these PAs. While the period of GEF support spans from 1991 to the present, forest loss and gain data, e.g., cover only the latter part of these 24 years of support. Global databases for contextual variables are typically reported for one year rather than as a time series. Also, not all GEF-supported PAs are documented in

9 Forest loss data were from Hansen et al. (2013) and Kim, Sexton, and Townshend (2015).

global databases, as many sites receiving GEF support are not registered by the countries in the World Database on Protected Areas. Many of these are state, municipal, communal, or private PAs. Like the bias in documented GEF-supported PAs, global databases also have systemic biases arising from the extent to which local monitoring data are available, e.g.—again skewing the distribution away from countries and sites that lack data.

The set of PAs analyzed do not represent the global extent of GEF support, but rather that which fits the constraints imposed by the global data sets. As discussed above, the use of filtering criteria for the various analyses helped address some of the data challenges. But these criteria yielded different sample sizes depending on the variables being tested, in some cases resulting in very low sample sizes that made it impossible to determine statistically significant differences in values. In addition, the non-normal distribution of both outcome and contextual variables limited the application of conventional parametric statistics, which are based on comparing means. While these many limitations were mitigated by performing several types of data analyses, they do limit the interpretation of results to a certain extent.

Difficulties in estimating counterfactuals

The counterfactual—or what would have happened without GEF support—is difficult to estimate, given the complexity of GEF-supported interventions and the absence of a predefined control. The lack of information on where and when GEF support took place made it difficult to identify with certainty the sites and time periods without GEF support that could serve as comparable units. To increase comparability and minimize overestimation of GEF impact, GEF PAs were compared only with non-GEF PAs within the same biomes located in the same countries. Other filters applied to ensure greater comparability were a minimum baseline forest area; also, for sites that had multiple overlapping PA categories, only those classified under IUCN's strictest reserve category were considered in the analysis. By decreasing the number of non-GEF PAs and ensuring greater comparability through filtering criteria, it was easier to identify misclassified PAs, and the likelihood of classifying GEF PAs as non-GEF PAs and vice versa was reduced.

In some cases, PAs that did not directly receive GEF support in some way benefited from the outcomes of GEF-supported interventions, as was revealed in field interviews. Furthermore, while the evaluation design included a comparative assessment between successful and less successful PAs, this turned out to be difficult to distinguish, as all cases had significant achievements but also faced challenges. Given that the selection of PAs to visit was not random, the search for both successful and less successful PAs helped mitigate the bias toward good examples in the selection process. As seen in tables 1.2 and 1.3, various quasi-experimental methods and units of comparison were used to approximate the counterfactual and rule out alternative explanations for the outcomes, rather than relying on a single type. For example, apart from using propensity score matching, which allows avoided deforestation in GEF-supported PAs in Mexico to be quantified, higher-resolution remote sensing analysis was also conducted in two of the PAs to verify the pressures of deforestation,

which had also been documented through field observations, interviews, and peer-reviewed literature.

Multidisciplinary and mixed-methods approach

To mitigate the gaps and systematic biases in the data sets, the evaluation used a mix of quantitative, qualitative, and spatial methods in data collection and analysis. Evidence was collected from a mix of sources, combining global data sets, field data, literature reviews, and statistical models. Methods were selected by matching them to the evaluation questions and the available data sources and technology (Garcia and Zazueta 2015; Stephenson et al. 2015). The findings of each analysis were deemed relevant to the specific set of PAs or countries that were included in that particular analysis. Broader conclusions were drawn only after comparing results from these different types of evidence and methods of analysis. Through the use of mixed methods and triangulation of findings, it was possible to identify directions and patterns regarding the extent of the GEF's contribution toward biodiversity conservation, and its interaction with the larger social-ecological system.

From the start, the evaluation team took a multidisciplinary approach and reached out to different institutions and individuals with the necessary capacities. A reference group consisting of members of the GEF Secretariat and GEF Agencies working in the biodiversity focal area was convened to provide expert opinion and information on GEF-supported interventions, sample selection, and data analyses. The group was engaged in the development of the evaluation approach, and was consulted at key stages of the evaluation to provide technical feedback and verification. A technical advisory group comprised of evaluation, social science, and biodiversity experts from within the GEF partnership and external institutions was formed to provide advice on appropriate methods and frameworks, and serve as peer reviewers of the different analyses.

The core evaluation team itself was multidisciplinary in composition, with skills in quantitative, qualitative, and spatial analyses; and specializations in the natural and social sciences. Different analyses were performed in collaboration with the Global Land Cover Facility at the University of Maryland, the U.S. National Aeronautics and Space Administration, the IUCN World Commission on Protected Areas–Species Survival Commission Joint Task Force on Biodiversity and Protected Areas, and the Institute of Development Studies. While the diversity in expertise has made the evaluation richer, differences in perspectives and assumptions contributed to delays in some cases.

CHAPTER 2

GLOBAL BIODIVERSITY TRENDS, CHALLENGES, AND OPPORTUNITIES

Over the past several decades, approaches to biodiversity protection have become more comprehensive and directed at drivers of biodiversity loss. Yet the loss of biodiversity continues at an alarming rate. Globally, a core conservation strategy has been the establishment of PAs. Evidence shows that, on balance, PAs have been effective at slowing the rate of biodiversity loss. Nonetheless, PAs remain woefully underresourced and require substantial strengthening if they are to continue protecting biodiversity in the future. A recent large expansion in PAs globally risks widening current financial shortfalls.

This chapter provides an overview of current global biodiversity trends and explores the principal issues driving biodiversity loss. The effectiveness of the nonmarine PAs as a conservation tool is presented, as well as the evolution of approaches for their conservation and management. The chapter concludes by outlining some of the future challenges facing biodiversity conservation and describes proposed solutions on how to strengthen nonmarine PAs to ensure that they continue serving their purpose in the 21st century.

GLOBAL BIODIVERSITY TRENDS

Biodiversity, is the "…variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems" (CBD 1992, 3). Influential scientific assessments have demonstrated biodiversity's importance, its intrinsic value, and the critical role it plays in providing the ecosystem services on which all humans depend (MEA 2005). Despite our growing awareness of nature's benefits and the intensification of efforts to address biodiversity loss, a mounting body of evidence indicates that biodiversity continues to decline at an alarming rate.

Assessing the state of biodiversity is a complex undertaking as, by definition, biodiversity encompasses all life on Earth. Furthermore, there are large gaps in our knowledge of biodiversity (Hassan et al. 2005). Data on genetic variability, for instance, remains very limited, largely existing only for the cultivated plants and domesticated animals that are relevant to agriculture (SCBD 2014). Indeed, most of the available indicators that measure the state of and trends in global biodiversity

focus on two of its most visible dimensions: species and ecosystems.

Recent studies on changes in species abundance, population trends, and the risk of extinctions all show significant declines. For species abundance, the data from the global Living Planet Index for the period 1970–2010 show a 52 percent decline in vertebrate populations in terrestrial, freshwater, and marine systems. The terrestrial Living Planet Index, which specifically measures terrestrial species, shows an average decline of 39 percent (McLellan et al. 2014). Concurrently, the Wild Bird Index and the Wildlife Picture Index show similar sustained declines (Leadley et al. 2014).

Available estimates on global species extinction rates indicate that the present overall extinction rate is 100–10,000 times higher than the natural rate of extinction (De Vos et al. 2015). Data from the 2015 Red List Index show a significant decrease since 1980 in the four taxonomic groups assessed—birds, mammals, amphibians, and corals.[1] This implies that for these four groups the average risk of extinction has steadily increased over the past four decades (Leadley et al. 2014). A global assessment of the world's plant species, carried out through the IUCN's Sampled Red List Index for Plants, revealed that one in five plant species is threatened with extinction; a further 8 percent are classified as near threatened (Kew Royal Botanical Gardens 2012).

Modification, and often degradation, of terrestrial ecosystems is well documented. Anthropogenic actions have greatly altered many of the world's terrestrial ecosystems to satisfy human needs for food, shelter, water, and resources. Forested ecosystems in particular have been significantly transformed, as nearly 45 percent of the original forest cover has disappeared over the last 8,000 years.[2] Between 20 and 50 percent of the land area in 9 out of 14 terrestrial biomes (Olson et al. 2001) has been converted to human use (Hassan et al. 2005). Tropical dry forests are the most affected, as nearly half of this biome's native habitats has been replaced by cultivated lands (Hassan et al. 2005).

Recent estimates of observed changes in forested ecosystems, as measured by global forest cover change between 2000 and 2012, project a substantial forest loss of 2.3 million square kilometers (Hansen et al. 2013). Forest loss occurred in all biomes, but there were notable regional variations. The tropics had the greatest total forest loss and gain. Brazil exhibited the largest decline in annual forest loss of all countries in the world, making it a notable exception to the overall trend in forest loss. A number of other countries, including Indonesia, Malaysia, and Paraguay, continued to show an increase in forest loss (Hansen et al. 2013).

Deforestation, as measured through changes in the forest canopy, represents only one aspect of decline in forested ecosystems. Understanding the scale and extent of other mechanisms of change, such as forest degradation and fragmentation—although historically a challenging

1 "The IUCN Red List of Threatened Species," http://www.iucnredlist.org/.

2 CBD, "Forest Biodiversity: What's the Problem?," https://www.cbd.int/forest/problem.shtml.

task (Miettinen, Stibig, and Achard 2014)—provides insights into the magnitude of the deterioration occurring inside the forests. Unsustainable collection of forest products, for instance, may continue even if forest cover remains essentially intact (Wilkie et al. 2011). Overexploitation of forest resources or unsustainable hunting can considerably reduce animal populations. In some cases, these populations can remain present in the community but be reduced to such an extent as to be essentially ecologically extinct, resulting in the so-called "half-empty forest" (Redford and Feinsinger 2001). Forest degradation and fragmentation can reduce biodiversity, especially in tropical forests (Gibson et al. 2011). This is of particular concern, as primary tropical forests are highly biologically diverse, providing critical habitats to more than half of all known plant and animal species on Earth (SCBD 2010).

All aspects of fragmentation—reduced fragment area, increased isolation, and increased forest edge—can be detrimental to the ecological integrity of forests and to the biodiversity within them (Haddad et al. 2015). Even though species sensitivity to fragmentation varies, fragmentation has been shown to degrade ecosystem functions, productivity, and pollination; and to reduce species persistence, richness, and trophic dynamics (Haddad et al. 2015). It can also reduce connectivity, by limiting species movement between remaining forest areas (Laurance and Useche 2009).

Fragmentation presents a significant threat to many of the world's remaining forests, as nearly 20 percent of remaining forest is within 100 meters of the forest's edge, and over 70 percent is within a kilometer of the forest's edge (Haddad et al. 2015). Moreover, so-called "intact forest landscapes" comprise only 13.1 million km^2, or 23.5 percent of the forest zone, with the majority located in tropical, subtropical (45.3 percent), and boreal forests (43.8 percent). In many landscapes, such as in the lowlands of continental Asia, no or only small undisturbed forest fragments remain (Potapov et al. 2008).

Other terrestrial ecosystems with high biodiversity values, such as grasslands and savannas, are not as widely studied as forests. In 2000, the available data indicated that the global extent of grasslands is declining. Nearly 50 percent of all grasslands were lightly to moderately degraded. Further, 37 percent of the world's grassland ecoregions were classified as highly fragmented (White, Murray, and Rohweder 2000). As with the forested ecosystems, there are strong regional variations. In some areas, such as Mongolia and the South American *campos*, grasslands are improving and increasing in their extent (SCBD 2014).

THREATS TO GLOBAL BIODIVERSITY

Global assessments of biodiversity (Mace, Ricketts, and Abell 2015; SCBD 2014) consistently identify five primary, or direct, drivers of biodiversity loss: habitat loss and degradation, overexploitation and unsustainable use, invasive alien species, pollution, and climate change. They also unambiguously state that underlying cases of biodiversity loss are directly related to human actions. These actions are predominately linked to a rapid increase in population numbers, coupled with unsustainable patterns of land use, consumption, and production (SCBD 2014). Other human actions include

expansion of roads and infrastructure development related to natural resource exploitation near parks and PAs, and critical habitats causing severe harm to the environment and biodiversity (Laurance et al. 2015). Next to human-driven land use change, the greatest threat to biodiversity is climate change (Sala et al. 2000). Climate change may induce range shifts of many species, cause extinctions, and alter habitats—and therefore possibly reduce the relevance and biodiversity values of existing PAs (Beaumont et al. 2011; Lee et al. 2007; Mokany, Harwood, and Ferrier 2013; Settele et al. 2014). Table 2.1 provides a brief summary of each direct driver of biodiversity loss and ecosystem degradation.

PROTECTED AREAS AS A BIODIVERSITY CONSERVATION TOOL

The Convention on Biological Diversity (CBD), for which the GEF is a financial mechanism, is a seminal global agreement that focuses on three key objectives: (1) the conservation of biological diversity, (2) the sustainable use of the components of biological diversity, and (3) the fair and equitable sharing of the benefits arising out of the utilization of genetic resources (CBD 1992). A fundamental strategy for achieving these goals has been to safeguard the Earth's land and marine environments from further degradation by formally designating them as PAs.

The pivotal role of PAs is detailed in Article 8 of the CBD, the Programme of Work on Protected Areas, and its Strategic Plan for 2011–2020. Notably, the Strategic Plan contains 20 key targets, commonly referred to as the Aichi Biodiversity Targets. Target 11 is directly linked to PAs. By 2020, it calls for

> at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, [to be] conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes. (CBD 2010, 9)

In addition, the other targets, if achieved, should positively affect the world's PAs.

The CBD defines a PA as a "clearly defined geographical space, recognized, dedicated and managed through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values" (SCBD 2015). For over a century, PAs have formed a core component of global conservation efforts. The past two decades have seen an extraordinary increase in the number of PAs worldwide. In 1993, PAs covered around 4 percent of the globe (CBD 2010). In 2014, they cover 15.4 percent of the Earth's terrestrial surface, with 197,368 PAs on 20.6 million km^2 (Juffe-Bignoli et al. 2014). And this number only refers to those PAs included in the IUCN database on PAs; it would be much larger if other PAs, such as those established by indigenous people or private enterprises, were taken into account (Watson et al. 2014).

The coverage of those areas significant for biodiversity and those that are ecologically representative has not advanced as much as the increase in the total area covered. Traditionally, PAs were sited in places of low economic interest, higher elevations, and low human density—and not necessarily in those locations significant for biodiversity

TABLE 2.1 OVERVIEW OF DIRECT DRIVERS OF BIODIVERSITY LOSS AND THEIR IMPLICATIONS

Habitat loss and degradation	• The most important current threat to terrestrial biodiversity (McLellan et al. 2014) • Occurs when natural habitats, such as forests and grasslands, are converted to those land uses that satisfy human needs: food production, energy production, urban and infrastructural development • Degradation of habitat between PAs may also reduce their connectivity (Caro et al. 2014) • Fragmentation of PAs due to habitat loss, agricultural encroachment, and road and fence construction can decrease biodiversity by lowering the genetic diversity of populations, slowing population growth rates, and altering species interactions (Rudnick et al. 2012)
Unsustainable use and overexploitation	• Humans consume an alarming proportion of the planet's resources, appropriating a quarter of the world's biomass (Krausmann et al. 2013) • Ecological footprint shows that annual demand for resources has consistently exceeded the Earth's capacity to regenerate each year; humans use the equivalent of 1.5 planets for their needs (McLellan et al. 2014) • Legal and illegal exploitation of wildlife occurs inside and outside of PAs, driven by demand for medicine, luxury items, trophy hunting, and food (Smith et al. 2009) • Unsustainable extraction leads to negative consequences for species and ecosystems within PAs; hunting, poaching, and illegal trade of megafauna is of particular concern, as they often fulfill important ecological roles within ecosystems—e.g., elephants' role as "ecosystem engineers" (Wilkie et al. 2011)
Pollution	• Within terrestrial ecosystems, excess nutrients—e.g., reactive nitrogen—can affect species composition, cause nutrient disorders, and have toxic effects on plants (SCBD 2014) • Nutrient pollution may also increase the dominance of invasive alien plants and decrease the diversity of plant communities (SCBD 2014) • Pesticides can be toxic, in some cases lethal, to a host of organisms and pose risks to nontarget species including birds, beneficial insects, and plants (Mitra, Chatterjee, and Mandal 2011) • Other sources of pollution, such as plastic and heavy metals, create additional pressure
Invasive alien species	• Historically, invasive alien species have contributed to more than half of the animal extinctions for which the cause is known (SCBD 2014), especially on islands • Invasive alien species have invaded native biota in almost every ecosystem type on Earth and in all biomes (CBD, "Invasive Alien Species," https://www.cbd.int/invasive/introduction.shtml) • Invasive alien species can alter the community structure and species composition of native ecosystems and can indirectly cause changes in nutrient cycling, ecosystem function, and ecological relationships between native species (CBD, "Invasive Alien Species," https://www.cbd.int/invasive/introduction.shtml) • The global impact of invasive alien species is either steady or increasing (Mace, Ricketts, and Abell 2015)
Climate change	• Climate change is becoming an increasingly important driver of biodiversity loss as many species, such as insects and birds, have already moved their ranges (mostly toward the poles and higher in altitude), altered their abundance, and shifted their seasonal activities in response to climate change in many regions of the world (Settele et al. 2014) • Under some projections for future climate change during the 21st century, many species may be affected through reduction in their populations, vigor, and viability, as they will be unable to move quickly enough to find suitable climates or may be spatially restricted (Settele et al. 2014) • Many terrestrial species face increased extinction risk under projected climate change, especially as climate change interacts with other pressures, such as habitat modification, overexploitation, pollution, and invasive species (Settele et al. 2014)

(Joppa and Pfaff 2009; Watson et al. 2014). An assessment of PA coverage shows that globally, 49 percent of Important Bird Areas and 51 percent of Alliance for Zero Extinction sites for biodiversity conservation remain unprotected—despite findings that species occurring in these sites with greater PA coverage experienced smaller increases in extinction risk over recent decades when compared with sites with partial or no protection (Butchart et al. 2012). In fact, recent assessments of the PA coverage of key biodiversity areas show that only about a fifth of the Important Bird and Biodiversity Areas

and Alliance for Zero Extinction Sites are completely covered by PAs (Juffe-Bignoli et al. 2014).

Additionally, the ecological representativeness of the global PA estate is inadequate. Studies show that less than half of terrestrial ecoregions have at least 17 percent of their extent covered by PAs (Juffe-Bignoli et al. 2014). And a global analysis of threatened birds, mammals, and amphibians found that 17 percent of these are not found in any PA; of those found inside PAs, 85 percent do not have sufficient population size to ensure their long-term survival (Venter et al. 2014).

The empirical evidence on the effectiveness of PAs in conserving biodiversity has been mixed, although generally more positive results are reported. PAs are seeing ongoing declines in animal populations (e.g., Craigie et al. 2010); and many continue to suffer from deforestation, mostly illegal (e.g., Laurance et al. 2012). However, other studies have provided evidence that PAs have successfully conserved habitats (e.g., Geldmann et al. 2013) and that the local extinction rate for species was lower in PAs than outside them (Karanth et al. 2010). A Living Planet Index of PAs, which measures trends in populations that occur inside terrestrial PAs, shows an overall decline of 18 percent between 1970 and 2010; this is less than half the rate of decline in the overall terrestrial Living Planet Index (39 percent). This finding suggests that species populations inside PAs are doing relatively better, even though there are factors other than formal protection that may contribute to this difference (McLellan et al. 2014). Overall, available evidence suggests that PAs do deliver positive biodiversity outcomes (Juffe-Bignoli et al. 2014), but the evidence base remains limited.

Terrestrial PAs are not immune to pressures that occur outside their boundaries. The land use dynamics of a PA's surrounding landscape can influence what happens inside the PA (DeFries et al. 2005). These can weaken PAs' ability to fulfill their core function of nature protection. Threats to PAs can be of different sources. Caro et al. (2014) broadly identify these threats as global (e.g., climate change), external (e.g., population pressure, degazettement),[3] and internal (e.g., deforestation, wildlife exploitation). Furthermore, species and habitats are seldom affected by only one threat at a time. Climate change in particular is anticipated to synergistically interact with and amplify other threats, such as the spread of invasive species (Hulme 2006).

PA downgrading, downsizing, and degazettement is another common but often overlooked aspect of conservation (Mascia and Pailler 2011). Between 1962 and 2009, 543 instances of PA downgrading, downsizing, and degazettement in 57 countries were identified, affecting more than 503,591 km^2 of protected lands and waters (Mascia et al. 2014). A study in Brazil identified 93 such events in the period 1981–2012 (Bernard, Penna, and Ara´Ujo 2014). The causes include resource extraction and development, local land pressures and land tenure disputes, and comprehensive revisions of PA and PA system conservation plans (Mascia et al. 2014). PAs therefore cannot be assumed to be permanent conservation initiatives, or to have boundaries that always coincide with biodiversity values (Rodrigues et al. 2004).

3 Loss of legal protection for an entire national park or other PA.

Lastly, many PAs operate under challenging national circumstances that often involve legal and policy constraints. Some of the key issues in this regard include substantial underresourcing of PAs, poor governance, political corruption, and armed conflict (Watson et al. 2014). Funding for PA management is often lacking or is inadequate to meet the needs; as such, it presents a major challenge to effective management. A global assessment of relative levels of underfunding for conservation spending suggests that the 40 most severely underfunded countries contain 32 percent of all threatened mammalian diversity and are geographically situated close to countries in some of the world's most biologically diverse areas (Waldron et al. 2013).For example, it has been estimated that the cost of establishing and maintaining a global PA system is $30 billion a year, but current expenditures amount to only $6.5 billion per year.[4]

EVOLUTION OF APPROACHES TO PROTECTED AREA CONSERVATION AND MANAGEMENT

Although the concept of PAs has been in existence for a long time, their purpose, objectives, and management have greatly evolved—especially over the last several decades (Ervin et al. 2010). The classic approach to PA management treated PAs as government-owned and -managed areas that are set aside for protection and thus exclude local communities (Phillips 2003). This model was widely adopted around the world, often leading to conflicts (Brandon, Redford, and Sanderson 1998).

In the early 1970s, it was increasingly recognized that indigenous and local people had historical claims to land and natural resources, even if formal ownership or access rights were not always recognized by the government. If PAs were to be established without conflict, then traditional rights holders would need to be involved in the process. The evidence from tropical forest areas suggests that such stakeholder involvement can lead to more effective management of biodiversity—at least in some cases (Terborgh 2004; UNEP-WCMC 2012). Ervin et al. (2010), drawing on experience from the United Nations Development Programme (UNDP) GEF PA portfolio, recognized that local people can contribute to both governance and management activities in PAs. Over the last few decades, social scientists have presented more evidence that local people can be powerful agents for conservation under the proper conditions (Pilgrim and Pretty 2010).

The modern approach to sustainable management of PAs gives much greater attention to participatory management and working with the people who live in and around the PAs, especially where poverty is an important issue. The modern conservation approach to PAs views them not as isolated entities, but as an integral part of their surrounding landscape, connected through corridors into a wider, more integrated, network of PAs (Phillips 2003). Recognizing the utility of a variety of approaches to PA management, the IUCN developed a system of PA categories in 1978. Several decades of experience led to a somewhat revised system being released in 2008 (Dudley et al. 2014); this is now widely adopted.

4 LifeWeb, https://lifeweb.cbd.int/benefits, accessed April 2016.

In 2006, the GEF Evaluation Office produced a report (GEF IEO 2006) that addressed precisely this interaction between biodiversity conservation and indigenous communities. It concluded that, in instances where biodiversity and human livelihood objectives were compatible, progress in biodiversity conservation was more robust. It also found that, in several instances, trade-offs between biodiversity and human livelihood objectives took place. In 2010, the UNDP Evaluation Office evaluated the Agency's contribution to environmental management for poverty reduction. It concluded that addressing the poverty-environment nexus is essential to achieving the UNDP mission. It noted that poor people depend disproportionately on access to natural resources for their livelihoods, and that development and poverty reduction programs have significant effects on the environment. It pointed that the UNDP strategic plan draws attention to urgent challenges facing poor communities stemming from climate change and notes that land degradation and loss of biodiversity pose serious challenges to poverty alleviation (UNDP IEO 2010). The results of the evaluation have encouraged UNDP to incorporate ecosystem services into its advice to countries preparing poverty alleviation strategies.

Recent approaches to PA management take into account the plurality of conservation, social, and economic needs that PAs are expected to fulfill (Ervin et al. 2010). They also recognize that these can only be achieved through diverse financial, management, and government structures that best fit each area (Juffe-Bignoli et al. 2014). A key assumption in many of the recent approaches to biodiversity conservation is that dialogue with people living in and around PAs can build a stronger positive link between PAs and efforts to alleviate poverty. Building this link is both practical and ethical. In practical terms, PAs where poverty is an important issue are likely to be most successful when they include a viable land use option that makes a significant contribution to sustainable development. On ethical grounds, human rights and aspirations need to be incorporated into national and global conservation strategies if social justice is to be realized (Scherl et al. 2004).

LOOKING AHEAD—CHALLENGES OF CONSERVING BIODIVERSITY IN A RAPIDLY CHANGING WORLD

The deterioration of the world's biodiversity is projected to continue—or even increase—in the future. The anthropogenic causes of biodiversity loss, especially the anticipated demographic changes, will continue to place unprecedented stress on the planet's resources in three primary ways:

- **An overall increase in human population**, rising from the 7.2 billion to nearly 9.6 billion in 2050 (UN DESA 2013). To meet food demand in 2050 alone, agricultural production will need to increase by 60 percent relative to 2005 (Alexandratos and Bruinsma 2012).

- **Rising affluence of humankind**, as nearly 3 billion people are expected to enter the global middle class by 2030 with resultant changes in their lifestyles and diets (Kharas and Gertz 2010).

- **Rapid urbanization of the global population by 2050**, as 66 percent of the world's population moves into urban areas (UN DESA 2014). To accommodate

this pace of urbanization, a doubling of the world's current infrastructure will be required. If carried out unsustainably, such a large extraction of resources could have extraordinarily negative impacts on the biosphere (SCBD 2014).

Biodiversity is expected to continue deteriorating during this decade (SCBD 2014). Beyond 2020, climate change will increasingly emerge as a significant stressor (Settele et al. 2014) and will exacerbate most of the existing pressures. Unless threats to biodiversity are comprehensively addressed, the possibility exists that some ecosystems may undergo abrupt and substantial changes to their structures and functioning. By 2050, the interaction of the direct and indirect drivers could push certain systems beyond their so-called "tipping points" at regional scales (SCBD 2014), resulting in fundamental ecological shifts (Settele et al. 2014).

This decline is not inevitable. The available empirical evidence shows that, on balance, PAs can be effective at conserving nature—in particular, at conserving habitats and, in some cases, species. There are notable examples where conservation actions have prevented extinctions of some endangered species (e.g., Butchart et al. 2004). Increasingly, PAs are becoming the places of last refuge for many species, especially for charismatic megafauna. As human domination of land continues to reduce the suitable habitats available to species, many are becoming predominately confined to PAs (Watson et al. 2014).

In addition to their environmental benefits, PAs demonstrably offer significant social and economic benefits to humankind. They have been shown to provide enormous benefits to human populations, especially to some of the world's poorest people (Watson et al. 2014). The purpose and objectives of PAs are continually expanding to encompass a much wider set of roles than originally envisaged. These roles include effectively responding to challenges such as climate change, including mitigation and adaptation; provision of ecosystem services, such as water and air purification; assisting with disaster risk reduction; and supporting human life through ensuring food security and improved health and well-being (Sandwith et al. 2014).

CHAPTER 3

GEF SUPPORT TO BIODIVERSITY CONSERVATION AND PROTECTED AREAS

Since its inception, GEF support for PAs has included financing to help reduce pressures by providing economic and social benefits to communities in adjacent landscapes. Over time, the GEF strategies for biodiversity have focused on addressing not only the key factors affecting PA management at a larger scale, but also the root causes of biodiversity loss.

STRATEGIC PRIORITIES

Since its pilot phase, GEF has adopted a comprehensive approach to biodiversity conservation. The operational programs developed in 1995 for GEF-1 (1995–98) and GEF-2 (1999–2000) were explicit about GEF support being closely linked to the relevant conventions, with the CBD being the most relevant for this evaluation (Mee, Dublin, and Eberhard 2008).[1]

For biodiversity, five general approaches were specified: long-term protection, sustainable use, addressing underlying causes and policies, stakeholder involvement, and targeted research. PAs were addressed primarily under the first approach—long-term protection—which included a variety of interventions ranging from PA demarcation, the establishment of long-term funds, the promotion of local participation and integrated conservation, and the application of geospatial technology for PA management. The 2004 Biodiversity Program Study indicated that 75 percent of GEF biodiversity projects since the pilot phase included some PA elements (GEF OME 2004).

The strategic priorities for biodiversity for GEF-3 (2002–06) had an explicit focus on providing support for a representative range of ecosystem types, or biomes. Both GEF-4 (2006–10) and GEF-5 biodiversity focal area programming have evolved in tandem with CBD strategies by giving more attention to the management and sustainability of PA systems and networks, rather than establishing or supporting individual PAs. GEF-4 strategic priorities began to make GEF support more explicit for policies that mainstream biodiversity conservation (e.g., reforms to remove institutional inefficiencies and perverse incentives) and markets for biodiversity-friendly goods and services (e.g., certification schemes, payment for ecosystems services). The GEF-5 focal area objectives also explicitly address broader drivers by reducing the threats to globally significant biodiversity, supporting the

1 The foundation for GEF support to PAs is clearly stated in the CBD Program of Work on Protected Areas.

sustainable use of biodiversity, and mainstreaming biodiversity conservation in production landscapes/seascapes and sectors. The GEF-6 programming directions have a strong focus on addressing drivers to better tackle the root causes of environmental degradation—and thus position GEF support to better contribute to addressing the current needs of PAs and the factors affecting the long-term loss of biodiversity.

Thus, while on the one hand addressing the immediate localized pressures to biodiversity, GEF support has from inception also increasingly sought to address upstream factors affecting PAs. Previous evaluations have pointed out many lessons learned from this experience that are being applied more broadly, including engaging local stakeholders in many of the major PA issues affecting biodiversity (Ervin et al. 2010; GEF IEO 2006; UNDP IEO 2010). The GEF considers integration of PA management with that of their surrounding areas important, because it can provide benefits to both biodiversity and human well-being (Miller et al. 2012).

As shown in tables 3.1 and 3.2, the GEF has provided more funding support to PAs through projects that combine PA and landscape/seascape management or production landscapes/seascapes only (about $3.4 billion), compared to projects that only focus on PAs (about $1 billion).[2] Within this portfolio, there was an increase in support to multifocal area projects during GEF-5, supporting landscapes/seascapes and economic sectors, and reflecting the increasingly integrated approach the GEF has taken over the years.

As an Implementing Agency of the GEF since its inception, UNDP has managed its biodiversity program support fully within the parameters set out in the successive GEF biodiversity strategies. Within the GEF strategic planning efforts, UNDP has called for greater consideration of upstream issues—in particular, the need to engage with indigenous communities. This heightened UNDP focus is in keeping with its broader strategies focused on capacity development and poverty alleviation. Indeed, the UNDP Strategic Plan (2008–2011, extended until 2013), emphasized that a UNDP goal was to "strengthen national capacity to manage the environment in a sustainable manner while ensuring adequate protection of the poor" (Executive Board of UNDP and UNFPA 2008).

It should be noted that the articulation of this poverty-environment nexus has not been easy. A 2010 evaluation assessing UNDP's efforts in this regard showed that while UNDP's environmental programming, largely through GEF funding, had seen a measure of success in integrating human/community imperatives, there was far less integration of environmental imperatives into its poverty alleviation programs. Since that time, UNDP has made a concerted effort to better integrate this programming. The 2014–17 UNDP Strategic Plan states an expectation to develop "scalable initiatives on sustainable productive capacities" that include the effective maintenance and protection of natural capital, including a focus on conservation and sustainable use of natural resources and biodiversity, as well as creation of employment and livelihoods, for instance, through management and rehabilitation of ecosystem services, from the subnational to the national level, including protected, indigenous and community

2 Values adjusted for inflation at 2015 rates.

TABLE 3.1 GEF FUNDING FOR PROTECTED AREAS BY OPERATIONAL PHASE

GEF phase	PA only		Landscape/seascape		Multifocal[a]	
	No. of projects	Grant amount ($)	No. of projects	Grant amount ($)	No. of projects	Grant amount ($)
Pilot	11	124,389,340	40	317,196,096	0	0
GEF-1	14	106,854,765	38	417,788,196	0	0
GEF-2	40	149,109,934	119	649,991,581	17	85,834,735
GEF-3	38	181,187,801	154	768,713,920	42	253,086,088
GEF-4	96	296,374,583	128	496,308,087	41	194,218,324
GEF-5	41	173,591,546	114	714,309,019	75	550,155,255
Total	240	1,031,507,969	593	3,364,306,899	175	1,083,294,402

NOTE: Values adjusted for inflation at 2015 rates. Amounts do not include support delivered through enabling activities, the GEF Small Grants Programme, the Earth Fund, and public-private partnerships. They also exclude support to global or regional summits or conferences, national biosafety frameworks, and Cartagena Protocol obligations.

a. Subset of landscape/seascape projects.

TABLE 3.2 GEF FUNDING FOR PROTECTED AREAS BY IMPLEMENTING AGENCY

Agency	PA only		Landscape/seascape		Multifocal[a]	
	No. of projects	Grant amount ($)	No. of projects	Grant amount ($)	No. of projects	Grant amount ($)
UNDP	138	495,211,290	250	1,129,908,938	48	237,661,240
UNEP	15	33,565,334	60	241,550,028	20	89,513,675
World Bank	80	479,917,695	220	1,668,627,173	75	557,995,274
Asian Development Bank	1	2,313,000	15	96,721,725	8	48,393,650
Food and Agriculture Organization of the UN	3	8,850,630	26	115,735,645	11	67,862,572
Inter-American Development Bank	3	11,650,020	10	68,376,409	5	49,252,409
Internat'l Fund for Agricultural Development	0	0	12	43,386,982	8	32,615,582
Total	240	1,031,507,969	593	3,364,306,899	175	1,083,294,402

NOTE: Values adjusted for inflation at 2015 rates. Amounts do not include support delivered through enabling activities, the GEF Small Grants Programme, the Earth Fund, and public-private partnerships. They also exclude support to global or regional summits or conferences, national biosafety frameworks, and Cartagena Protocol obligations.

a. Subset of landscape/seascape projects.

conserved areas (UNDP 2014a). Consistent with its mission, grants in support of PAs implemented by UNDP also include interventions related to landscape/seascape management.

FINANCING

Over the past 24 years, the GEF has 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 PAs, PA systems, and their adjacent landscapes.

Since its inception, the GEF has funded 618 projects related to nonmarine PAs, PA systems, and their adjacent landscapes.[3] Seventy-five percent of these were full-size projects, and 25 percent medium size. In many cases, adjacent landscapes were also supported through these projects, either as the focus or as one of the components. Through these projects, under different modalities, the GEF provided $3.4 billion in direct funding, and leveraged $12.0 billion in cofinancing to 137 countries.[4]

Seven GEF Agencies—UNDP, UNEP, the World Bank, the Asian Development Bank, the Food and Agriculture Organization of the United Nations, the Inter-American Development Bank, and the International Fund for Agricultural Development—contributed to GEF biodiversity work on PAs in their capacity as lead agency (table 3.3).[5] Two Agencies dominate the portfolio, together accounting for implementation of 87 percent of the projects: UNDP (50 percent) and the World Bank (37 percent). Together, these two Agencies have received 90 percent of total GEF project funding.

UNEP implemented 7 percent of the projects from the portfolio while the remaining four agencies (the Asian Development Bank, the Food and Agriculture Organization of the United Nations, the Inter-American Development Bank, and the International Fund for Agricultural Development) together implemented approximately 6 percent of the projects.

Since the GEF pilot phase, when 42 projects received a total of $392 million in GEF grants, the number of projects supporting nonmarine PAs and PA systems has steadily increased with each successive operational phase up until GEF-4. In GEF-4, the number of CEO approved/endorsed projects peaked, with 160 projects funded. In GEF-5, the number sharply declined to 95, although the grant amount ($545 million) is similar to funding levels for GEF-4 ($560 million).6 Table 3.4 indicates that projects in GEF-2 and GEF-5 had higher average funding per project compared to the other replenishment periods. The largest grant total for nonmarine PAs and PA systems was disbursed during GEF-3—about $702 million, or 21 percent of total GEF funding, for 147 projects.

GEF-supported PA-related projects have been implemented in all four GEF regions (table 3.5 and figure 3.1). Thirty-five countries (26 percent) have had only one project implemented within their borders since 1991. The largest grants and most projects addressing nonmarine PAs and PA systems were implemented in Mexico (20 projects, $192.2 million), Brazil (17 projects, $182.3 million), and China (25 projects, $125.4 million). Together, these three countries have received 21 percent of GEF funding related to nonmarine PAs and PA systems.

Latin America and the Caribbean has received the highest amount of funding by region (35 percent of total grant amount); the number of projects in the region was nearly equal to that

3 This includes only full- and medium-size projects that have reached at least the CEO (Chief Executive Officer) endorsement/approval stage; it does not include enabling activities or small grants funded through the Small Grants Programme. It also excludes global and regional projects (n = 529).

4 Values adjusted for inflation at 2015 rates.

5 Two additional agencies—the International Finance Corporation and UNESCO—helped implement a small number of projects (three and one, respectively), but were not the lead agency.

6 Values adjusted for inflation at 2015 rates

TABLE 3.3 GEF FUNDING FOR NONMARINE PROTECTED AREAS AND PROTECTED AREA SYSTEMS BY IMPLEMENTING AGENCY

Lead Agency	No. of projects	Grant amount ($)	% of grant total	Cofinancing ($)	% of cofinancing total
UNDP	306	1,334,672,938	39.3	4,117,280,147	34.3
UNEP	44	147,343,715	4.3	423,018,549	3.5
World Bank	231	1,727,499,535	50.9	5,936,343,026	49.7
Asian Development Bank	10	60,131,308	1.7	947,330,002	7.8
Food and Agriculture Organization of the UN	12	42,265,114	1.2	182,866,963	1.5
Inter-American Development Bank	9	61,946,256	1.8	282,954,683	2.3
International Fund for Agricultural Development	6	19,569,399	0.6	110,074,620	0.9
Total	618	3,393,428,265	100.0	11,999,867,990	100.0

NOTE: Values adjusted for inflation at 2015 rates.

TABLE 3.4 GEF FUNDING FOR NONMARINE PROTECTED AREAS AND PROTECTED AREA SYSTEMS BY OPERATIONAL PHASE

GEF phase	No. of projects	% of projects	GEF project grant at CEO approval/ endorsement stage ($)	% of total GEF funding
Pilot phase	42	6.8	391,487,986	11.5
GEF-1	49	7.9	501,465,529	14.7
GEF-2	125	20.2	693,105,940	20.4
GEF-3	147	23.7	701,880,428	20.6
GEF-4	160	25.8	560,257,611	16.5
GEF-5	95	15.3	545,230,770	16.1
Total	618	100.0	3,393,428,265	100.0

NOTE: CEO = Chief Executive Officer. Values adjusted for inflation at 2015 rates.

TABLE 3.5 GEF FUNDING TO NONMARINE PROTECTED AREAS AND PROTECTED AREA SYSTEMS BY REGION

Region	GEF grant amount ($)	% of total grants
Latin America and the Caribbean	1,200,453,632	35
Africa	941,863,496	28
Asia	786,127,679	23
Europe and Central Asia	302,644,184	9
Global/multicountry projects	162,339,275	5
Total	3,393,428,265	100

NOTE: Values adjusted for inflation at 2015 rates.

FIGURE 3.1 LOCATION OF GEF-SUPPORTED PROTECTED AREAS

implemented in Africa, which received 28 percent of total funding. These two regions also had similar amounts of cofinancing—28 percent and 29 percent, respectively.

The GEF has helped protect 2,785,350 km² of the world's nonmarine PAs, 58 percent of which are key biodiversity areas.

A review of project documents (endorsed/approved by the GEF CEO as of April 2015) and of METT assessments (submitted as of January 23) identified a total of 1,292 nonmarine PAs as having been supported by the GEF in 119 countries; these cover a total area of 2,785,350 km². Fifty-one percent of the PAs (664) were in tropical biomes, and 58 percent were classified as in key biodiversity areas.[7] Globally, key biodiversity areas represent the most significant sites for biodiversity conservation in terms of vulnerability and irreplaceability, and are crucial for maintaining the population of different species and conserving ecosystems (Eken et al. 2004). Thirty-one percent of GEF-supported PAs in the evaluated cohort, while not classified as key biodiversity areas, have received one or more international designations for high biodiversity and/or cultural value as a WWF priority area, a Conservation International biodiversity hotspot, an Alliance for Zero Extinction site, an Important Bird Area, a Ramsar site, or a UNESCO World Heritage Site (annex B). The remaining 11 percent of PAs were found to have various levels of local or national designation indicating high biodiversity value to their respective country. The 1,292 sites included in the evaluation do not include PAs supported by the GEF that are not registered by countries in the World Database on Protected Areas, such as municipal or private PAs, which also constitute a large area. They also do not include PAs that were not specifically named in project documents, but nevertheless received GEF funding.

7 Key biodiversity areas are classified using five major criteria and thresholds: (1) threatened biodiversity, (2) geographically restricted biodiversity, (3) ecological Integrity, (4) biological processes, and (5) biodiversity through quantitative analysis. Each of these major criteria has globally standardized subcriteria and thresholds.

CHAPTER 4

BIODIVERSITY IMPACTS IN GEF-SUPPORTED PROTECTED AREAS

To assess the impacts and contributions of GEF support to PAs and PA systems, the evaluation used two indicators to measure biodiversity outcomes at the global scale: changes in forest cover and trends in wildlife populations. Based on availability of spatial information regarding both the PAs and landscapes where the GEF provided support, Mexico was selected as a case study for a detailed analysis of forest cover change using propensity score matching. Information from a subset of 191 projects that were included in OPS5 was used to assess environmental outcomes at project completion, as reported in terminal evaluations. The results from these analyses are presented below.

TRENDS IN FOREST COVER

From 2001 to 2012, GEF-supported PAs lost up to four times less forest cover than the countrywide aggregate, and at least two times less than PAs that were not supported by the GEF in the same biomes and countries.

At a global scale over the 2001–12 period, the aggregate median loss in 580 GEF-supported forested PAs in 73 countries was 1.2 percent. In comparison, the countrywide aggregate loss—which included both protected and nonprotected forests—was 4.1 percent (see annex C for individual country figures).[1]

For the same time period, and within the same country and biome type, forest cover loss was lower both in GEF-supported PAs and their 10-km buffers compared to PAs not supported by the GEF and their respective 10-km buffers. Median forest loss was found to be 2.4 times less in GEF-supported PAs (0.9 percent) than in non-GEF PAs (2.3 percent) within the same biome (table 4.1). Furthermore, the 10-km buffers of GEF-supported PAs had 1.3 times less forest loss (3.4 percent) than the respective buffers of the same non-GEF PAs (4.5 percent). GEF-supported PAs therefore had 3.6 times less forest cover loss than their buffer areas. In contrast, because they had higher forest cover loss to begin with, non-GEF PAs had only 1.9 times less percent cover loss than their respective

1 For this analysis, "forested" is defined as a polygon that meets two criteria for the baseline year of 2000: (1) at least 1 km^2 of forest area and (2) at least 10 percent forest cover. Of 1,109 non-overlapping GEF-supported terrestrial PAs, 580 met these criteria. These PAs are limited to those identified from project document reviews and METT assessments that could be found in the World Database on Protected Areas.

TABLE 4.1 FOREST COVER LOSS 2001–12 IN GEF AND NON-GEF PROTECTED AREAS AND THEIR RESPECTIVE BUFFERS

Unit of analysis	Median % forest cover loss	
	GEF supported	Not GEF supported
PA	0.9	2.3
10-km buffer	3.4	4.5

NOTE: GEF and non-GEF comparisons are within the same country and biome type.

buffer areas. Thus, overall, GEF-supported PAs fared better than non-GEF-supported PAs and nonprotected forests during the decade.

On the other hand, increase in forest cover over the same period was marginally higher (0.1 percent) in non-GEF PAs on average than in GEF-supported PAs. This marginal difference is not indicative of any conclusive and clear trends in forest cover gain. Gain in forest cover generally occurs due to natural regeneration in some regions, such as in boreal forests due to abandonment of agricultural lands (Achard et al. 2006) or establishment of plantations. Causality is difficult to establish without direct evidence and local data from the ground. It is also difficult to establish whether gain in forest cover is temporary or permanent, or whether it is due to natural or plantation species (Lepers et al. 2005).

Non-GEF PAs in South Africa had maximum gains, with 5 out of 12 PAs showing more than 50 percent gain in forest cover. Most of the sites that gained forest cover were in plantations within and adjacent to the PAs, which were identified through interpretation of high-resolution time-series satellite data. The country has a legacy of establishing commercial forestry plantations at the margins of natural forests (Grundy and Wynburg 2001). Similarly, other non-GEF PAs in Malaysia and Vietnam that saw forest cover gain have historically been part of forestry plantations, and have undergone a cycle of deforestation and reforestation over the years. Among the GEF sites, the highest gain (16.6 percent) was in Ibera, a protected reserve in Argentina, while the second highest gain (16.0 percent) was in Krka-donji tok, a protected landscape in Croatia. The gain in Ibera most likely reflects better protection of native forests as well as plantations by private landowners, who own 60 percent of the land within the reserve;[2] whether the gain in Krka-donji tok was due to plantations or native forests is difficult to discern without ground data.

Loss across biomes

Most (199) GEF-supported PAs were in the tropical and subtropical moist broadleaf forest biome, which also experienced the greatest forest loss in terms of area at 6,219.03 km^2 (table 4.2). These results are consistent with global trends: globally, tropical and subtropical forests exhibit the greatest loss, followed by temperate and boreal forests (Hansen et al. 2013). The least loss in forest cover among GEF-supported PAs was seen in the temperate coniferous forest biome (17.67 km^2, $n = 7$). In terms of percentage loss of forest cover, GEF-supported PAs in the tropical and subtropical coniferous biome had the largest loss at 6.22 percent, followed by the tropical and subtropical dry broadleaf forest biome at 2.57 percent. Again, the temperate coniferous forest biome had the smallest loss at 0.58 percent.

2 The Conservation Land Trust, http://www.theconservationlandtrust.org/eng/ibera.htm.

TABLE 4.2 ESTIMATED FOREST LOSS IN GEF PROTECTED AREAS BY BIOME

Biome	Number of GEF PAs	Forest area in 2000 (km^2)	Forest loss 2001–12	
			km^2	%
Tropical and subtropical moist broadleaf forest	199	382,864.50	6,219.03 (H)	1.62
Tropical and subtropical coniferous forest	22	33,527.81	2,087.01 (H)	6.22
Tropical and subtropical dry broadleaf forest	39	72,640.73	1,866.83 (H)	2.57
Desert and xeric shrubland	7	1,691.13	28.02 (L)	1.66
Temperate coniferous forest	7	3,035.45	17.66 (L)	0.58

Loss across countries

Forest loss in GEF-supported PAs varied widely within countries. By percentage, Turkey had the lowest forest cover loss (0.02 percent), while Nicaragua had the highest (9.78 percent) (table 4.3). In terms of square kilometers of forest area loss, again Nicaragua had the largest loss at 2,672.77 km^2 (n = 24), followed by Indonesia at 1,931.12 km^2 (n = 15); again, Turkey had the lowest loss in forest area (table 4.4).

While the broader trend of forest loss in GEF-supported PAs indicates high forest loss in tropical countries, the drivers of deforestation can be influenced by both country-specific socioeconomic conditions, policy formulations, and the local context (Rudel et al. 2005). The key factors at play in the worst-faring countries, as in Nicaragua, might be related to an overall low level of socioeconomic development and land tenure enforcement (Redo et al. 2012). The GEF-supported PAs in Nicaragua, for example, are mostly in the tropical biome, which suffered more forest loss than other biomes, as its forests are threatened by agricultural expansion, cattle grazing, commercial logging, and forest fires. Government-granted logging concessions in the mid- to late 1990s and illegal logging also increased forest degradation and loss in Nicaragua (Gourdji 2013). A GEF project implemented in the country from 2005 to 2012 to support its PA system did not succeed in having the government pass a PA act or develop a PA financing mechanism as planned. Thus, the project's terminal evaluation concluded that, while PA management in the country had improved, it was to a lesser extent than could have been expected given the scale of degradation (Montes and Jerez 2013). In Honduras, and also recently in Nicaragua, rapid deforestation has been linked to an increase in drug trafficking and commercial agriculture (McGrath 2014).

On the other hand, as shown in tables 4.3 and 4.4, Suriname and Turkey had low forest cover loss. Turkey's Camili Biosphere Reserve is the first and only Biosphere Reserve in the country, with 60 percent of the reserve having minimal ecological risk from natural disasters, hydroelectric power plant construction, road construction and human activities (Özşahin and Kaymaz 2013). Camili Biosphere Reserve was one of the four pilot sites of the Turkish government's Biodiversity and Natural Resources Management Project supported by the GEF from 2000 to 2008. Project activities included training and awareness raising,

TABLE 4.3 HIGHEST/LOWEST FOREST COVER LOSS IN GEF NONMARINE PROTECTED AREAS BY COUNTRY (%)

Country	Number of GEF PAs	Forest area (2000)	Loss from 2001–12 (%)	Biome
Nicaragua	24	27,320.52	9.78 (H)	Tropical and subtropical moist broadleaf forest; tropical and subtropical dry broadleaf forest; tropical and subtropical coniferous forest; mangrove
Honduras	11	18,998.90	8.60 (H)	Tropical and subtropical moist broadleaf forest; tropical and subtropical dry broadleaf forest; tropical and subtropical coniferous forest
Guatemala	8	11,663.91	8.16 (H)	Tropical and subtropical moist broadleaf forests; tropical and subtropical coniferous forests;
Suriname	2	12,114.40	0.06 (L)	Tropical and subtropical moist broadleaf forests
Turkey	1	175.40	0.02 (L)	Temperate grasslands, savannas and shrublands

TABLE 4.4 HIGHEST/LOWEST FOREST COVER LOSS IN GEF NONMARINE PROTECTED AREAS BY COUNTRY (KM^2)

Country	Number of GEF PAs	Forest area (2000)	Loss from 2001–12 (km^2)	Biome
Nicaragua	24	27,320.52	2,672.77 (H)	Tropical and subtropical moist broadleaf forest; tropical and subtropical dry broadleaf forest; tropical and subtropical coniferous forest; mangrove
Indonesia	15	63,587.64	1,931.12 (H)	Tropical and subtropical moist broadleaf forest; mangrove
Honduras	11	18,998.90	1,635.26 (H)	Tropical and subtropical moist broadleaf forest; tropical and subtropical dry broadleaf forest; tropical and subtropical coniferous forest
Tunisia	1	20.16	0.02 (L)	Mediterranean forests, woodlands and scrub
Sierra Leone	1	12.29	0.01 (L)	Tropical and subtropical grasslands, savannas and shrublands

development of participatory management plans, alternative income generation, and ecotourism activities. The local contextual factors and recognition and prioritization by the Turkish government in promoting the reserve may be linked to the low forest loss in the area. Despite these achievements, planned infrastructure projects in Turkey are currently threatening its PAs (Şekercioğlu et al. 2011).

Loss over period of GEF support

The average difference in forest loss rate before, during,and after project implementation was a median value of –0.006 percent per year, indicating almost no change between these periods.[3] But these results should be interpreted with caution. Due to constraints posed by limited project-related and global time-series data for analyses that attempted to compare differences between periods with

3 No statistically significant difference was seen when comparing aggregate forest loss rates during the period of GEF support with those of the preceding periods (n = 290, t = –0.16, p > 0.05), and after GEF support (n = 273, t = –1.73, p > 0.05).

and without GEF support, only PAs that received support no earlier than 2003 (for the analysis of before versus during GEF support) or that stopped receiving support no later than 2008 (for the analysis of during versus after GEF support) could be included in the samples. No time-series comparisons could be made for PAs that were supported fully within or before this period as globally consistent 30-m-resolution forest loss data are available only for the period 2001–2012.

However, examining individual PA cases shows differences in forest loss rates between the periods before and during GEF support. These differences range from an annual increase in forest loss of 2.86 percent in Ranobe PK-32, a PA in Madagascar; to an annual decrease of 8.68 percent in the Ubsunurskaya Kotlovina Nature Reserve in the Russian Federation. The Madagascar increase may be partly explained by overall countrywide and local factors—forest clearance for subsistence farming; small-scale disturbances associated with selective logging; cutting of trees for fuelwood, charcoal, and building materials within PAs; and political crisis in Madagascar during project implementation (Allnutt et al. 2013; Sussman, Green, and Sussman 1994). Also, Ranobe PK-32 is located in the spiny forest ecoregion, which has one of the fastest rates of forest loss among the different forest types (Baastel 2012; Harper et al. 2007).[4] The terminal evaluation of the national-scale Third Environment Programme that implemented activities in Ranobe PK-32 mentions that the PA was new, and that the large number of stakeholders made it difficult to coordinate interventions (Baastel 2012).

On the other hand, the nature reserve in Russia shows a large decrease in the rate of forest loss during the project period. The two main drivers of deforestation in this region (Eurasia) are unsustainable logging and increased frequency of fires (Achard et al. 2006; Lepers et al. 2005; Shishikin, Onuchin, and Sukachev 2012). GEF support was delivered as one of three parallel projects in three adjacent countries spanned by the Altai-Sayan ecoregion. Direct support provided to the Ubsunurskaya Kotlovina Nature Reserve as part of this project included the development of a management plan; establishment of a visitor center; and purchase of equipment and vehicles, including fire-fighting equipment. The project also supported initiatives for the expansion of the PA and for its joint management with an adjacent PA in Mongolia, to cover a larger area of the ecoregion. The project itself was rated highly satisfactory by the terminal evaluation (Kasparek 2011).

Contextual factors contributing to loss

A linear mixed effects model was used to understand the influence of 15 contextual variables on forest loss rates.[5] Higher terrain ruggedness, mean terrain elevation, and

4 The rate of deforestation in spiny forests between 1990 and 2000 was 1.2 percent, the highest recorded among all forest cover types; however, image availability issues may affect the accuracy of that figure (Harper et al. 2007).

5 These variables were terrain ruggedness, terrain elevation (mean), road density, percentage of natural land cover, human population, human footprint (Human Influence Index), PA size, age of PA, year of project start, biome (tropical/temperate), biome (Mediterranean forest), percentage of forest cover in PA, percentage of forest cover in buffer, Implementing Agency, and project type (medium or full size).

road density were correlated with lower forest loss rates within GEF-supported PAs. The most reasonable explanation for the importance of terrain ruggedness and terrain elevation is that forests located within rugged PAs and situated at high elevations are less accessible and therefore less likely to be harvested (Dale et al. 1993; Green and Sussman 1990). Clearing for agriculture also tends to take place in areas accessible and suitable for such land use (Nagendra, Southworth, and Tucker 2003). While the correlation between lower forest loss rates and higher road density seems counterintuitive given these explanations, it should be noted that the road data used are mostly primary roads connecting two settlements and do not include unpaved or logging roads.[6] Although roads in forested areas can lead to deforestation (Laurance and Williamson 2001; Mäki, Kalliola, and Vuorinen 2001), increasing road density could be an indicator of overall development in feasible economic activities and governance institutions—thus strengthening law enforcement in the PA and reducing dependence on timber-based products to sustain the local economy (Chomitz 2007). While elevation and roads do influence forest loss, their impacts have been context specific and found to vary across different time periods (Nagendra, Southworth, and Tucker 2003). None of the other contextual or project-related variables showed statistically significant correlations.

One major limitation to increasing the sample size to ensure more robust statistical results was the lack of spatial information on which PAs the GEF provided support to, and the lack of PA-specific information that could be extracted from project documents (e.g., exact period and type of support). The type and extent of global data currently available also constrained the type of analyses and interpretation of results that could be made. The small sample sizes and large variance in forest cover loss across GEF-supported PAs and countries preclude generalization of these results using the global average.

To address the limitations of the global data, more detailed analyses were done for a specific country to assess the extent of avoided forest cover loss that could be attributed to the GEF by quasi-experimental means. Mexico was chosen as a case study, based on the ready availability of spatial information regarding both PAs and landscapes where the GEF provided support (figure 4.1).

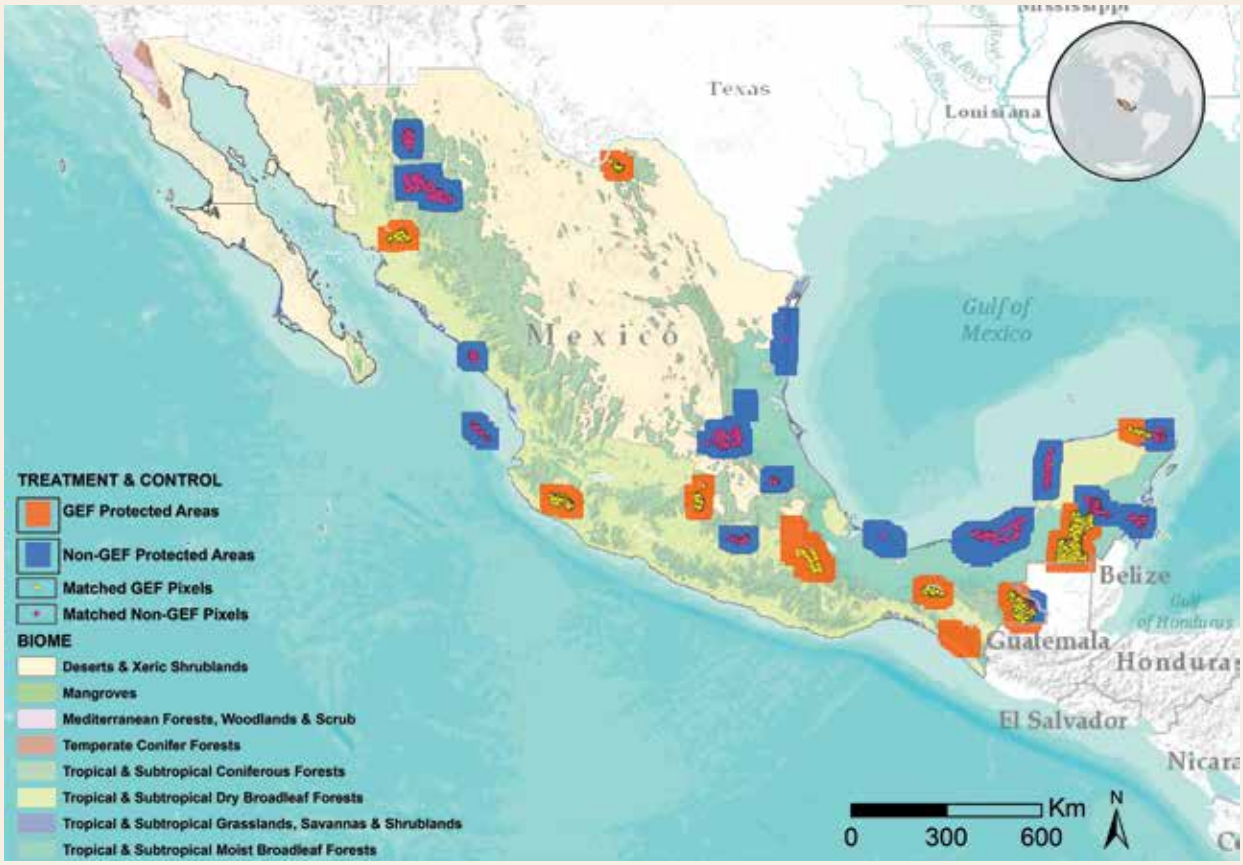
Analyses show that GEF-supported PAs in Mexico avoided up to 23 percent forest loss from 2001 to 2012 compared to PAs that did not directly receive GEF support during this period, with results varying across biomes and ecoregions.

Propensity score matching using 30-m-resolution forest loss pixels as the dependent variable and nine socioeconomic and biophysical explanatory variables showed that GEF-funded PAs in Mexico have 23 percent less forest loss than PAs not funded by the GEF over the 2001–12 (SE = 0.0059, n = 13,291 pixels).[7] Among

6 Global Roads Open Access Data Set, Version 1 (gROADSv1), http://sedac.ciesin.columbia.edu/data/set/groads-global-roads-open-access-v1, accessed April 2016.

7 The variables used for matching were percentage of forest cover (2000) and forest loss, distance to forest edge, elevation, slope, topographic ruggedness index, land use suitability, travel time to nearest major city, distance to road, and

FIGURE 4.1 LOCATION OF GEF AND NON-GEF PROTECTED AREAS IN MEXICO



the representative biomes,GEF-funded PAs in the tropical and subtropical coniferous forest biome saw the greatest advantage, with 28 percent less forest loss compared to non-GEF PAs in this biome (SE = 0.02, *n* = 1,636 pixels). However, non-GEF PAs conserved 20 percent more forest in the mangrove biome compared to GEF-funded PAs (*n* = 85 pixels). The GEF-supported mangrove PAs included in this analysis are under pressure from agriculture, cattle ranching, and tourism. The proliferation of cattle ranching and new road construction within the central and western parts of the Ria Lagartos PA, for example, was initially verified through both field interviews and 50-cm resolution DigitalGlobe images available through the U.S. National Aeronautics and Space Administration's NextView program. Non-GEF PAs included in this analysis were found to have very different demographics and income sources, thus resulting in lower pressures.

Among the ecoregions, GEF-funded PAs were particularly better preserved in the

population density. Of the 10 GEF-supported PAs that were matched, 4 began receiving direct support between 2002 and 2009. Due to limitations in the method, any deforestation that occurred prior to these years is assumed to be within the period of GEF support; therefore, the calculated value for avoided deforestation is likely to be an underestimate.

Yucatan moist forest ecoregion, where 65 percent forest loss was avoided in comparison to non-GEF PAs (n = 16,260 pixels). GEF PAs cover 10 percent (7,236 km^2) of this ecoregion. Because GEF-supported PAs were least common in the tropical and subtropical moist broadleaf forest ecoregion, not enough appropriate counterfactual pixels could be identified for these areas to perform the analysis.

Analysis of forest cover loss in four production landscapes in Mexico shows that GEF-supported landscapes had more than ten times less forest cover loss, and also higher forest cover gain, than non-supported ones over a five-year period.

As the GEF has provided considerable support not just to PAs but also to the landscapes adjacent to them, forest cover loss was also analyzed for a landscape-based land use regime. *Ejidos* have mixed land uses, where communities have rights to pursue agricultural as well as forestry activities.[8] Commercially available high-resolution satellite data (up to 2.5 m) for 2005–10 were used to examine land use change in two pairs of *ejidos* located in similar ecosystems. Workshops and field visits with the participation of local leaders were also carried out to interpret satellite images and identify the processes affecting changes.

Results comparing the two GEF-supported *ejidos* and two nonsupported ones indicate that the average forest cover loss in nonsupported *ejidos* (0.035 percent) is more than 10 times higher than that in GEF-supported *ejidos* (0.002 percent).[9] Considering that these *ejidos* cover large areas spanning from 131.5 to 845.0 km², these values are considerable. GEF-supported *ejidos* also showed high forest growth (5.22 km² and 2.28 km², respectively), while growth was negligible (0.05 km^2) in the nonsupported *ejidos*. Despite having considerable areas of forest land and high potential for tourist development, the nonsupported *ejidos* lacked the resources, permits, and know-how to exploit them.

In the two *ejidos* where the GEF supported mainstreaming of biodiversity-friendly productive activities as part of a larger-scale intervention in the Mesoamerican Biological Corridor (box 4.1), forestry activities were much more prominent. Their forests were also much better managed with no presence of invasive ferns, which, when dried, are very combustible, and thus represent a high risk for forest fires in the dry season. This analysis indicates that GEF-supported *ejidos* had opportunities to carry out a variety of biodiversity-friendly enterprises; nonsupported *ejidos* lacking these opportunities were faced with having to adopt more destructive activities, creating a negatively reinforcing cycle of deforestation.

TRENDS IN SPECIES POPULATION OUTCOMES

An analysis of 88 cases of species population time-series data, which included 29 projects implemented in 39 GEF-supported PAs,

8 An *ejido* is an area of land owned and worked by a group of small farmers in accordance with Mexico's Agrarian Reform Law.

9 Factors affecting forest loss in nonsupported *ejidos* included selling land to large agricultural firms, invasive species growth attributed to recurrent burning of agricultural and livestock lands, and land use changes due to urbanization.

BOX 4.1 THE MESOAMERICAN BIODIVERSITY CORRIDOR: ADDRESSING DRIVERS OF ENVIRONMENTAL DEGRADATION, FROM LANDSCAPES TO FARMS

GEF support to landscape management has been both broad and diverse. It has included the introduction of sustainable forestry management and of biodiversity-friendly alternative economic activities, such as payment for ecosystem services and mainstreaming of biodiversity considerations in public spending.

As an example, the GEF has supported the Mesoamerican Biological Corridor for nearly 20 years, with the objective of conserving a set of national biodiversity corridors that would allow for ecological connectivity throughout the region. The corridor covers 768,990 km², representing 30 percent of the land mass of six Central American countries and five southern states in Mexico. In Mexico, the corridor covers 6.8 million ha of land, connecting 23 PAs spanning 2.8 million ha in four states.

The Mexican component of the project began in 2000; it specifically sought to mainstream biodiversity into landscape management in addition to conserving the biological corridors. One objective was to introduce biodiversity-friendly productive activities in 15 percent of this area.

Delays in the establishment of a monitoring system make it difficult to assess the extent to which GEF support helped reduce the rate of habitat loss, but proxy indicators drawn from the National Forest Inventory indicate a drop in deforestation from 1.5 to 1.0 percent yearly for the four states during the periods 1993–2002 and 2002–07. While these changes are not fully attributed to the project, they are likely linked to it.

From 2005 to 2009, the project and its cofinancers supported biodiversity-friendly production in 22,580 ha, and reached more than 40,000 producers. It also helped redirect around $35 million of other government agency funding (nine times the funding provided by the GEF) to 233 biodiversity-friendly subprojects in 680 communities (World Bank 2010). The project helped mitigate drivers affecting biodiversity by helping establish national and state corridor councils, in which government institutions collaborate with nongovernmental organizations and indigenous peoples' organizations to harmonize public development programs for sustainable development activities. These councils helped mainstream biodiversity in public spending affecting the corridor. The project's terminal evaluation reports that at least 40 percent of existing and new public programs took into account biodiversity considerations (World Bank 2010).

While the reach of the project was very broad and points at important contributions to biodiversity protection, inputs and investments are not sufficient to attribute reduced rates of deforestation to GEF support.

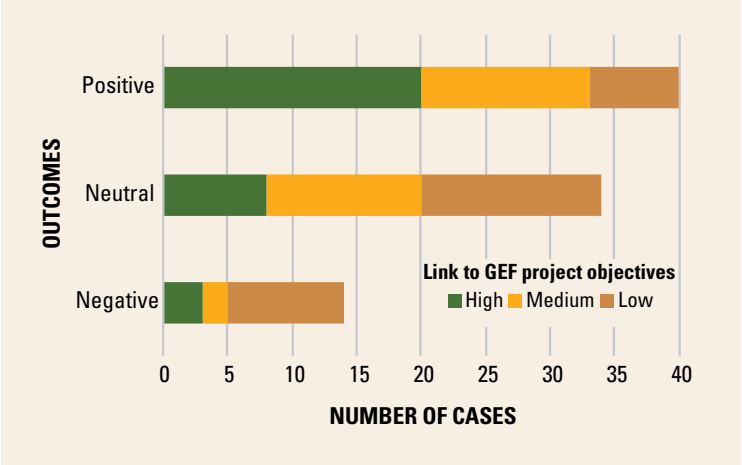
shows that 45 percent had positive trends in wildlife abundance.

Maintaining populations of native species is an implied objective of all PAs, and consistent with the IUCN and CBD definitions of a PA. As such, changes in wildlife abundance are one of the most tangible and appropriate metrics of conservation impact available, and were therefore used as one method to assess the GEF's impact on nonmarine PAs. Species population time series in the Living Planet Index were matched to the GEF-supported PAs by location, and their temporal overlap matched against GEF project start and end dates. Species data were also evaluated against project objectives to check for reasonable expectation of measurable impact. Based on this analysis, the determination was made on the extent to which the changes reported in species population time series can be linked to PA management—and, ultimately, to the goals of the GEF projects.

The likelihood of a project affecting a species population time series was determined against the following criteria:

- **High.** The project goals were specifically related to the species in question; there was some evidence that the activities in the project occurred in the PA in question; and/or the species would likely have been the focus of management, based on its public profile, IUCN category, and biology.
- **Medium.** The project goals were general and not explicitly specified in relation to the species in question, but it could reasonably be concluded that the species would benefit from the project as described, taking into account the biology and habitat needs of the species.
- **Low.** The project goals were poorly specified, and it was uncertain if any species-focused actions took place in the PA as a result of the project; or the species in question was an ecological generalist and unlikely to benefit or lose as a result of most interventions.

FIGURE 4.2 DISTRIBUTION OF SPECIES POPULATION OUTCOMES BY EXTENT OF LINKAGE TO GEF PROJECT OBJECTIVES



Only those population time series determined to have either a high or medium possibility of impact were included in the analysis.

A total of 88 cases of species population time-series data from the Living Planet Index were matched with the objectives of 29 GEF projects implemented in 39 PAs (figure 4.2). Of the 88 cases, 40 (45 percent) had a positive trend in wildlife abundance, 34 (39 percent) presented no change, and 14 (16 percent) showed negative trends. The outcome was considered positive when the slope of the population was more positive after the project was initiated compared to the slope before the project. Thus, the overall trend of the population could still be downward after the project was initiated, but it was considered positive if the rate of decline slowed after project start. A negative change was where the slope of the population was found to be more negative after the project started. A neutral outcome indicated no change in slope.

In PAs where conservation of a particular species was not strongly linked with GEF project objectives, there was a greater incidence of the species population trend not changing or becoming worse. Information obtained through field visits indicates that GEF support was helping reduce threats to biodiversity at the site level. In all 14 GEF-supported PAs for which information was available, biodiversity protection activities were taking place. Ten of these PAs reported reduction in destructive activities; in six, clear links were established between these reductions and GEF support.

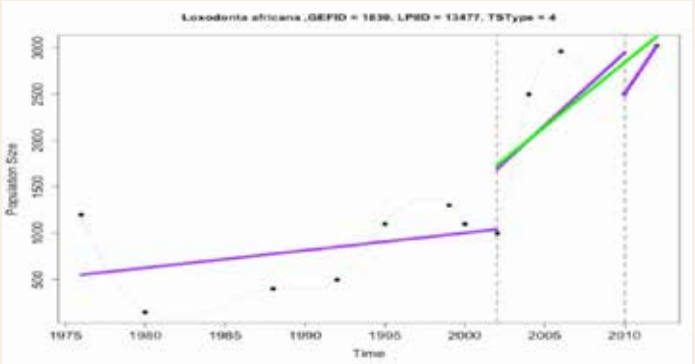
An example of a case with a positive outcome in species population trend is shown

in figure 4.3. In this case, African elephants (*Loxodonta africana*) in Uganda's Queen Elizabeth National Park showed a clear and positive trend after the start of the GEF PA project, and the population has remained high beyond project end. The project goals were aimed at sustainable and cost-effective management of Uganda's wildlife and cultural resources. Sustainability was promoted through a combination of (1) providing funds for improving Uganda's ability to attract tourists to its wildlife and cultural heritage, and (2) encouraging cost-effective management strategies to reduce overall operating costs of the institutions managing these resources. National in scope, the project had specific infrastructure and capacity-building interventions in Queen Elizabeth Park, which had identified elephants as one of its high-profile species for management and for attracting tourists. For these reasons, the ability of the project to influence the species population trend in this PA was considered to be high.

However, the very steep change in slope suggests that other factors may have contributed to the outcome. It is likely that monitoring methods improved, allowing for more complete documentation of the existing population of elephants Interviews of PA staff who have worked in the area support this concept; they report that drones are now being used to monitor wildlife populations in this PA.

Because project documents do not specify all of the individual PAs the GEF supported, the analysis was not able to take into account instances where GEF support may have been delivered through several projects addressing the same species in a given PA. Thus, a lack of change in slope may be due to GEF support or interventions by

FIGURE 4.3 POPULATION TIME-SERIES DATA FOR AFRICAN ELEPHANT FROM QUEEN ELIZABETH NATIONAL PARK IN UGANDA



NOTE: Dotted lines indicate project start and end points.

other actors already influencing the species population trend prior to the specific project period examined in this analysis. No project-related or contextual variables tested proved to be significant in explaining the outcomes.[10] The most significant factor, as assessed through regression tree models, was that larger PAs (> 600 km^2) were more likely to have positive species outcomes compared to neutral outcomes. However, this result was not consistent in all three models used and should be interpreted with caution.

The GEF often supports PA systems at regional, national, and international (more than one country) scales. These kinds of projects are usually designed to build capacity for PA management. For these

10 Contextual variables used for principal components analysis were slope, elevation, road density, human population density, human footprint, PA size, PA age, biome, child malnutrition rate, PA's IUCN category, and species' IUCN Red List Category. Project-related variables included Implementing Agency, project size, and region.

projects, it was very difficult to assess if capacity building at the regional, national, or international level resulted in any on-the-ground impacts in an individual PA. This scale difference between project activities and a PA has the potential to confound the results of the analysis and is a significant limitation of this study.

Some of the species abundance changes observed may be due to factors beyond the influence of the GEF projects; thus, attributing them to GEF involvement is challenging. Species in PAs will undoubtedly be affected by changes occurring beyond the scope of project management. These changes might be as broad as climate change or a global policy change such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) ivory trade ban in 1992. They might also be regional, such as drought or disease outbreak.

These caveats and the very low sample size illustrate the challenges involved in assessing this type of impact. The results cannot be generalized at a larger scale nor attributed to GEF support, but rather are indicative of what could be happening to species populations in some places the GEF has supported. These results are complemented by field visits and interviews to assess which factors, causal links, and behaviors might be at play in leading to the outcomes.

TRENDS IN ENVIRONMENTAL OUTCOMES AT PROJECT END

While global environmental benefits cannot be expected to be achieved immediately after the end of a GEF-supported intervention, some improvements in environmental outcomes may be observed as early as the implementation period.[11] Reviews of terminal evaluations of 191 projects implemented in nonmarine PAs that were included in OPS5 showed that a total of 68 percent of projects reported some positive environmental outcomes by project end.[12] That is, 45 percent of projects reported a reduction in environmental threats, such as stricter ecosystem protection or a decrease in destructive activities; 23 percent further reported an improvement in environmental conditions, such as in habitat cover and species population counts. Twelve percent of projects reported either no change or worsening biodiversity conditions despite GEF intervention due to threats posed by government-sanctioned infrastructure development projects within the PA (e.g., energy, mining), continuing deforestation and poaching due to expanding human settlements, and destruction of habitats due to weather and climate-related phenomena. In one case, habitat degradation was resulting from overgrazing by wildlife that had proliferated with successful protection.

At least 70 percent of projects in each region reported some positive environmental outcomes—except for Africa, where only 57 percent did (table 4.5). Most global projects did not demonstrate positive environmental impacts, as these were often

11 The goal of the GEF is to achieve environmental impact or outcomes, defined as changes in biophysical parameters that could take the following forms: (1) environmental stress reduction: biophysical changes that reflect reduction of threats emanating from human actions (local communities, societies, economies); and (2) environmental status: changes in the status of the environment.

12 The OPS5 portfolio consists of GEF projects with terminal evaluations submitted from 2005 to 2012. As such, these were not randomly selected nor representative of any GEF phase, focal area, or this evaluation's portfolio.

designed to have a research or communications focus, and thus were not expected to produce direct impacts on the environment but to instead catalyze processes and produce information leading to the design of lower-scale interventions with this aim.

These results do not necessarily mean that other projects did not generate any environmental impact. Terminal evaluations were not required to document environmental changes even if they occurred; in cases where these were documented, monitoring data were not always provided to support reports of positive outcomes. In many cases, the time scale required for environmental changes to manifest is quite long and cannot be assessed at project end or even a few years after project completion. In other cases, environmental monitoring practices might not have been sufficiently robust to detect and report on changes in the environment.

Of the biodiversity focal area portfolio analyzed for OPS5, 65 percent of terminal evaluations provided some quantitative information on environmental outcomes. These quantified outcomes were aggregated to estimate the extent of change that had occurred by project end. Table 4.6 shows the results of this analysis. While

TABLE 4.5 PERCENTAGE OF GEF PROJECTS REPORTING ENVIRONMENTAL IMPACT AT PROJECT COMPLETION, BY REGION

Type of environmental impact	Africa	Asia	ECA	LAC	Global
Reported positive impact	57	72	77	70	71
No reported positive impact	43	2	23	30	29

NOTE: ECA = Europe and Central Asia; LAC = Latin America and the Caribbean.

TABLE 4.6 TYPES OF ENVIRONMENTAL OUTCOMES RECORDED AT PROJECT COMPLETION

Type of environmental impact	Quantified value	No. of projects reporting
Habitat and species conservation		
Area of new PAs (ha)	187,155,172[a]	50
Number of new PAs	446[b]	44
Area of improved management (ha)	1,750,289	7
Area restored (ha)	338,661	28
Decline in cases of poaching (average %)	63	4
Sustainable management in landscapes		
Area allocated for conservation (nonmarine) (ha)	1,590,593	13
Area allocated for sustainable enterprise and cultural uses	347,740	3
Area of freshwater ecosystems under sustainable resource use	27,097	2

NOTE: *n* = 125 projects.

a. Of these, 25.05 million ha correspond to a total of 297 newly established PAs.

b. The area and number of new PAs do not coincide, as some terminal evaluations only report either total area or number of new PAs, but not both.

these projects represent a small percentage of the entire portfolio covered by this evaluation, they indicate the types of environmental outcomes that may be achieved by project end and how commonly reported each type is.

CHAPTER 5

MANAGEMENT EFFECTIVENESS

MANAGEMENT EFFECTIVENESS AT A GLOBAL SCALE

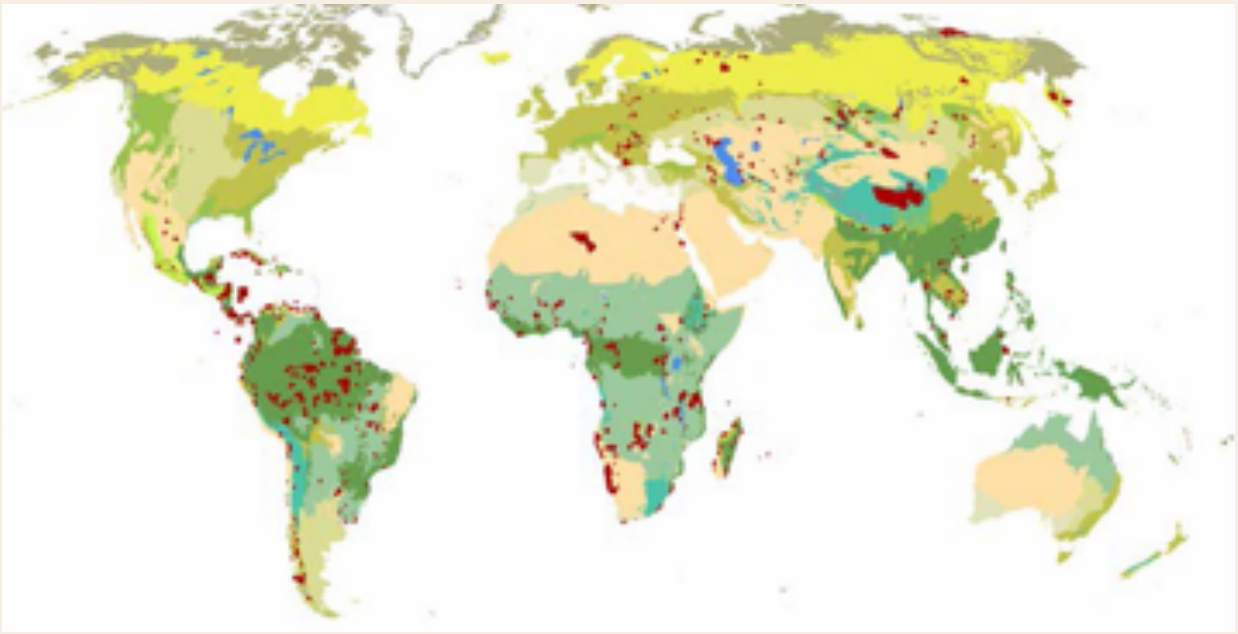
PA management effectiveness schemes are used in many parts of the world to evaluate the strengths and weaknesses of PA management systems. Management effectiveness is comprised of three main components: (1) design and planning issues, (2) appropriateness of management systems and processes, and (3) delivery of PA objectives (Hockings 2003).

The Management Effectiveness Tracking Tool is part of a suite of approaches designed to help understand PA management effectiveness and is one of the most widely used management assessment tools for PAs worldwide (Stolton et al. 2007). It is a questionnaire-based monitoring tool that documents the status of 30 site-specific management elements ranging from legal status, equipment, and quality of management plans to outreach programs and tourist facilities (annex A). It collects information on PA objectives, threats, budgets, staffing, size, and designations. For each question, assessors in the field assign a score from 0 to 3, depending on the status of the specific management element. While not a direct measure of conservation outcomes, improvements in management effectiveness are considered to be a proxy for a PA's potential to deliver desired conservation outcomes. Since 2004, the GEF has required submission of a METT for each PA a project supports at least three times during the project period (baseline, midterm, and end) to monitor progress toward more effective PA management over time. METT assessments submitted for GEF-supported PAs were analyzed to assess management effectiveness in GEF-supported PAs and to measure change in METT scores over time. The evaluation also assessed the reliability of the METT as a monitoring tool.

Information gathered through the METT indicates that GEF-supported PAs tend to have well-established legal status, boundaries, and design. Improvements over time were greatest in process-related aspects such as management planning, law enforcement, PA regulation, and resource inventory.

A total of 2,440 METTs were analyzed from 1,924 GEF-supported PAs in 104 countries, of which 352 PAs had multiple METTs (figure 5.1). A METT has 30 individual questions, but only 20 percent of assessments had only half or less than half of the 30

FIGURE 5.1 LOCATION OF PROTECTED AREAS WITH SUBMITTED METTS



questions answered.[1] Some 46 percent of the METTs came from Latin America and the Caribbean, especially Mexico; Asia was the least represented region, with only 11 percent of the METTs in the data set. As the majority of GEF-supported PAs are also found in Latin America and the Caribbean, the global results reported here may therefore be more representative of Latin America and the Caribbean than all regions on average. It is also expected that the METT assessments available for analysis are skewed toward PAs that are better managed and countries that have higher capacities, as filling out the METT and ensuring it is submitted to a global repository requires certain capacities that less effectively managed PAs may not have. UNDP was the GEF Agency for the majority of the METTs in the data set (n = 1,281).

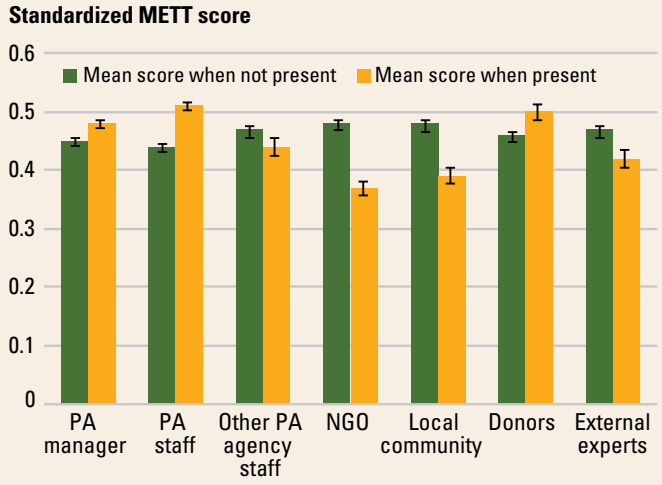
Standardizing METT scores on a 0–1 scale for only those assessments that had more than half the questions answered, the overall mean METT score for GEF-supported PAs was 0.47. The highest individual mean scores were found to be for legal status, PA boundaries, and PA design. The lowest mean scores were found for contributions of commercial tourism to PA management, and involvement of local communities and indigenous people in PA decision making. Ten contextual variables, selected based on

1 This evaluation found in an initial study that 65 percent of required PAs (1,865) had submitted METT assessments at least once during the project period; only 24 percent of PAs supported by completed projects (290) also submitted a METT assessment at project end for which a time-series analysis could be done. For more recent, ongoing projects as of 2013, submission of at least one METT was found among 72 percent of PAs (1,575). This evaluation, with the help of the Secretariat, the Agencies, and some country GEF focal points, invested significant effort and resources for this initial study into compiling the METTs in a searchable database, and subsequently searching for additional METTs.

those factors from the literature identified as likely to affect PA outcomes, were tested against overall scores and did not yield any statistically significant correlations.[2] However, it was found that higher mean METT scores were correlated with the presence of PA managers and staff; scores were found to be lower by as much as 0.1 (on a scale of 0–1) when community members, nongovernmental organizations (NGOs), and external experts were present (figure 5.2). Thus, which stakeholder groups are present when METT assessments are conducted has a significant effect, suggesting that factors other than PA management level and quality affect METT scores.

Only 275 of the 1,924 PAs (14 percent) had repeat METT assessments that could be analyzed for changes in management effectiveness over time. Of these, 70 percent saw improvements in total score, 27 percent experienced declines, and 3 percent saw no change. The greatest improvements were observed in the process- and planning-related elements as opposed to the context, output, and outcome elements. The average increase was from 0.45 to 0.51, over a mean of 3.8 years.[3] A significant positive correlation was found between the number of years between first and last METT assessment and changes in scores; this suggests that the longer the period of management, the greater the change in score (figure 5.3). Of the 30 individual METT measures, 26 showed statistically

FIGURE 5.2 EFFECT OF STAKEHOLDER PRESENCE AT ASSESSMENT ON MEAN METT STANDARDIZED SCORES



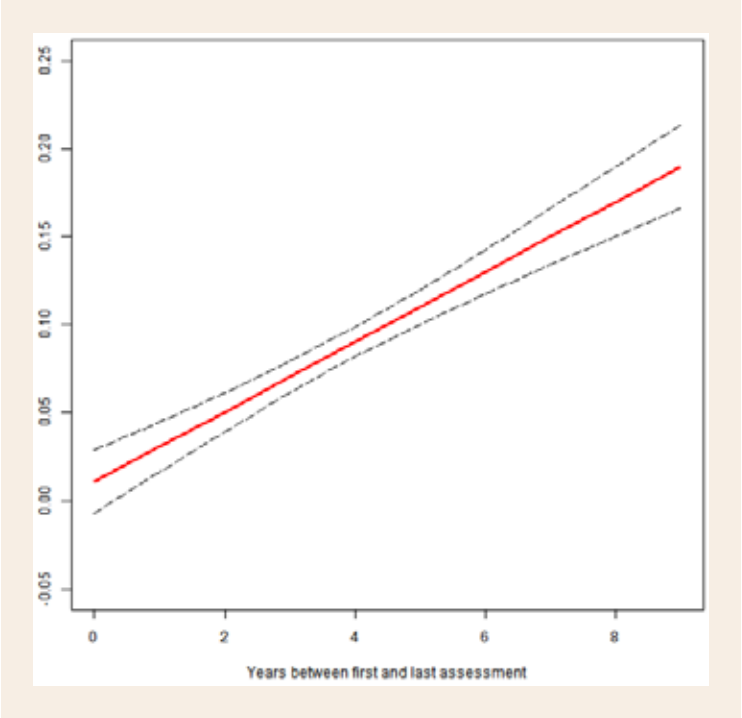
NOTE: Error bars show the standard error of the mean.

significant improvement (figure 5.4). The greatest improvements were observed in the adequacy of management plan (Question 7), law enforcement (Question 3), PA regulation (Question 2), resource inventory Question 9), and PA objectives (Question 4). No statistically significant improvement was seen in legal status (Question 1) and use of fees (Question 26); assessments of the involvement of indigenous peoples (Question 22) and of the PA's biological condition (Question 27) indicated a decrease in mean scores. Low or no improvement of legal status is expected, as the vast majority of PAs supported by the GEF are already legally gazetted, and thus there is very little room for improvement. Lower scores on involvement of indigenous peoples and the biological conditions in PAs may reflect weaknesses in the METT itself rather than accurately capturing change. For instance, on the measure related to indigenous peoples, the structure of the METT does not

2 The 10 tested variables were slope (median), elevation (mean), road density, human population, human footprint, size, age of PA, year of METT assessment, staff, and budget.

3 The standard errors for these scores were 0.008 and 0.009, respectively; $t = 5.25$; $p < 0.0001$ (SE = 0.09; median = 3 years).

FIGURE 5.3 ESTIMATED CORRELATION BETWEEN NUMBER OF YEARS BETWEEN METT ASSESSMENTS AND CHANGE IN SCORE



NOTE: Dotted lines represent 95 percent confidence interval.

allow evaluators to distinguish between PAs where no indigenous peoples were present and those where issues related to indigenous peoples were relevant but not addressed. In both cases, the measure would receive a score of 0.

While the METT does include measures of outputs and outcomes, it is much better at evaluating processes and inputs. This is because measures of outcomes, such as those related to biological conditions, implicitly measure several variables of a complex, integrated nature. Yet each complex outcome is captured by only one question structured similarly to questions measuring more straightforward processes and inputs, and is assessed using a single four-point scale question rather than with actual quantitative monitoring data.

Assessment of biological conditions, for example, is a complex process, because many PAs encompass several key species and ecosystems (wetlands, forests, etc.) that often have varying trends. Interpretation of field data is thus difficult, as those who conduct the METT may find it challenging to integrate information from across different ecosystems and ecosystem components (e.g., predators, herbivores, invasive species) in answering a single question.[4] Thus, to fully evaluate outcomes toward biodiversity objectives, other lines of evidence—such as remotely sensed forest cover change or wildlife abundance measured at several points in time, as presented in chapter 5—are used to triangulate METT results.

None of the contextual variables significantly explain the overall METT scores, which suggests that neither landscape characteristics, PA attributes, nor socioeconomic factors systematically affect the observed scores. In addition, an analysis comparing final METT scores with 2001–12 forest cover loss showed no correlation between overall management effectiveness and forest cover loss. A correlation analysis between METT scores and wildlife abundance trends was not possible because of to the low sample size of GEF-supported PAs when matched to Living Planet Index data for the specific periods of GEF support. Analyses of changes in METT scores with and without and before and after GEF support were attempted; however, information

4 Two recent case studies conducted in India and Zambia to assess METT utility led to a revision of the tool to address systemic weaknesses with regard to outcome measurement. Recommendations were also made to eliminate bias. The METT has since been revised to address these limitations in preparation for use in GEF-6.

gaps regarding GEF support of particular PAs and time periods made comparison within an acceptable margin of error impossible.

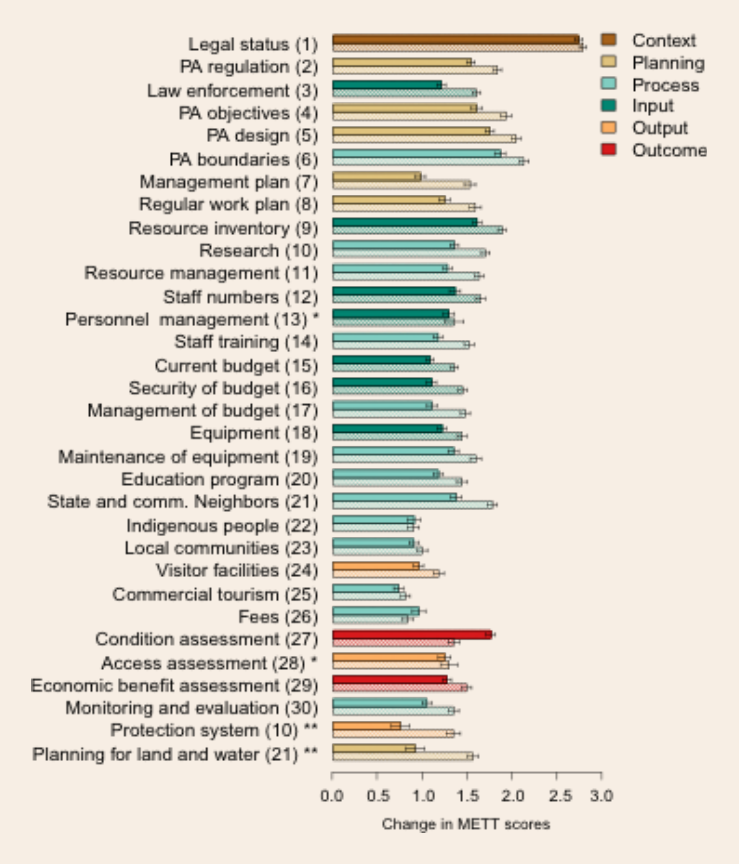
The METT is a site-specific tool (Stolton et al. 2007); as such, it allows for a review of management, output, and outcomes in the context of local conditions (box 5.1). It has limited utility in providing information on multisite-level initiatives or interventions targeted at higher, systemwide scales (e.g., national legislation, agency level, or governance). Yet many GEF projects have been designed at these scales, working to improve PA systems, country-level legislative procedures, and governance structures. Many GEF projects working in nonmarine PAs may therefore have contributed to changes at higher scales that are not captured by a site-level METT analysis.

MANAGEMENT EFFECTIVENESS AT VISITED SITES

Increased management effectiveness was reported in the majority of GEF-supported PAs visited; this primarily took the form of improved law enforcement and compliance with PA regulations. However, external pressures continue to threaten most PAs.

To complement the global analyses and investigate the drivers and causal links that may be leading to observed biodiversity outcomes, field visits were conducted in 28 PAs in seven countries, covering three regions.[5] Both GEF-supported and non-GEF PAs were visited to identify and compare factors affecting the extent of biodiversity outcomes: 17 were identified as GEF-supported, and 11 did not receive GEF support. While efforts were made to select comparable PAs representing both successful and unsuccessful cases, the expert opinion of Reference Group members and of relevant

FIGURE 5.4 CHANGES IN MEAN SCORES ON INDIVIDUAL QUESTIONS BETWEEN FIRST AND LAST METT ASSESSMENTS



NOTE: The first assessment (solid-colored bars) and last assessment (hatched bars) for 275 GEF-supported PAs with multiple METT assessments. Error bars are standard error. All changes were significant and increased except for Questions 1, 26, and 27. The different colors represent the six PA management effectiveness elements. * = questions only found in METT 1; ** = questions only found in METT 3.

5 Case study criteria are set out on page 9. In addition, it was agreed that countries meeting these criteria that were already overburdened by GEF and/or UNDP evaluations and/or overstudied by other institutions would not be selected. Final country selection was made in consideration of the number of UNDP projects (completed and ongoing) implemented in the country to ensure adequate representation among GEF Agencies.

BOX 5.1 METT APPLICATION AT THE COUNTRY LEVEL: THE VIETNAM CONSERVATION FUND

The GEF has provided considerable support to biodiversity monitoring using the METT, which is required as part of a project's regular reporting processes. But use of the METT has seen mixed results, with some countries modifying questions to suit their purposes (e.g., South Africa, Zambia), others using other tracking instruments (e.g., Colombia, Indonesia, Mexico, Uganda), and still others saying they use the METT only to comply with GEF project requirements (e.g., Uganda, Vietnam). This divergence highlights a divide between the technical experts developing the tool and the end users at the country level. Moreover, capacities in completing the METT vary across PAs, making the quality of the data collected uncertain, and uneven at best. Vietnam's experience illustrates the challenges in using the METT as currently configured to inform management decisions.

As part of the GEF-supported Forest Sector Development project, the Vietnam Conservation Fund analyzed 219 METTs completed for 56 special-use forests to assess improvements in management effectiveness.

General trends were discernible: notably, aspects related to management board capacities increased from 19 percent to 30 percent while scores related to threats tended to decrease, reflecting increased illegal logging and hunting, which the project found especially difficult to counter due to high levels of demand. Staff verified 113 METT assessments for 21 forests and made significant downward adjustments in the scores. The staff found that variations in how the METT had been conducted in different regions made comparisons difficult. They also noted the disconnect between improved management board scores and the continued threats to biodiversity, in some cases involving corrupt forest department officials.

Overall, the staff's assessment of the METT was that (1) it is highly subjective, (2) scores are open to manipulation, (3) scores are difficult to compare year to year, and (4) the METT has too many variables while not properly incorporating aspects related to threats.

government agencies was ultimately used as the basis for final PA selection given the lack of detailed site information.

Consistent with the results of the METT analysis discussed in the previous section, improved law enforcement was reported in 13 of the 17 GEF-supported PAs that were visited, with 10 reporting a reduction in at least one activity destructive to biodiversity, such as poaching or illegal logging; and 9 noting improved compliance with PA regulations (figure 5.5). Positive changes were found in areas that experienced an increase in PA staff capacity and infrastructure, such as fences, ranger outposts, and surveillance technology. All PAs that reported increased compliance with regulations also reported increased participation among communities in PA management activities.

The GEF contributed to improvements in law enforcement by providing training and equipment to PA staff. It contributed to increased community participation in PA management by promoting co-management approaches and by helping change community attitudes toward PAs. Chapter 6 provides a more in-depth discussion of GEF support toward increasing community engagement.

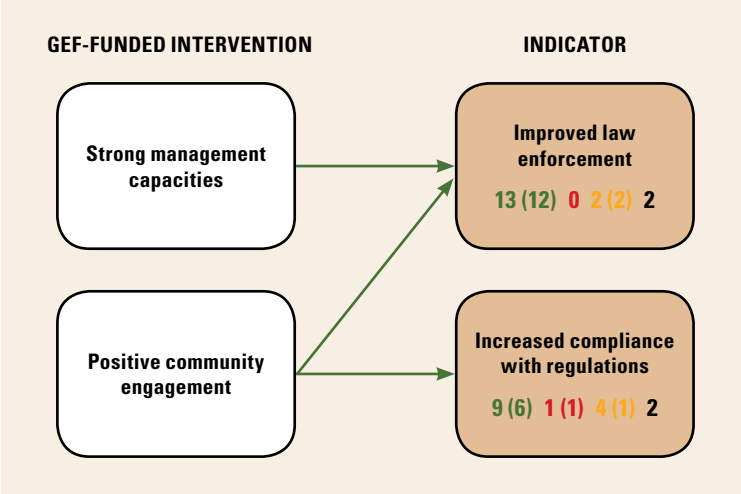
Key contributing factors to improved law enforcement and compliance with regulations were found to be a combination of strong management capacities and

community engagement activities, which the GEF has supported to a significant extent in the majority of PAs. At least 11 of the 17 visited PAs reported that GEF support contributed to the development of dedicated PA staff and leadership, perception of concrete benefits from the PAs by adjacent communities, and synergistic relationships with other donors and local government.

Among the 28 PAs visited, qualitative comparative analysis showed that 85 percent of those reporting a decrease in destructive activities had five characteristics in common:[6]

- Professional, trained, and dedicated PA staff
- A process for basic community consultation
- Information on the PA provided to communities
- The presence of threatened species or high-value resources in the PA (such as timber or wildlife), which may provide an incentive to governments to increase protection
- Either good PA leadership, or external support in addition to that coming from the government

FIGURE 5.5 LINKS BETWEEN GEF-FUNDED INTERVENTIONS AND INDICATORS OF MANAGEMENT EFFECTIVENESS AT VISITED PROTECTED AREA SITES



NOTE: ■ = positive change (linked to GEF support); ■ = negative change (despite GEF intervention); ■ = no change (despite GEF intervention); ■ = no data.

The absence of one characteristic can lead to a difference in outcome, as in Nakuru in Kenya, which did not see a decrease in destructive activities; it possessed all key contributing factors except for information on the PA being provided to communities, which indicates a lack of community engagement.

Moreover, a decrease in destructive activities was seen when communities either perceived concrete benefits from PA management activities or the PA was easy to access. This finding could mean that destructive activities declined when communities complied more with regulations, or when they shifted their activities to more biodiversity-friendly ones as a result of seeing direct or indirect benefits in the PA's existence. It could also mean that regulations were better enforced, as a result of roads making the PA more accessible for PA staff to patrol—a factor that was also seen

6 Qualitative comparative analysis is a deterministic (nonprobabilistic) method used to identify the conditions or combination of conditions that lead to specific outcomes. For this analysis, the 28 visited PAs were split into 30 PAs, to account for different conditions and the extent of GEF support in the Bwabwata core and buffer zones in Namibia, and between the adjacent Aketajawe and Lolobata PAs in Indonesia.

on a global scale in relation to lower forest cover loss (see discussion on page 33). In 41 percent of PAs that saw the positive change, both conditions were present. Moreover, qualitative comparative analysis found that the presence of political conflict in PAs did not result in more destructive activities, as long as these two conditions (perception of concrete benefits and easy access to the PA) were present and relations between PA management staff and local governments were effective.

Many of the key factors contributing to a decrease in destructive activities were found to be the same areas the GEF contributed to the most (table 5.1). Of the 17 PAs that received GEF support, 15 (88 percent) reported some or a significant GEF contribution toward developing professional and dedicated PA staff; 13 (76 percent) reported similar levels of contribution toward community perception of concrete benefits from PA management activities. Twelve PAs (71 percent) said the GEF contributed toward leveraging other external support and/or forging effective relations with local governments. In half of the PAs, the GEF was reported to have contributed toward developing or supporting good PA leadership. The GEF contribution was least evident in making contextual factors (e.g., accessibility) more favorable to positive biodiversity outcomes, as these attributes were largely established prior to GEF support.

For example, the Mount Kenya East Pilot Project for Natural Resource Management used a combination of infrastructure and tools for rangers and alternative livelihood options for local communities provided through GEF support is reported to have had considerable impact on reducing threats to biodiversity. The success of GEF interventions in Mount Kenya has attracted greater interest and support from the local communities, NGOs, and local governments at the county level to address threats to species and habitats. The GEF has also helped increase the capacity of both communities and local authorities to participate in natural resource management.

MANAGEMENT CAPACITIES

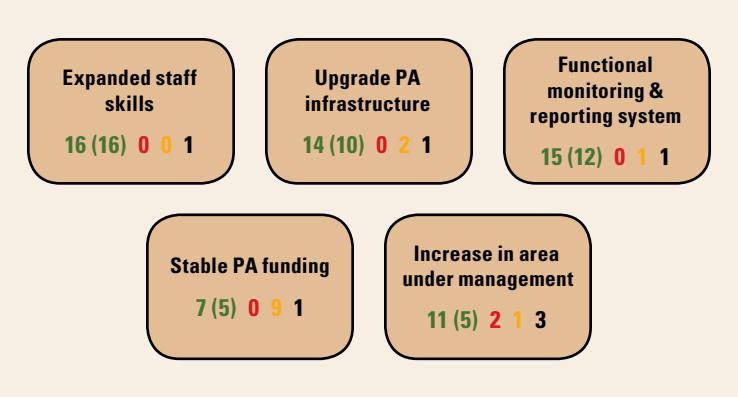
Stronger management capacities were seen in visited PAs in the form of expanded PA staff skills, upgraded equipment and

TABLE 5.1 GEF CONTRIBUTION TO KEY MANAGEMENT EFFECTIVENESS FACTORS IN VISITED PROTECTED AREA SITES

Factor	Negligible or no GEF contribution	Some or significant GEF contribution
Professional, trained, and dedicated PA staff	2	15
Concrete benefits perceived by communities (including projects and financial support)	4	13
Provision of information	10	7
Good PA leadership	8	9
Leveraging other external support, e.g., donors	5	12
Effective relations with local authorities	5	12
Easy access to PA/reduced isolation	15	2

infrastructure, stable funding for PA operations, monitoring and reporting systems for both management and biodiversity targets, and an increase in the area under conservation management (figure 5.6). Combined resources from the GEF, national and local governments, civil society organizations (CSOs), and bilateral donors played a key role in strengthening these capacities, as few PAs have consistent funding for operations.

FIGURE 5.6 INDICATORS OF MANAGEMENT CAPACITY IN VISITED PROTECTED AREA SITES



NOTE: ■ = positive change (linked to GEF support); ■ = negative change; ■ = no change; ■ = no data.

Of the 16 GEF-supported PAs visited that had sufficient information, improved staff capacity and/or PA infrastructure was reported as partially or fully the result of GEF support (figure 5.6). National and local government, CSO, and bilateral donor funds and interventions complemented GEF contributions.

Very few PAs reported an increase in staff or staff budget. However, all visited GEF-supported PAs reported an increase in staff skills; this was, in many cases, a result of direct training through GEF-funded projects on topics ranging from financial management and community engagement to off-road driving. GEF projects often worked with CSO partners to train PA staff on management techniques and tools, including geographic information system (GIS), survey methods, and communication and outreach skills. Such investments in PA staff improved management efficiency and created a management culture that was more engaged with neighboring communities. The GEF also directly supported the development of new management plans in several PAs—a result reflected in the global METT analysis as discussed on page 45.

GEF support to infrastructure in the 10 of 14 sites that reported improvements often came in the form of better facilities and tools, such as buildings, guard posts, fences, tourist centers, vehicles, binoculars, computers, and software. In Mudumu, the GEF's Namibia Protected Landscape Conservation Areas (NAMPLACE) project (GEF ID 3737), implemented by UNDP, has funded construction of two anti-poaching camps for use by conservancy game guards and government rangers in conservancies neighboring the park. GEF-supported PAs have also benefited from larger government infrastructure investments, particularly roads. As discussed earlier, when accompanied with strong law enforcement and oversight capacity, improved access to PAs through the existence of major roads is associated with lower forest cover loss and a decrease in destructive activities.

In non-GEF PAs, similar improvements in management capacities were reported as a result of similar support from NGOs and bilateral donors. For example, in Aberdare in Kenya, WWF and the local NGO Rhino Ark provided cameras, vehicles, radios, and fence resources; the U.S. Agency for

International Development (USAID) provided computers and helped improve capacities for data management and sharing. These organizations—along with the Africa Wildlife Foundation, the Zoological Society of London, and the Japan International Cooperation Agency—also provided training to both the Kenya Wildlife Service and the Kenya Forest Service in the PA. Thus, PA staff in Aberdare have very strong capacities in research, law enforcement, management, and community engagement.

Twelve of 15 GEF-supported PAs that reported an improvement in environmental monitoring credit GEF support for some of this improvement. Four PAs reported the adoption of specific monitoring and evaluation structures or systems that continue to be used as of this writing. In Mexico's Monarch Butterfly Biosphere Reserve, community participation in monitoring and evaluation has expanded in capacity and reach, and the government has established automated meteorological stations in the regions of Sierra Chincua and Chivati-Huacal. All three of the GEF-supported PAs in Namibia have adopted the Event Book System, a community monitoring system used to collect data on wildlife, vegetation, wildlife crime and poaching incidents, and other key management aspects and to inform management decisions. First introduced by WWF, the system was refined and consolidated in two national-level GEF projects in Namibia: Integrated Community-Based Ecosystem Management (ICEMA; GEF ID 1590) and Strengthening the Protected Area Network (SPAN; GEF ID 2492).

Expanded management

At least 10 PAs saw an increase in the extent of area under conservation management. The GEF was reported to have contributed to such expansion in six PAs. Typically, the way in which the area under conservation management expanded was through increased connectivity among previously separately managed ecosystems; this was the case for Etosha and Mudumu in Namibia, Mount Kenya and Nairobi in Kenya, and Iguaqué and Los Nevados in Colombia. Similarly, corridors established between the Nkasa-Rupara, Mudumu, and Bwabwata National Parks enabled the movement of wildlife between Angola, Botswana, Namibia, and Zambia—four of the countries comprising the larger Kavango-Zambezi Transfrontier Conservation Area. The GEF not only supported the creation of such corridors, but also aided in the adoption of a co-management approach engaging communities in the sustainable management of lands adjacent to PAs. Adoption of such an approach occurred in 15 of the 17 GEF-supported PAs visited.

Non-GEF PAs visited in Colombia, Kenya, Mexico, and Namibia (among others) also reported adopting co-management, landscape, and ecosystem-based management approaches as a spillover effect from GEF support to the PA system or from a nearby GEF-supported PA. The promotion of new management approaches was found to be effective when there was national government support for them, evidenced through allocation of resources and enactment of legislation; an active and influential civil society engaged in PA management activities; and widespread acceptance of the role of communities in PA management.

Another type of GEF support that contributed to larger areas being brought under PA management was the funding of boundary surveys. In Bwabwata National

Park in Namibia, for example, this allowed the Kwando area to be included in 2007 under the SPAN project, which targeted the country's entire PA system. In Aketajawe in Indonesia, the GEF supported a boundary socialization and awareness exercise to enhance community understanding of rights and responsibilities, and the resolution of disputes in this newly formed national park; boundary demarcation was financed and conducted by the national government.

Sources of funding

A consistent source of funding is critical to the effective operation of PAs. In a few of the visited PAs, improved financial sustainability resulted from governments' increasing official PA budgets. The GEF was reported to have made some or a significant contribution toward securing adequate funding for PA operations in 9 of the 17 PAs (53 percent); in 5, this led to financial sustainability. In three PAs—the Monarch Butterfly Biosphere Reserve in Mexico, and Bwindi and Mgahinga in Uganda—the GEF established trust funds that are helping finance both PA operations and community engagement activities.

PA budgets have elsewhere been supplemented by the proceeds of ecotourism activities or combined with the financial resources from conservancies, NGOs, and other civil society actors. In Namibia, the GEF helped establish an automated fee collection system in the Etosha National Park, which will be replicated in Bwabwata with the help of another GEF-funded project.

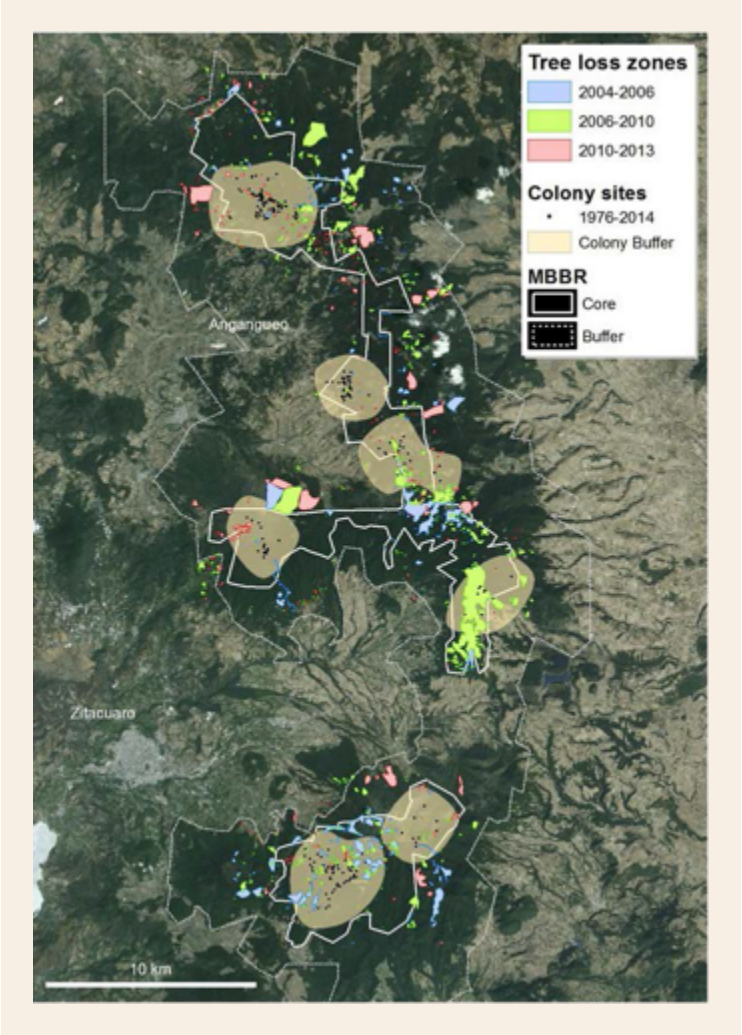
In PAs such as those in Vietnam where no provisions were made for financial sustainability, PA budgets declined with the end of GEF support, affecting the sustainability of the management capacity installed by the project.

Continuing threats

Despite the positive changes noted above, 13 GEF-supported PAs reported a continuing threat of encroachment, as people move in to establish settlements or agricultural plots. Examples of encroachment are seen in Bwabwata in Namibia, where the chief of a local tribe has encouraged his people to claim territory and settle in the multiple-use part of the PA; and in Aketajawe in Indonesia, where second- and third-generation immigrants and locals seek new agricultural areas within the PA. Continued expansion or intensification of agricultural or animal husbandry practices in and around PAs was reported in nine of the GEF-supported PAs. In many of these, adjacent communities were the source of the threat.

In Kenya's Nairobi National Park, although the Wildlife Conservation Leasing Demonstration project (GEF ID 1999) has helped improve compliance with regulations, poaching, bush meat trade, pollution, and illegal livestock grazing continue during periods of drought. Moreover, expanding human settlements are severely degrading the main catchment and fragmenting animal habitats and migratory routes; while pollutants from a power line and an oil pipeline installed inside the PA, as well as from external sources, are affecting PA water and air quality. In Vietnam, while illegal logging within the Ba Be park has declined, external threats have encroached into the park in the form of wood collection for housing construction and sale on the market; and the collection of orchids, snakes, and other small animals. New roads and transport

FIGURE 5.7 TREE LOSS IN MONARCH BUTTERFLY HABITATS IN THE MONARCH BUTTERFLY BIOSPHERE RESERVE AT DIFFERENT PERIODS



NOTE: Only the large areas in green (2006–10) in the middle of the map indicate clear-cutting activity; the rest of the tree loss zones indicate only tree loss activity.

options around Mexico's Monarch Butterfly Biosphere Reserve have abetted logging in butterfly nesting areas where it is most destructive, despite a marked reduction in illegal logging in the reserve's core area due in part to the growing community participation in payment for ecosystem services (figure 5.7). In the buffer zones, deforestation has cleared the way for avocado plantations with their heavy herbicide and pesticide use. Further habitat degradation has resulted from natural water courses being diverted and springs piped. Ría Lagartos suffers persistent and recurring threats of sewage pollution from the large human population within and around the PA, and habitat loss from encroachment and arson further degrade environmental quality. Conflict between cattle herders and jaguars constitutes an ongoing threat to wildlife.

Fire outbreaks PAs pose a significant threat in some PAs. Fires in the Etosha and Namib Naukluft National Parks, as well as on private and communal lands, in 2011 destroyed close to 370,000 ha of vegetation and killed 25 black rhinos, 5 white rhinos, 11 elephants, 60 giraffes, 30 kudu, and 3 lions—wildlife estimated as being worth $2.3 million. Although Etosha has begun a controlled burning program to reduce problems from uncontrolled fires, it is clear that such fires continue to be a major threat and that the fire management infrastructure in the affected PAs was inadequate.

CHAPTER 6

COMMUNITY ENGAGEMENT

This chapter considers the extent to which GEF community-oriented activities have contributed to the achievement of results and impacts associated with PA management, and the extent to which GEF support has addressed the social and economic needs of affected populations. Over the years, the GEF has given increasing attention to the engagement of stakeholders in its operations to ensure sustainability of outcomes and prevent any negative on local populations.

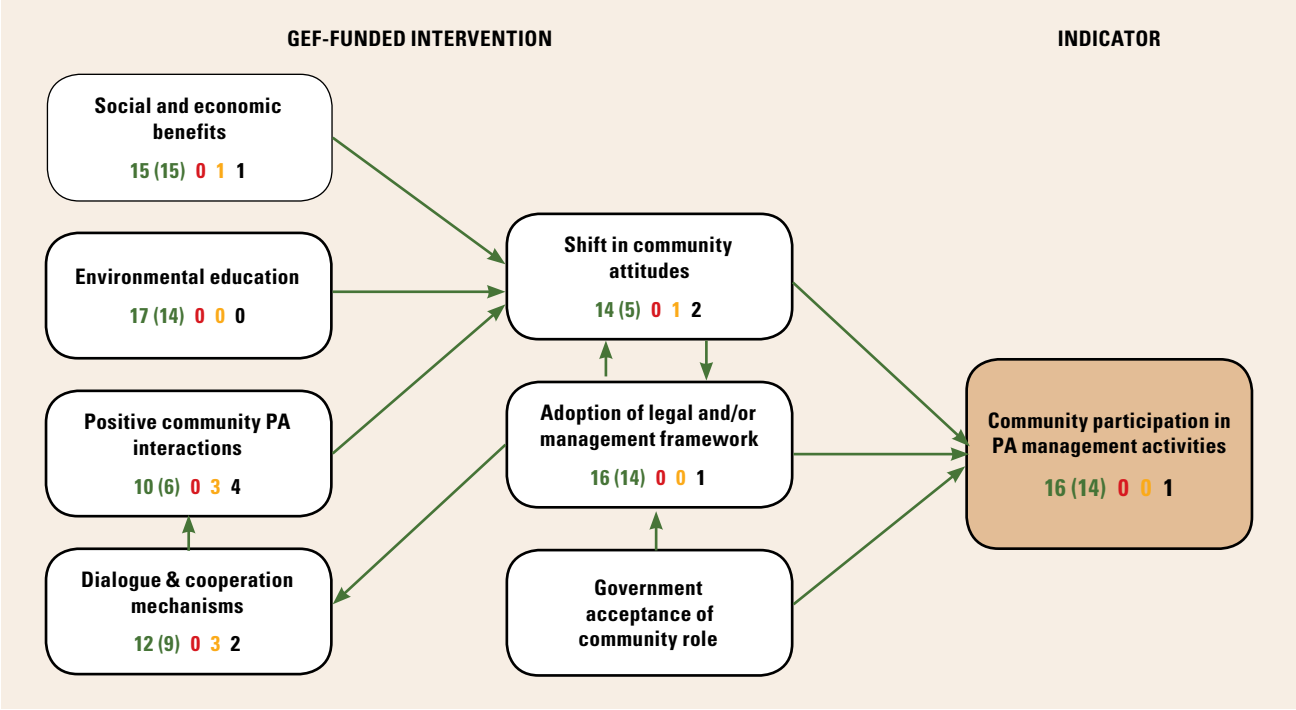
The GEF Instrument requires that consultation and participation be conducted with major groups and local communities throughout the project cycle (GEF 2015). Further, the 1996 GEF Public Involvement Policy reiterates the need for participation as a means to address the social and economic needs of affected people, and ensure sustainability of the benefits generated by GEF projects (GEF Secretariat 2014). More recently, the GEF Council adopted an Environmental and Social Safeguard Policy with the intent of coupling a "do-no-harm" approach to environmental management with the GEF's existing "do good" approach (GEF 2011).

Community engagement through the adoption of co-management approaches has resulted in increased community participation in management activities in visited PAs, such as in ecosystem restoration and law enforcement, with some social and economic benefits to these communities.

Sixteen of the 17 GEF-supported PAs visited for this evaluation reported increased community participation in PA management, with 14 indicating that GEF support made a direct contribution to improved community engagement (figure 6.1). Similar trends in community participation were seen in visited PAs not supported by the GEF. Most commonly, communities are involved in vigilance and intelligence gathering. They also join park staff in PA management activities, such as management of human-wildlife conflict. Direct intervention to prevent or mitigate threats to biodiversity—e.g., through fire control and ecosystem restoration—take place in all GEF-supported PAs, with participation from communities in seven of them. In 11 of the 17 PAs, community participation has been formally mainstreamed through the PA's adoption of a co-management approach or through broader legislation.

The Monarch Butterfly Biosphere Reserve in Mexico was established with little consultation with the local population, resulting

FIGURE 6.1 LINKS BETWEEN GEF-FUNDED INTERVENTIONS AND INDICATOR OF COMMUNITY ENGAGEMENT IN VISITED PROTECTED AREA SITES



NOTE: ■ = positive change (linked to GEF support); ■ = negative change; ■ = no change (despite GEF support); ■ = no data.

in strong opposition to the reserve from most local stakeholders. Over the years, different mechanisms at various scales (*ejido*, microregion, reserve-wide) have been used by the PA administration to interact with the local population, plan joint activities, and resolve conflicts. This approach has paid off over the long run. Notably, since the GEF-supported National System of Protected Areas (Sistema Nacional de Áreas Protegidas, SINAP) I was first implemented in 1995, community group participation in the area has increased with regard to PA monitoring, forest fire prevention, rehabilitation and restoration activities, and tourism services. Communities have established a network of 34 patrols, with approximately 800 community members trained in biological and environmental monitoring. Community members share their priorities and needs with PA and government authorities through six regional committees and participate in management through dialogues and exchanges of ideas. They have been hired as PA staff and engage in conservation activities such as ecotourism and habitat restoration. While a few communities still resist the reserve, local participation in management—coupled with the income generated by the development of tourism around the reserve—has contributed to the gradual improvement of relations and collaboration between most of the local communities and the PA staff.

In Bwindi and Kibale, part of the PA management strategy adopted by the Uganda Wildlife Authority was to provide both

incentives and disincentives to poachers—livelihood support and cash in exchange for disarming wildlife traps, and steep fines and imprisonment for those caught. The Kenya Forest Service adopted a countrywide participatory forest management approach and promoted the creation of community forest associations. Communities there are now involved in resource protection, tourism management, law enforcement, monitoring, rehabilitation of degraded areas, and fire suppression. The resulting collaboration between communities, the Kenya Wildlife Service, and the Kenya Forest Service has improved management of resources in and around the PA as well as the delivery of forest products and services, including fuelwood, animal forage, water, herbal medicines, beekeeping, commercial tree nurseries, and ecotourism. Through the Mount Kenya East Pilot Project for Natural Resource Management (GEF ID 1848), the GEF supported development of a community forest management plan, funded joint training and capacity-building activities, supported community engagement in carrying out and monitoring conservation activities, and helped develop strategies to minimize human-wildlife conflicts.

While poaching and governance issues continue to affect PAs across Kenya, in Nairobi National Park, community members serve as volunteer game scouts and participate in rule making, planning, and priority setting for the PA. Increased engagement from stakeholders in the community and the private sector has alleviated management pressures on the PA staff—and thus increased the capacity of park management. Fewer incidents of human-wildlife conflict and greater support for wildlife conservation have been reported; these in turn generate employment opportunities.

COMMUNITY ATTITUDES AND INTERACTIONS

Shifts to more favorable attitudes in communities toward PAs are associated with environmental education, economic and social benefits from PAs, and more frequent positive interactions between communities and PA management staff.

Out of the 17 visited PAs supported by the GEF, a change in community attitudes was reported for 14 regarding the importance of environmental protection and the role of communities in natural resource management. Eleven PAs reported improved community relations with PA staff, and all of the PAs reported an increased level of environmental awareness in adjacent communities.

Field interviews revealed that positive changes in community attitudes and interactions were the result of three types of interventions: environmental education; establishment or improvement of mechanisms for dialogue and cooperation between communities and PA staff, often through the adoption of co-management approaches and/or a legal framework that establishes use or management rights for communities; and the creation of benefits for communities as part of PA management activities—or, at the very least—implementation of measures to mitigate the loss of economic benefits. These three intervention types are further discussed below; box 6.1 highlights how two of them in combination have worked effectively in improving community interactions.

BOX 6.1 EDUCATION + DIALOGUE = IMPROVED ATTITUDES

Indonesia's Lambusango Game Reserve is an example of a PA where environmental education and the creation of a mechanism for dialogue have improved community attitudes and interactions. Community environmental education campaigns initiated by the NGO Operation Wallacea were later supported by the GEF through the Lambusango Forest Conservation, Sulawesi, project (GEF ID 2077) with mass social advertisement campaigns, and environmental education activities in schools, mosques, and community meetings. The GEF funded outreach activities, including community education on sustainable production methods, natural resource management, and alternative livelihoods. Operation Wallacea, with GEF support, worked to establish the Lambusango Community Forest Management Forum, which improved openness and collaboration between communities and local government authorities. Unfortunately, despite its initial effectiveness, the forum ceased to function, with the end of GEF support in 2008 and a lack of local government funds.

ENVIRONMENTAL EDUCATION

Environmental education occurred through GEF projects or through activities of PA management staff, local government, or CSOs, often in collaboration with each other. These activities made community members aware, for example, of the relationship between forest cover and the amount of water available as rainfall or as irrigation for crops, as well as the importance of harvesting forest resources at a rate that would sustain economic benefits over the medium and long term. In Los Nevados and Iguaqué in Colombia, where the GEF supported environmental education and skills development in fire control, landscape conservation, and sustainable agricultural production, communities continue to participate in these activities.

MECHANISMS FOR DIALOGUE AND COOPERATION

In 12 PAs, mechanisms for dialogue and cooperation on conservation activities have increased communication between communities and PA staff, thus improving relations, changing attitudes, and reducing conflict. The GEF provided support in nine of these PAs that directly contributed to the establishment of communication bodies and the facilitation of stakeholder consultations. Government contributed to these changes with legislation that mandated community engagement and encouraged dialogue between PA management and stakeholders. As in the Monarch Butterfly Biosphere Reserve and Mount Kenya cases described above, improved relations can greatly increase cooperation and collaboration between communities and PA staff.

In Bwabwata in Namibia, cooperation between communities and PA staff has become standard management practice. Prior to the GEF intervention, which began in 2005, there was often conflict between park officials and communities. Community members were legally prohibited from entering the PA, and faced a high degree of uncertainty regarding their rights to land and resources. After national independence, and with the entry of the GEF and other international development players, there has been a growing acceptance of communities as partners in conservation. This shift in attitude has been adopted at a larger scale: the Policy on Tourism and Wildlife Concessions on State Land of 2007 and the National Policy on Protected Areas' Neighbors and Resident Communities of 2013 both provide guidelines for community engagement in PA management—and were supported by the GEF. The mandated

cooperation between communities and PA staff has resulted in improved community relations; this in turn is credited with positive conservation outcomes, such as stable or increasing wildlife numbers and low poaching and encroachment in the PA.

SOCIAL AND ECONOMIC BENEFITS

The third type of intervention observed to trigger a shift in community attitudes toward conservation activities is the creation of social and economic benefits for those whose access to resources has been most affected by the presence of a PA. For example, in the Bwindi Impenetrable National Park in Uganda, community attitudes toward the PA were changed in large part due to the socioeconomic benefits created by projects financed through a GEF-supported trust fund. Where previously communities around Bwindi had deliberately started fires within the forest to protest their being displaced from the PA without consultation or advance warning, now these communities voluntarily help control forest fires and are often the first on the scene to provide assistance.

Sources of income and capital

GEF support to biodiversity conservation includes interventions that have provided economic benefits to adjacent communities which helped improve community attitudes toward the PA and willingness to cooperate with PA staff. These interventions typically seek to develop alternative sources of income to replace economic activities that are perceived as threats to biodiversity.

GEF support for economic activities in and around PAs that are intended to replace income lost from prohibited activities in PAs is common across the GEF biodiversity portfolio. Forty-five percent of PA-related projects reviewed for OPS5 (186) had components that introduced alternative or supplementary livelihood sources for local populations, such as promoting sustainable agroforestry practices and other conservation-friendly production systems or developing markets for nontraditional forest products. Alternative livelihood activities within and outside the PA included ecotourism, sustainable harvesting of nontimber resources in the PA, agriculture and animal husbandry, and participation in PA management. Thirty-eight percent of the OPS5 cohort reported that opportunities for other sources of income had increased by project end, e.g., through crop diversification; and 27 percent reported that the community's actual income had increased. One percent reported a decline in income, e.g., due to crop destruction from increased wildlife populations. All of the 15 PAs visited during the evaluation for which relevant information was available reported receiving GEF support for economic activities.

The GEF has contributed to alternative sources of income and capital by supporting the development of operational mechanisms for specific economic activities; this includes through training, provision of capital, and political support for increased community participation in PA management. Examples include sustainable rattan collection in Lambusango, Indonesia; and sustainable fisheries, animal husbandry, and agriculture practices in lands adjacent to the Sian Ka'an biosphere reserve in Mexico and to Mount Kenya National Park. Across most GEF-supported PAs, specific work has been undertaken to develop tourist services and infrastructure.

Payment for ecosystem service schemes have been implemented with GEF support in Iguaqué, Colombia. Indirectly, this model has helped promote forest and water conservation, and enabled an improved drinking water supply to rural and urban communities. The impact of a payment for ecosystem service scheme has been particularly striking in Mexico's Monarch Butterfly Biosphere Reserve. Specifically, following implementation of the scheme—combined with other types of interventions—the extent of illegal logging, the most significant driver of deforestation in the reserve, was markedly reduced. From 2001 to 2007, studies calculate that a total of 2,057 ha of forest in the reserve had been affected by illegal deforestation, 1,503 ha of which by large-scale operators. Between 2005 and 2007, the number of hectares attributed to large-scale illegal logging had dropped to 713, and is reported to have reached zero in 2012 (Vidal, López-García, and Rendón-Salinas 2014). Remote sensing analysis carried out by this evaluation verified this trend, but found—as noted on page 53—that some illegal logging continues albeit at a much lower scale, and that some affected areas are butterfly colonies (box 6.2).

In Sian Ka'an, the SGP worked in partnership with the Mexican government, international and local NGOs, and other community organizations to implement 20 small-scale economic development projects involving sustainable fisheries, ecotourism, and emergency response. The federal government funded fishing, aquaculture, and agriculture activities; and the state government provided training and capacity building to facilitate their adoption. Local NGOs trained community members

BOX 6.2 INGREDIENTS OF SUCCESS COMBINE IN MEXICO'S MONARCH BUTTERFLY BIOSPHERE RESERVE

The reduction in illegal logging at the Monarch Butterfly Biosphere Reserve is an important achievement, considering that 93 communities with a total of 27,000 people live inside the PA, and that the area had previously experienced persistent intra-community tensions and a lack of trust in government agencies. The significant reduction in logging was the result of a combination of improved law enforcement, the engagement of local communities in forest protection through co-management arrangements that generated income to local people (which included tourist cooperatives and payment for ecosystem services), improved coordination among public institutions, and the development of other livelihood opportunities for local residents. These achievements build on many years of support from government programs, NGO initiatives, and—most importantly—the Monarch Butterfly Conservation Trust Fund. The trust fund, which was established with significant GEF funding, is managed by the Mexican Fund for the Conservation of Nature and mobilizes funds from several foundations and organizations including the Packard Foundation, WWF, and the Carlos Slim Foundation.

The Monarch Butterfly Biosphere Reserve experience underlines the importance of robust community organizations having a voice in PA management, and effective coordination between community and government institutions (Tucker 2004). Communities in other PAs have also formed their own organizations that have become active and important PA management partners, especially in enforcing aspects of PA regulations that are directly related to their income sources. A few such examples are fishing cooperatives in Sian Ka'an in Mexico and Ria Lagartos; and conservancies adjacent to Bwabwata, Etosha, and Mudumu in Namibia.

on agriculture and artisanal crafts methods and ecotourism. The SGP also supported a local women's group in the development of a tourist operation. In collaboration with The Nature Conservancy, WWF, and the Rare Center, the SGP also supported the negotiation of agreements among competing tourism cooperatives in Punta Allen to develop ecologically friendly standards and practices and to present a united front to tourist operators in Cancun. This initiative immediately improved their negotiating power and resulted in higher fees for local tourist operators.

The changes in livelihood for the Sian Ka'an communities have been sustained over time. Communities are producing higher quality products and services, and are marketing these products in national and international markets. Quality of life was reported as greatly improved compared to the period prior to the PA's establishment, which was characterized by boom-and-bust economic cycles.

An important factor in the sustainability of alternative livelihoods and income-generation activities in Sian Ka'an is the proximity of a highly dynamic and expanding tourism corridor between Cancun and Tikal, which has been a positive force in maintaining demand for the crafts and ecotourism services provided by the PA communities (Brenner and Job 2012). On the other hand, however, from 2000 to 2012, Sian Ka'an lost 1.1 percent of its forest cover—mostly in the coastal zones—due to expansion of summer homes and construction of infrastructure (Bezaury-Creel et al. 2012). And with growth in the Cancun corridor, the reserve is being pressed to expand its tourism industry at scales much larger than those now managed by community groups.

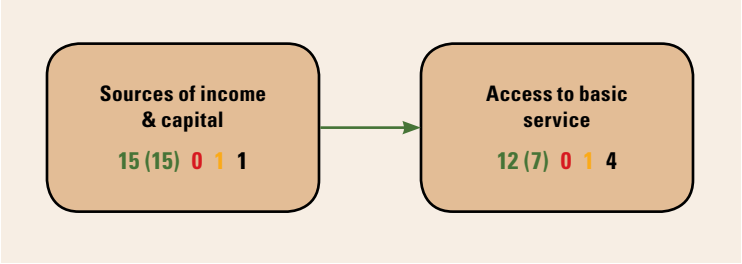
Access to basic services

GEF support of alternative sources of income and capital has indirectly increased access toward basic services and social benefits by building communities' financial capacity to provide these services for themselves, or by attracting support from other donors or the government. Such social benefits have included improvements in water supply, health services, education, safety, and roads in and around PAs.

Improved access to social services often accompanied improvements in economic opportunities. Field visits to 28 GEF-supported and non-GEF PAs during this evaluation showed that improving access to basic services in communities adjacent to PAs can result in positive changes in community attitudes and behavior in relation to PA management activities; this has positive implications for PA management and biodiversity. In some cases, these economic activities have helped reduce destructive activities and motivated cooperation with PA staff. At least 12 of the 17 GEF-supported PAs visited during this evaluation reported increased community access to basic services during the period of GEF support (figure 6.2). However, in only half of these sites were the improvements directly linked to GEF interventions. GEF support—combined with the support of other partners in alternative livelihoods, sustainable production practices, community organization, and economic diversification—contributed to the ability of some communities to enhance basic services in the face of national and local government limitations.

In the Nairobi and Mount Kenya PAs, GEF projects supported the building of new classrooms in several secondary schools,

FIGURE 6.2 LINKS BETWEEN TYPES OF SOCIAL AND ECONOMIC BENEFITS IN VISITED PROTECTED AREA SITES



NOTE: ■ = positive change (linked to GEF support); ■ = negative change; ■ = no change; ■ = no data.

and timed payments to communities for parents to receive them just as the school year started, making available the necessary funds to enroll their children in time. The Bwindi Mgahinga Conservation Trust (BMCT) in Uganda, established in 1994 using GEF funds, has attracted bilateral and private donor funding for school and health center construction; installation of an extensive water delivery system that included construction of toilets for schoolchildren; and purchase of land for the Batwa, an indigenous group that had been displaced by the creation of the Bwindi Impenetrable National Park in Uganda. The BMCT has also funded community projects in villages that were beyond the coverage of the government's revenue-sharing program, which committed 20 percent of PA entry fees toward projects for immediately adjacent communities. BMCT's work complemented the government revenue-sharing program, and positively influenced community perceptions of the PA over a greater geographical area.

Increased access to basic services in some PAs was a result of increased income from new livelihood activities. For example, ecotourism enabled community organizations to build schools and provide scholarships in Bwabwata and Etosha in Namibia, and in Bwindi and Kibale in Uganda. The GEF Small Grants Programme (SGP), implemented through UNDP, has been particularly instrumental in facilitating sustained community benefits through alternative livelihood sources. In Uganda's Kibale National Park, an SGP grant provided seed money for a revolving fund to the Kibale Association for Rural and Environmental Development (KAFRED), a community-based organization that established an ecotourism enterprise adjacent to the PA. These funds allowed the association to produce educational materials and provided start-up funds for members to create their own enterprises. With good management practices and technical support from a U.S. Peace Corps volunteer and local NGOs, the Kibale association has generated sufficient revenue from ecotourism to build schools, support scholars, and undertake other community projects. SGP staff in the country continue to build capacity by providing technical support as needed.

In Bwindi, an SGP project allowed the Buhoma Community Development Association to build a gravity water scheme that supplies water to the PA management offices, residences, tourism establishments, and schools in several villages. These water sources continue to be used, and the community organization continues to benefit from SGP capacity-building activities. Similarly, in Lambusango, Mount Kenya, and Mudumu, GEF-funded interventions helped to rehabilitate water sources and improve potable water access.

In a few PAs, conservation activities have directly improved community safety. In Nairobi and Mount Kenya National Parks, improved PA management reduced

physical dangers arising from human-wildlife conflict, and improved food security by reducing crop destruction and livestock predation. In Uganda, as the economic significance of the Bwindi PA has grown, the government has prioritized peace, safety, and stability in the region. The result has been better access to education and health services for communities around Bwindi.

It is important to note that access to community services is a secondary and minor aspect of GEF support to PA management, and that most achievements in this regard have come about through counterpart funding from government and donor resources. What is apparent is that the engagement of the GEF in PAs often stimulates increased government and donor support for such basic services.

DISTRIBUTION OF BENEFITS AND COSTS

While socioeconomic benefits have been created in the majority of GEF-supported PAs visited, the cost and benefits of conservation are generally not distributed equally among stakeholders; this results in attitudes that undermine the objectives of conservation.

The literature regarding the socioeconomic impacts of PAs is decidedly mixed, and provides little in the way of decision-making guidance on how to achieve win-win outcomes for biodiversity and human well-being (Pullin et al. 2013). Diverse interests, local histories, and emergent conditions occurring at various scales all affect how costs and benefits are distributed among the various stakeholders. Understanding the complex interaction of these factors aids in assessing the trade-offs between human well-being and biodiversity conservation (McShane et al. 2011).

Unequal constraints and compensation

PAs have often been established on lands with existing formal or traditional property or use rights. In Mexico, for example, most PAs established prior to 1990 were declared without consultation with, or providing information to, local populations. Restrictions on the use of resources were put in place that affected individuals and communities with title to the land, but no compensation was granted to those affected (García-Frapolli et al. 2009). This approach has been a major obstacle in gaining support for conservation among affected populations in GEF-supported PAs.

In Cuc Phuong, a GEF-supported PA that was visited in Vietnam, the pressures placed on the local population have been particularly great. PA management is directly under the central government, but the PA's buffer areas are under the jurisdiction of three different provincial governments. The central government and the PA management have planned to relocate the local communities living in the core of the PA to the buffer areas, but the provincial governments have not provided land for these communities. This has created a problematic situation with the potential for further conflict (McElwee 2006).

Perceived inequalities in PA-related benefits have been cited as a cause of continued unauthorized access to natural resources inside Bwindi (Twinamatsiko et al. 2014). Field visits to different parts of a given PA revealed that the extent of economic and social benefits—and, indeed, access to any

benefits at all—varied greatly depending on the strength of community institutions and on a community's proximity to tourist areas in the PA, to PA management offices, and to the PA itself. For example, the community organization in Buhoma, situated near a visitor center in the Bwindi Impenetrable Park in Uganda, benefited from a variety of options for sources of income from associated tourist activities; accordingly, it generated sufficient revenue to build schools and provide scholarships. In contrast, another visited community organization that was at a distance from the visitor centers in Bwindi earned income only from basket weaving, using nontimber resources from the PA accessed through a strict agreement with PA management. As there were no tourists in the vicinity, the market for the baskets relied on fellow villagers, resulting in significantly less income and no capital to invest in other sources of income.

Additionally, while 20 percent of national park entry fees are disbursed to local governments for community projects, only groups of villages or parishes immediately adjacent to the PA are able to benefit from the funds. Members of other, more distant, parishes receive nothing, despite their also being stakeholders who have traditionally used resources in the PA. The BMCT Fund the GEF helped establish in Bwindi has contributed to the mitigation of this inequality by funding livelihood projects in those parishes; in Kibale and other PAs in the country, however, no such mechanism exists.

Similar inequities were observed in Ba Be in Vietnam. Interviews with local residents in Ba Be report that the communities living inside the PA—which provide home stays, food, transportation services, and artisanal goods for tourists—have more income opportunities compared to communities outside the PA. The outside communities tend to perceive the PA as constraining their flexibility and forcing them to change their economic strategies. For example, since the establishment of the PA, villagers have not been allowed to let their buffalo roam in the forest during winter; this has translated into extra costs to pay for feed during these months. Although villages within the PA also have to comply with this requirement, they have benefited from government-funded irrigation projects, which have increased their agricultural productivity and have resulted in some forest regeneration of fields previously used by more extensive types of agriculture. Lack of attention to the economic well-being of communities adjacent to PAs frequently leads to problems of illegal activity within park boundaries. Within Ba Be, most of the small-scale illegal logging and collection of high-value species such as orchids and snakes appears to be carried out by those living outside the PA.

In the Monarch Butterfly Biosphere Reserve, PA management has been highly successful in reducing large-scale illegal logging. However, smaller-scale logging and encroachment of cattle into the reserve continues, indicating that there are adjacent communities that have not benefited from the livelihood opportunities that have emerged around the reserve.

In Namibia, many communities have come to appreciate the benefits that are to be gained from sustainable use of wildlife. Yet there are major differences in income and spending on community benefits between neighboring conservancies. Moreover, human-wildlife conflict is emerging as a potentially serious problem. This is particularly the case in areas adjacent to PAs, due

to damage to crops and essential infrastructure, such as water points and power lines, by elephants; as well as livestock mortalities caused by the increasing abundance of predators. In those areas where communities receive benefits from parks and through conservancies as well as human-wildlife conflict mitigation and reduction support, retaliation against problem animals is low. It has the potential to increase if people do not perceive sufficient benefits.

The distribution of funds among PAs has also affected levels of compensation to the local population. Field visits identified support from multiple donors to Sian Ka'an, one of the best-known reserves in Mexico. The country's Ria Lagartos PA (figure 6.3), on other hand, has attracted much less funding from other sources—even though it has a much larger population than Sian Ka'an and faces more complex social problems (box 6.3).

Inequalities among beneficiaries

Even within areas where community benefits are evident, field visits showed that the extent to which different groups have benefited from the same intervention have varied. Individuals who had a higher economic status and educational level tended to be in a better position to exploit opportunities than others, as they typically possessed sufficient capital and entrepreneurial knowledge to take advantage of the new livelihood skills introduced. In the cases of Sian Ka'an, Ria Lagartos, and Yum Balam in Mexico, indigenous and small farmer communities were highly affected by constraints placed by the PA, as their livelihoods depend on natural resources. Salt mine operators, owners of tourist operations, and summer vacation homeowners, on the other hand, are not under such constraints as they have access to information and political contacts they can use to their advantage (Brenner 2012; Fraga 2006).

FIGURE 6.3 MAP OF THE RIA LAGARTOS BIOLOGICAL RESERVE, MEXICO

SOURCE: Digital Globe Inc.,U.S. National Aeronautics and Space Administration NextView.

NOTE: Commercial satellite 40-cm and 50-cm data were used to identify and map roads, cleared areas, animal pens, and area of development.

The same circumstance was observed in Ba Be. Here, community members with more formal education and better English language skills were reported to have more home-stay visitors than others in the village. While successful home-stay businesses generated jobs for other villagers, wages were generally low and seasonal. Similarly, in Bwindi, community members who benefited from GEF-supported and other donor interventions were able to leverage this support and establish their own tourist accommodations. Members of the same community without the same initial resources were not able to take advantage of the influx of tourism at this level of return. Studies by Ikirezi, Muhanguzi, and Bush (2011) and Blomley et al. (2010) report that economic benefits from Bwindi—especially tourism-related enterprises—accrue more to wealthier groups, and that the poorest people are less likely to benefit from PA

BOX 6.3 DIFFERENT BEGINNINGS, DIFFERENT OUTCOMES

The contrast between Sian Ka'an and Ria Lagartos in Mexico illustrates how different local histories result in conditions leading to different biodiversity outcomes. Both PAs are located in the Yucatan Peninsula and had people living within the PA boundaries when they were first declared protected (respectively, in 1986 and 1979). Both have a history of internal conflicts and of tensions with government agencies, NGOs, and private enterprises related to the use of local biodiversity (Brenner 2012; Fraga 2006). Both PAs included titled communal and private lands, and both were declared with little or no consultation with the affected stakeholders. Local populations as well as external actors with stakes in the reserves—such as salt mine owners, tourist operators, and summer home owners—initially saw the reserves as curtailing their private livelihood or profit objectives.

Thirty years after PA creation, local communities and the PA staff in Sian Ka'an have found an acceptable working arrangement that meets both local livelihood and conservation goals. Most of the threats to biodiversity conservation originating from the local population have been reduced. In Ria Lagartos, on the other hand, tensions between the local population and the PA administration persist. Several important differences between the two PAs account for these conditions.

Sian Ka'an has an area of 528,148 ha, most of it owned by the federal government. A total of 1,500 people live within the reserve, mostly fishers in Punta Allen. In contrast, Ria Lagartos has a much smaller area of 60,348 ha; more than half of which is owned by private interests, *ejidos*, and communities. It has a much larger, more diffused, and ethnically diverse population of 7,000. Its economy is also more diverse than that of Sian Ka'an.

Because of its size and national importance, Sian Ka'an attracted considerable attention from the federal government and national and international NGOs. The SGP established a special partnership with PACT to provide small grants to community groups living in and around the PA. Over time, these programs helped the local population established cooperatives that provide a reliable income to most households and also helped ensure a sustainable use of the area's natural resources.

Its wider array of economic activities, coupled with a more diverse ethnic composition, create a more complex set of interests affecting biodiversity resources in Ria Lagartos. Most people in Ria Lagartos depend on activities with a high potential for environmental degradation, such as cattle raising, agriculture, and salt mining; a small portion of the population depends on fishing. Also, support to Ria Lagartos has been much lower than that received in Sian Ka'an. Consequently, except for the fishing cooperative, PA benefits to most local people have been negligible.

Around the time the GEF-supported SINAP I project concluded, Fraga (2006) reported that most persons living in the Ria Lagartos Reserve perceived the PA administration as distant. Further, they objected to the restrictions on cattle raising and salt mining, which they viewed as an infringement on their livelihoods. Up to the present day, most local people continue to see the reserve as curtailing their livelihood opportunities (Doyon 2008). This perception has contributed to ongoing encroachment of cattle herds in the core area of the reserve, resulting in a loss of forest cover of 2.4 percent from 2000 to 2012; this loss was corroborated by high-resolution remote sensing analysis carried out for this evaluation.

management programs such as controlled access to PA resources.

In Sian Ka'an, a fairly small local population has enabled progress in developing more equitable opportunities for livelihoods. But even here, differences are beginning to emerge. A small group of families that are members of the first fishers cooperative established in the area in the mid-1980s have disproportionately benefited from the development programs undertaken in the reserve. While the expanding opportunities in the tourism sector are generating employment and benefits to other families as well, this group of families has increasingly captured local institutions that act as brokers with the government and other external funders, and is increasingly perceived as a local elite. This situation is helping to reignite old conflicts among the local population (Brenner 2012).

CHAPTER 7

GOVERNANCE

LEGAL FRAMEWORKS FOR PROTECTION AND CO-MANAGEMENT

Changes in their legal framework in the visited PAs have resulted in stricter protection and increased community participation. The GEF and CSOs have contributed to these national government initiatives by supporting activities facilitating new legislation.

As indicated in chapter 6, key to improved enforcement and compliance in the visited PAs were government funding and resources to improve management capacities, and the acceptance by government of community members as partners in PA management. Thus, management effectiveness outcomes would not have been sustained without equal attention to strengthening the legal frameworks for biodiversity conservation and community engagement.

Changes to the legal status of PAs resulted in stricter protection of all or parts of seven PAs, in only three of which the GEF played an important role. For example, parts of Ría Lagartos were declared a natural PA and sanctuary; Sian Ka'an was declared a biosphere reserve and a UNESCO World Heritage Site; Namibia's Caprivi Game Reserve was expanded and renamed as the Bwabwata National Park; and Bwindi and Kibale were converted from forest reserves to the stricter designation of national parks under the management of the Uganda Wildlife Authority. For Mount Kenya, the GEF contributed to a similar type of change by orchestrating a first meeting of all relevant agencies and supporting implementation of the first community forest associations.

Changes in the legal framework for communities to access or manage land and resources often coincide with increased community participation, even in nonsupported PAs where CSO and government support for co-management were the main contributors to change.

The GEF-funded Wildlife Conservation Leasing Demonstration project (2008–12) in Nairobi National Park is credited with influencing the devolvement of responsibilities for wildlife to local people through Kenya's Wildlife Act of 2013. The Wildlife Act is the most recent in a series of legislative changes that have confirmed the mainstreaming of community engagement in biodiversity conservation in the country. Beginning with the Environmental Management and Coordination Act of 1999, a number of laws have since been passed in

Kenya to cement the role of communities as key players in PA management.

The role of legislation in increasing community participation was found to be particularly important in non-GEF PAs such as Aberdare in Kenya and Itwara in Uganda. Although CSOs and bilateral donors implemented interventions contributing to greater community participation in these PAs (e.g., environmental education), the mandatory inclusion of communities in PA management activities through national laws created formal mechanisms and bodies through which communities could directly participate.

Such changes could only occur where the national government came to recognize the role of communities living adjacent to or inside PAs. In some cases—as in Mexico, where PAs had been declared with little or no consultation with local populations—changes to the legal framework came first, followed by increased community participation. In other cases, legislation was enacted after years of gradually increasing community participation, as in the case of Kenya.

SUPPORT AT THE SYSTEM LEVEL

As one way to deal with drivers beyond the local scale, GEF has provided support to the PA systems or sub-systems of at least 57 countries, with many of the individual PA-level interventions also linking to system-level interventions. In the four visited countries that received support at this scale, GEF was credited for having contributed to policymaking grounded in scientific research and broad stakeholder consultation, improved human resource management, and greater financial transparency, efficiency and sustainability.

One of the earliest ways that GEF support has dealt with larger-scale or systemic challenges to governance at the PA level is by helping strengthen the country's PA system. In many cases, interventions implemented at the PA level are part of a larger systemwide intervention. Specifically, at least 21 percent of the PA-related projects (186) analyzed for OPS5 reported activities linking individual PAs to the PA system

The possible effect of GEF support on PA systems was tested by comparing non-GEF PAs located in the 57 countries that received system-level support from the GEF with non-GEF PAs found in countries that did not receive GEF support at this scale. The percentage of forest cover loss was marginally lower by 0.13 percent in non-GEF PAs within countries receiving PA system support compared to non-GEF PAs in countries where the GEF only supported individual PAs.[1] Nevertheless, although GEF support at the system level affects the management effectiveness of all PAs in the country—such as through policies and regulations—whether this support leads to reduced forest cover loss is difficult to establish.

In the four visited countries that received support at this scale (Colombia, Mexico, Namibia, and Uganda), the GEF was credited with having contributed to policy making grounded in scientific research and broad stakeholder consultation; improved human resource management; and greater financial transparency, efficiency, and

1 These differences are marginal, but statistically significant (n = 7,108, mean = 1.42 percent for PAs in countries with system support; n = 2,730, mean = 1.55 percent for PAs in countries without system support; $p < 0.05$).

sustainability (table 7.1). The countries visited that received PA system support were found to have more functional PA systems (box 7.1). Of the three countries that did not receive systemwide support from the GEF, Kenya was found to have a more functional PA system, while Indonesia and Vietnam have less functional PA systems.[2] All of the more functional PA systems—and none of the less functional ones—were reported in

2 While Kenya received GEF support for its eastern montane and coastal forest PA networks during GEF-4, it did not receive support for its entire PA system, as an earlier tourism-focused World Bank project (Protected Areas and Wildlife Services—PAWS) had already provided support at that scale. In Indonesia, the GEF is providing long-term support at the PA system level, but only for its marine PAs. In Vietnam, a conservation fund was established through GEF support at the national level, but this initiative focused on increasing forest plantations and sustainable use of biodiversity by adjacent communities rather than strengthening the capacities of the PA system itself.

BOX 7.1 DEFINING A FUNCTIONAL PA MANAGEMENT SYSTEM

In a workshop with country consultants, the evaluation team defined a "functional PA management system" as having the following characteristics: (1) sufficient **resources** (human, financial, etc.) to meet its management objectives; (2) **staff** with requisite skills and expertise to carry out management functions (including timely planning); (3) an operational **management information system that** generates knowledge used for adaptive management; and (4) the ability to be **resilient** against catastrophes and shocks (e.g., market forces, climate change).

This definition is distinct from that of a "sustainable PA system," which the GEF defines as one that (1) effectively protects ecologically viable **representative samples** of the country's ecosystems and provides **adequate coverage** of threatened species at a sufficient scale to ensure their long-term persistence; (2) has sufficient and predictable **financial resources** available, including external funding, to support PA management costs; and (3) retains adequate individual and institutional **capacity** to manage PAs such that they achieve their conservation.

TABLE 7.1 TYPES OF GEF INTERVENTIONS AT THE PROTECTED AREA SYSTEM LEVEL

Intervention	Colombia	Mexico	Namibia	Uganda[a]
Policy development		x	x	x
Technical support		x	x	
Consultations/meetings		x	x	
Research			x	x
Financial and human resource systems		x	x	x
Establishment of new PAs/improved representativeness of ecosystems	x	x	x	x
New management approaches	x	x	x	x
Sustainable financing mechanisms	x	x		x
New administrative bodies		x	x	x
Monitoring system (biological outcomes, management effectiveness)	x	x	x	
Vehicles/equipment/infrastructure		x	x	x
Community participation/benefits		x	x	x

a. Refers to the PA system administered by the Uganda Wildlife Authority.

field interviews as generally having good enforcement of laws.

GEF support to the management effectiveness of PA systems in Colombia, Mexico, Namibia, and Uganda can broadly be classified as support to policy development processes; improvement of management capacities; and the introduction or support of innovative management approaches, including sustainable financing mechanisms.

Policy development

During the mid-1990s when the restructured GEF stepped up its grant-making activities, many countries were in the process of developing national biodiversity strategies and conducting the necessary reforms to ratify the CBD adopted in 1992 in Rio de Janeiro. During this time, the GEF supported most countries reporting to the CBD through enabling activities. However, the extent and approach of GEF support differed from country to country.

The GEF's contribution to policy development processes in countries where it provided system-level support included technical assistance in crafting new regulations and funds that allowed consultation with a broader group of stakeholders. Also supporting policy development were research studies conducted through GEF projects, such as the valuation of forest resources and the impacts of climate change on forests—both of which were used as inputs in legislation affecting the PA systems in Namibia and Uganda.

In Mexico, GEF support to a national workshop involving academia, CSOs, and government helped identify conservation priorities in the country (Carabias, de la Maza, and Cadena 2003).[3] In Namibia, the GEF SPAN and ICEMA projects (implemented by UNDP and the World Bank, respectively) funded technical assistance to develop new policies permitting multiple-use zones, outlining guidance on working with neighboring communities, and rationalizing PA management.

In Namibia, Mexico, and—to some extent—Uganda, GEF support reportedly influenced laws or policies related to how communities adjacent to PAs could benefit from revenue-generating activities across the PA system. In countries where the national government stance was explicitly "pro-people" as far as conservation was concerned, legal frameworks already existed for communities to benefit from natural resources. For example, in Namibia, where GEF policy support was driven directly by government demand, support was aimed at helping make benefit-sharing arrangements more concrete for and favorable to the communities adjacent to PAs, and to enable implementation of these arrangements on the ground.

Further, the ICEMA, SPAN, and NAMPLACE projects in Namibia supported the evolution of co-management between the PAs and neighboring conservancies in the Mudumu North Complex and Mudumu landscape; this concept was then adopted by national legislation throughout the PA system. In Uganda, the GEF helped promote a system

3 This support to Mexico complemented and built on support provided in Latin America as a whole through a GEF-financed regional workshop held to discuss and identify approaches and conservation priorities. This workshop helped many of the region's countries define policies and administrative arrangements for PAs.

of revenue sharing of user fees with adjacent communities in national parks. It also helped develop a national framework for co-managed community conservation areas in important wetland areas that were not considered part of the national PA system.

In Mexico, the policy focus has been somewhat different. Since the 1970s, the Mexican model of biodiversity conservation has allowed people to live in PAs. Sarukhán et al. (2009) report that 25 percent of the PAs in the country are located in lands inhabited by indigenous people, and Halffter (2009) reports that there are 3,359 agrarian settlements situated in PAs across the country. As noted previously, many of the reserves created before the mid-1990s were created with little community consultation, which has often contributed to a history of tense relations between PA staff and local communities. Since 1995, GEF support has helped Mexico to explore ways to test approaches to involving people in PA management (World Bank 2003, 2010a, 2010b). It has enabled the establishment of PA advisory councils and the development of comprehensive social strategies for each PA which include indigenous peoples' development plans and, when appropriate, sustainable development action plans or strategies for co-responsibility.

Even in countries where it did not provide PA system-level support, the GEF indirectly contributed to strengthening the PA system through enabling activities such as technical assistance in drafting national biodiversity strategies and providing training to government agencies. Perhaps the most important contributing contextual factor to these changes was a new political will to enact legislation that would be conducive to the successful management of PAs.

Management capacities and approaches

In four of the seven countries visited, the sustainable financing mechanisms and more streamlined financial systems established with support from the GEF continue to function at present. These have allowed the national government to eventually take on the costs of sustaining the PA system and to leverage funds from other donors. Innovative management approaches introduced through pilots at the PA level have also been adopted systemwide. Nonetheless, financial sustainability remains a critical concern.

In Mexico, Namibia, and—to some extent—Uganda, GEF support has contributed to the establishment of administrative bodies that now manage the PA systems in these countries. Management capacities were further improved by streamlining financial and human resource management systems, and creating a more equitable compensation and benefit package for PA staff. Through these interventions, GEF support was perceived as helping improve transparency in the financial management of some PA systems. According to PA staff in Uganda, more streamlined financial and human resource systems helped reduce corruption, thus increasing PA revenues; in Mexico, these helped attract highly qualified professionals to work in PAs.

In Uganda, GEF support was also credited with introducing a decentralized planning system that cut administrative costs and allowed PA managers to be more responsive to enforcement- and community-related issues. In Namibia, the Ministry of Environment and Tourism initiated a restructuring process that led to a similar decentralization

of management and budget powers to the local park level. The GEF SPAN project, along with Germany's KfW Development Bank and the Integrated Rural Development and Nature Conservation NGO, helped promote this decentralization. The SPAN project was also reported to have helped persuade Namibia's Ministry of Finance to increase the overall budget for the Ministry of Environment and Tourism, in part by providing an economic valuation of the PAs and their wildlife.

PA system support from the GEF in Mexico, Namibia, and Uganda was also provided in the form of vehicles, staff buildings, and equipment. Also, management effectiveness monitoring systems were established with GEF support; these play a significant role in Colombia and Namibia.

In Colombia, Namibia, and Uganda, GEF support contributed to the establishment of new PAs or to the re-establishment of PA boundaries, with the aim of ensuring better ecosystem representation within the PA system. Innovative management approaches supported by the GEF at the PA level mainstreamed biodiversity conservation at the landscape scale, and have been further integrated throughout the PA system. Among these approaches are translocation of wildlife in Namibia; conservation mosaics in Colombia; payment for ecosystem services in Mexico; and corridors and community resource management arrangements in Mexico and Namibia, with initial efforts being made in Kenya, Uganda, and Vietnam. In Namibia, the GEF supported a system to grant concessions to communities in conservancies. This system introduced sustainable use of fauna and natural resources, and helped develop the local population's support for conservation. Some of these approaches are part of larger, regional initiatives, such as GEF's support for the creation of the Mesoamerican Biodiversity Corridor, which links PAs in six Central American countries and southern Mexico.

The financial sustainability of national PA systems became an explicit and distinct priority for GEF biodiversity support starting in GEF-4.[4] Three of the seven visited countries credited GEF support, to some extent, for establishing a sustainable or adequate source of funding for PAs. The GEF supported the establishment and strengthening of trust funds in Colombia and Mexico. Indirectly, GEF support helped put in place a cross-subsidization system as well as create a reserve fund from tourism revenues in Uganda as sustainable financing mechanisms.

GEF sustainable financing support was particularly important in Mexico, leading in 2008 to the eventual incorporation of PA management costs into the regular government budget, although gaps in PA system funding still remain (Bezaury-Creel 2003). In Colombia, the GEF supported initial establishment of a trust fund. Through subsequent projects, it provided additional financing for the sustainable use of biodiversity through conservation mosaics that also covered indigenous peoples' territories. The World Bank reports that, by its end in 2015, the project had financed the protection of 2,638,018 ha of core conservation areas (108 percent of the revised

4 This emphasis was complemented by other priority areas: strengthening PA networks and policies for mainstreaming biodiversity, and supporting markets for biodiversity-friendly goods and services.

target value) and 1,444,246 ha or 51 percent of the surrounding territories. Landscape-oriented planning was strengthened in 10 conservation mosaics, and ecological connectivity had been improved in 8. The project also was reported as having supported 22 indigenous and Afro-Colombian associations (World Bank 2015).

In Uganda, where the national PA systems are administered by two separate ministries, governance issues led to the reserve fund being reallocated beyond the PA system. However, the cross-subsidization and sound financial management that GEF support helped put in place allows the Uganda Wildlife Authority–administered PA system to continue running almost entirely on revenues. USAID is now supporting a more efficient electronic fee collection system in selected PAs to further increase revenues. Uganda's National Forest Authority, on the other hand, received system-level support from the European Union. One output of that support was a forest conservation master plan intended to achieve financial sustainability through revenue from timber production in plantations. Stakeholders interviewed reported that the National Forest Authority—like forest management agencies in many other countries—has a long history of corruption at high levels, which has led to the plantations being grossly mismanaged. The project was discontinued, and the European Union is now investing mainly in strengthening the private sector to expand tree plantations. Currently, the National Forest Authority relies heavily on the national government budget for day-to-day operations.

Despite these initiatives, financial sustainability remains a critical concern. User fees as a source of revenue are highly dependent on global economic and political drivers. In Kenya and Uganda, for example, the ability of revenues from wildlife tourism PAs to subsidize non-earning PAs was reduced when terrorist attacks scared off international tourists. Even in countries where the financing plans are currently appropriate face challenges, as new proclamations increasing the size of the country's PA estate—and thus the associated management costs—will eventually render these plans inadequate.

Contributing contextual factors

In the visited countries, large-scale political drivers were found to provide opportunities for environmental reform that in turn led to more functional PA systems. Factors contributing to functional PA systems were positive stakeholder attitudes toward the environment and an adequate national government budget allocation. In the absence of these attributes, what became important was the presence of champions and of a stable financial mechanism.

Contextual factors identified as contributing to the success of PA systems were either large-scale political drivers that opened up space for the environmental agenda, or favorable institutional settings that allowed the intervention to have a greater reach. A change in political regime, for example—such as independence in Kenya and Namibia, and the end of civil war in Uganda—provided an opportunity for radical changes in policy and political structure. The 1992 United Nations Conference on Environment and Development (the Rio Earth Summit), which was also an initiating factor for the GEF, was cited as creating a shift in countries' policies toward biodiversity conservation and community participation,

and linked to the creation of national laws aligned with these themes. Thus, by the mid-1990s when GEF financing increased, many countries were seeking to strengthen their institutional and administrative capacities to better address environmental issues to meet their commitments to the global conventions.

A factor reported in several countries is increased pressure placed on governments beginning in the late 1980s and early 1990s by academia, CSOs, and public opinion to address concerns over the destruction of natural resources. In most countries visited, as in many other developing countries, long-standing PAs—many established in the late 19th century—were symbolic designations only. Such PAs were national monuments with cultural or aesthetic value or areas functioning as reserves for sustainable use rather than strictly protected for biodiversity conservation. It was not until the 1980s and 1990s that national PAs and PA systems with biodiversity conservation objectives were broadly established and funded. In Mexico, for example, the engagement of academia and CSOs both within and outside the administrative apparatus of the state brought about this shift, especially the support provided by national and international NGOs such as WWF and The Nature Conservancy (de la Maza 1999; Rambaldi, Bugna, and Geiger 2001).

Using qualitative comparative analysis, factors found necessary for the operation of functional PA systems in the visited countries were transparency of financial flows and management; transparency of decision-making procedures; and clear, non-overlapping mandates among institutions. All more functional PA systems were reported to have these; however, these factors were not sufficient to ensure functionality. In four of the five more functional PA systems, positive societal attitudes toward the environment and conservation turned out to be key. "Positive societal attitudes" refers to high environmental awareness among the general population, the private sector, and local NGOs.

With all of the above factors being present, the analysis showed that in the countries visited, champions for the PA system also need to be present to ensure adequate financing through the national government budget. PA systems with inadequate national budgets were robust when supplemented with funds from a sustainable financing mechanism such as a trust fund or cross-subsidization system like those the GEF helped initiate in Colombia, Mexico, and (to some extent) Uganda. In the absence of positive societal attitudes and a national government budget for the PA system, what became important was both the presence of champions and a stable financial mechanism

Namibia has created a sustainable financing mechanism by directly apportioning 25 percent of PA revenues toward a game products trust fund that funds equipment and infrastructure proposals of individual PAs within the system. The remaining portion of PA revenues goes to the central government, which allocates a budget to each park from the national treasury.[5]

5 The GEF made no direct contribution toward establishing this financing mechanism.

Clarity and coordination of mandates

PA systems were found to function less coherently where they were managed by different government entities. Overlapping mandates and administrative jurisdictions within PAs exacerbate poor conservation practices resulting from conflicting management objectives. Country commitment to a well-integrated national PA system was found to be a critical factor affecting the progress made in biodiversity conservation.

The presence of a single agency or ministry with a strong mandate and enforcement capacity emerged as a key feature of effective PA management in Colombia, Kenya, Mexico, and Namibia. In PA systems managed by different government ministries or agencies, forest areas often fell under overlapping jurisdictions subject to different regulations, with no central authority to resolve administrative conflicts. PA management decentralized to local governments—as in Indonesia, Vietnam, and Uganda—often lacked funding for monitoring and enforcement activities, as local revenue typically was not sufficient to cover the requisite activities and tended to be reallocated toward other local government priorities such as basic services.

Under Indonesia's system of decentralized government, the control of forest resources outside the PA system rests with district-level government, whose conservation priorities can differ from those at the national level. The result is that local governments can permit reduction in natural habitats in the landscape outside the PA system, leading to more human-wildlife conflicts. Wildlife populations are under threat since the proportion of lowland habitat in the PA system is limited, affecting the viability of populations in the longer term. For example, data on elephants in Aceh indicates that 80 percent of their habitat lies outside the PAs. The government budget for conservation has increased over the years, from approximately $72 million in 2008 to $130 million in 2012. Much of this budget has gone toward maintaining and expanding the government system, as well as toward addressing priorities such as fire control. However, the budget for ground-level operations is low, which results in constraints on protection and enforcement activities. International NGOs and donors bridge gaps at the site level, but the scale of the PA system and the threats to it mean that the system overall remains significantly underresourced.

In Indonesia, conservation organizations work under memorandums of understanding with government agencies, but remain largely outside government work plans and budgets. Sustainability of new procedures for effective management—such as patrolling, monitoring, education, community involvement, and enforcement, all of which are components of support provided by NGOs—is in question, since these activities are not embedded into the work plans and budgets of the responsible government agencies. There is a major funding gap for effective management of the system; 2008 estimates by the Indonesian government put the amount allocated to the system at about a quarter of the global average for a typical PA system. Financing this gap will always be a major challenge. Demands on the government budget will always result in suboptimal allocations to conservation, and there is little motivation for the Ministry of Finance to borrow from international financial institutions for biodiversity conservation when

more economically attractive priorities exist in other sectors.

In Vietnam, multiple management jurisdictions and planning and budgeting processes affecting PAs hinder coherent administration and flow of resources to PAs. Of the 168 PAs in the country, 6 are managed by the Ministry of Agriculture and Rural Development; the rest are managed by the provinces. The Ministry of Natural Resources and Environment provides guidelines and technical assistance related to PAs, and the Ministry of Tourism plays a role in identifying and designating national parks with cultural value. PAs managed by provincial governments are financed through central funds provided to the provinces, which are then distributed by the respective provincial peoples committee on the basis of provincial needs and priorities. But biodiversity conservation is rarely a high priority for local governments; thus allocations to PAs tend to be low. PAs managed by the Ministry of Agriculture and Rural Development are generally better funded, but management priorities are typically focused on forest protection and fire prevention, not on biodiversity conservation. Finally, the Ministry of Natural Resources and Environment—the strongest institutional stakeholder in PAs—has the least voice and influence over what happens in PAs.

One of the roles of the Ministry of Natural Resources and Environment is to collect information and report on the state of PAs in the country. Because it has no direct access to PAs, the ministry must rely on the good will of provincial governments and on the Ministry of Agriculture and Rural Development in order to access the requisite information. A lessons learned study financed under the Creating Protected Areas for Resources Conservation (PARC) in Vietnam Using a Landscape Ecology Approach project (GEF ID 209) reports that these conditions severely affect resource flows to PAs and that funds often arrive late in the fiscal year to PAs, allowing for only a few months in which to use the funds (Emerton et al. 2003). Insufficient and extemporaneous funding was reported by a PA official in the Ba Be National Park as an important factor affecting park management, as it was impossible for rangers to properly patrol the PA to prevent extraction of wildlife.

GEF support to Vietnam for PAs and adjacent landscapes started in 1992, and has consisted of 15 projects totaling $48 million. Given this institutional structure, GEF support has been channeled to specific PAs or has taken place through different agencies which do not have good communication or coordination. Lessons derived from projects such as Vietnam's Protected Areas for Resources Conservation have had little effect on the overall national PA system, as the coordination of PAs within the Ministry of Natural Resources and Environment has remained small with a weak mandate and no capacities to interact with PAs.

Terminal evaluations reported that the multiple institutions responsible for PA management in Vietnam have resulted in a lack of clarity on roles and responsibilities for PA management and financing. These institutional constraints are exacerbated by limited individual capacity on development and management of revenue-generation mechanisms, PA planning and management, business planning, marketing, and communication strategies. Incentive systems are currently ineffective in motivating individual performance, and has resulted in adverse values and attitudes among PA staff (Bao et al. 2005).

Having wildlife and forests managed as separate components by two ministries with different objectives makes effective management of a single PA system that is naturally composed of integrated ecosystems difficult. In this, Uganda makes for a unique situation. In other countries, wildlife and forestry management are typically both under the mandate of the country's ministry of environment, which allows for better coordination and conflict resolution between the two sectors.[6]

While both the Uganda Wildlife Authority and the National Forest Authority have shared objectives of conservation and sustainable resource use, both are also compelled to earn revenue to support their operations: the Uganda Wildlife Authority through wildlife tourism, being under the Ministry of Tourism, Wildlife and Antiquities; and the National Forest Authority through timber, under the Ministry of Water and Environment. As such, the incentive for conservation is greater for the Uganda Wildlife Authority, since wildlife tourism is profitable only if wildlife numbers are high. The National Forest Authority's business model, on the other hand, provides greater incentive for extraction than conservation to ensure its own survival. Due to the urgent need to generate their own revenues from year to year, both are at risk of compromising their conservation objectives in the face of proposals for incompatible but more lucrative revenue sources. Both tourism and timber production are important to the country's development and need equal attention, despite differences in their current capacities to generate revenue.

No formal mechanism enables the Uganda Wildlife Authority and the National Forest Authority to coordinate their mandates and activities on the ground, where they often overlap in the same or adjacent geographical areas. Local governments and community members must deal with two different authorities, each with its own processes and regulations to be followed. This inevitably results in doubled operational costs in terms of time and money for everyone involved.

In addition, the national government's push toward mining and oil exploration in PAs risks undermining long-term conservation efforts, unless conservation priorities in PAs are enforced and subsequent actions aligned with these priorities. Agricultural programs incompatible with sustainable use around PAs will likely compromise achievements if the various government agencies responsible for land use do not coordinate their activities through clearly demarcated zones. In some PAs not visited, there were reports of politicians themselves going against the law by encouraging communities to encroach into the PAs (Otieno 2014 and interviews with government officials).

LOCAL PRESSURES, LARGE-SCALE DRIVERS

Despite the progress made as a result of GEF contributions to management and governance, high demand for wildlife products

6 For example, the Kenya Wildlife Service and Kenya Forestry Service are in the process of merging, with the latter to become a department under the former. Both are under the Ministry of Environment, which has resolved previous jurisdictional conflicts by assigning responsibility to one or the other entity. Similarly, in Indonesia, wildlife and forests are managed by different directorates, but both are under the Ministry of Forestry. Also, all national PAs are managed by the forestry directorate.

and a lack of livelihood options for growing local populations threaten biodiversity.

As a country's population grows, the need for timber, firewood, and agricultural land also increases. At present, land in Uganda is being cultivated right up to the boundaries of many PAs, with no buffer zones in between. Cattle raising and agriculture have been a major factor in land conversion in several PAs in Mexico. In Ba Be in Vietnam, while the PA administration has been successful in stopping slash-and-burn agriculture and commercial illegal logging, population growth in the communities surrounding the PA, a high market demand for wildlife products, and the lack of adequate economic opportunities have resulted in the persistence of poaching and illegal logging. These examples highlight the potential of the need for resources to push people to encroach into PAs despite government efforts to enforce boundaries.

Government-sanctioned infrastructure development, uncontrolled mining and prospecting, unsustainable land management practices, and poorly directed tourism and recreation activities are among the major threats to biodiversity in some PAs. Tourism and recreation raise special concerns in Namibia, since these activities are concentrated in some of the country's most ecologically sensitive areas. Similarly, in Mexico, the development of tourism in the Yucatan Peninsula has provided alternative sources of income to local communities living in and around PAs, but its unchecked expansion is resulting in growing land encroachments of summer homes in PAs in the area.

In recent years, illegal activities by organized crime have resulted in an upsurge in poaching, despite improvements in law enforcement and legal frameworks supported by GEF interventions. Examples include reduction of elephant populations in Bwabwata in Namibia and Kibale in Uganda. Among the countries visited, local demand for illicit wildlife trade is particularly high in Indonesia and Vietnam (Nuwer 2015). While GEF support has generally helped improve capacities for law enforcement and community engagement, higher demand for wildlife products gives incentive to poachers to develop new technologies to which PA management staff have to adapt.

Drug trafficking has been a driver of deforestation and biodiversity loss in Central America since 2005, through the construction of air strips for delivering drugs by plane. Forest loss has increased in the Caribbean lowlands, particularly in Guatemala, Honduras, and Nicaragua. Among the PAs affected in this region are those in the Mesoamerican Biodiversity Corridor, an area of high globally important biodiversity and the recipient of GEF grants totaling more than $50 million over the last 10 years (IEG 2011). Thus, over the past decade, the spike in drug trafficking throughout this region has coincided with high rates of deforestation in areas that are considered to be drug trafficking nodes.

But it is the money-laundering effects that are having much greater and longer-lasting effects in terms of the capitalization of illegal loggers, palm oil producers, and land speculators who are converting large tracts of land in the region to agriculture (McSweeney et al. 2014). Recently, the World Conservation Society reported that the global "illegal wildlife trade is big business. Not including the illegal trade in timber, it exceeds $19 billion annually. The trade is heavily capitalized and is part of the

same criminal networks that are involved in drugs, weapons, and human trafficking" (Robinson 2015). The report also noted that trafficking networks often hire local people to help poachers with food, accommodation, and information and to act as guides.

These situations demonstrate how economic drivers such as high market demand, price shocks in wildlife trade, or lack of food security can counteract the benefits of GEF-supported interventions. Despite these challenges, the evaluation found that GEF support can help countries put in place inter-institutional mechanisms to coordinate activities in PAs. For example, in the Sierra de Manantlán reserve in Mexico, advisory groups (*consejos assesores*) were formed to identify priorities and coordinate activities with the participation of local organizations and state agencies. These advisory groups proved to be very effective instruments in reaching agreement on priority areas, coordinating enforcement of regulations and public investments in the region, and helping to tap public funds to address the priorities identified (Graf et al. 2003). The Mesoamerican Biological Corridor project in Mexico also reports having formed advisory groups at the state level to facilitate inter-agency coordination. Group participants included state and regional representatives from key ministries, state and local governments, and CSOs including indigenous groups. The project's implementation completion report notes that, through regular meetings, the Mesoamerican Biological Corridor management office has helped at least 40 percent of investment in public programs to coordinate impacts on biodiversity within the project area (World Bank 2010).

Since its pilot phase, the GEF's strategies have evolved in tandem with CBD strategies by focusing not only on key factors affecting PA management but also on large-scale governance issues and root causes of biodiversity loss. This evolution is discerned in the shift in priorities from the establishment of individual PAs during the pilot phase, to the focus on corridors and landscape approaches, and now toward interventions targeting specific drivers through the integrated approach pilots in GEF-6. Challenges remain, however, requiring a concerted effort beyond traditional environmental sectors and stakeholders.

CHAPTER 8

THE GEF CATALYTIC ROLE

The previous chapters demonstrate how GEF support has contributed to reducing environmental threats and improving management effectiveness—which in turn contributes to positive biodiversity outcomes. However, to achieve global environmental benefits as specified in its mandate, the GEF is expected to catalyze transformational change in the ways and systems with which humans interact with the environment. Such transformations typically take place through the expansion and broader adoption of the outcomes of GEF support by stakeholders, ideally beyond project funding.

The following are the most common processes of broader adoption in GEF projects as identified in OPS5. This set of processes is used in this section as a guide to assess how GEF support has contributed to broader changes observed in nonmarine PAs and PA systems.

- **Sustaining.** Interventions originally supported by the GEF continue to be implemented by stakeholders without GEF support to demonstrate the benefits to, and provide benefits for adoption by, other stakeholders beyond the original project scope.
- **Mainstreaming.** Information, lessons, or specific results of the GEF are incorporated into broader stakeholder mandates and initiatives such as laws, policies, regulations, and programs of governments and/or development organizations and other sectors.
- **Replication.** GEF-supported initiatives are reproduced or adopted at a comparable administrative or ecological scale, often in another geographical area or region.
- **Scaling-up.** GEF-supported initiatives are implemented in larger geographical areas, often expanded to include new aspects or concerns that may be political, administrative, economic, or ecological in nature.

EXTENT OF PROGRESS TOWARD IMPACT AT PROJECT END

Analysis of 191 completed projects in the GEF portfolio found that 95 percent of these projects reported some broader adoption or impact in the form of threat reduction or improvement of biodiversity in PAs. The type, extent, and speed of change varies greatly. The most frequently cited factors

affecting the extent of broader adoption of the outcomes of GEF support were extent of government support, extent of engagement of stakeholders, deficiencies in project design, and extent to which projects carried out activities supporting broader adoption.

An analysis of terminal evaluations of projects financing nonmarine PAs shows that 68 percent of GEF-supported projects reported reduced threats and improved ecosystem conditions at project end. The analysis also provides indications that the extent to which project outcomes are likely to be more broadly adopted is already apparent by project end. A key premise in the following analysis is that if both broader adoption processes and some type of positive environmental impact are observed by the time a project ends, it is likely that progress toward larger-scale impact is being made.

As shown in table 8.1, 45 percent of the 191 projects analyzed reported both some type of broader adoption and environmental impact taking place by project end. In 34 percent of projects, arrangements had been made for some type of broader adoption process to take place, but no process had begun yet by the time the project ended. Even so, in 20 percent of projects, some environmental impact was reported. In 5 percent of projects, neither broader adoption nor any environmental impact was reported.

The Europe and Central Asia region had the greatest proportion of projects achieving progress toward impact (60 percent), but the least number of nonmarine PA projects reviewed (35; table 8.2). Latin America and the Caribbean and Africa each had 45 percent of the projects in the region achieving likely progress toward impact by the same measure, while Asia had the least proportion of projects at 24 percent.

Focusing on mainstreaming, replication, and scaling-up processes across the OPS5 portfolio, the analysis of 191 PA projects found that management frameworks and approaches initially supported by the GEF were the most commonly mainstreamed initiatives (70 percent). This included such interventions as establishing community-based PA management and preparing and/or implementing PA management plans. Adoption of laws, policies, and

TABLE 8.1 OCCURRENCE OF BROADER ADOPTION AND ENVIRONMENTAL IMPACT IN GEF NONMARINE PROTECTED AREA PROJECTS

	Projects reporting no environmental impact		Projects reporting environmental impact		Total	
Extent of broader adoption	Number	Percent	Number	Percent	Number	Percent
Most broader adoption initiatives adopted/implemented	7	4	30	16	37	19
Some broader adoption initiatives adopted/implemented	21	11	56	29	77	40
Some broader adoption initiated	25	13	39	20	64	34
No significant broader adoption	9	5	4	2	13	7
Total	62	32	129	68	191	100

TABLE 8.2 REGIONAL DISTRIBUTION OF BROADER ADOPTION AND ENVIRONMENTAL IMPACT (%)

	Africa	Asia	ECA	LAC	Global
No environmental impact	43	28	23	30	71
Most broader adoption initiatives adopted/implemented	5	2	3	5	0
Some broader adoption initiatives adopted/implemented	12	11	3	13	29
Some broader adoption initiated	17	11	14	10	29
No significant broader adoption taking place	10	4	3	2	14
Environmental impact	57	72	77	70	29
Most broader adoption initiatives adopted/implemented	14	17	26	11	0
Some broader adoption initiatives adopted/implemented	31	17	34	34	29
Some broader adoption initiated	10	35	17	21	0
No significant broader adoption taking place	2	2	0	3	0
Total projects as % of portfolio (number of projects)	22 (42)	24 (46)	18 (35)	32 (61)	4 (7)

NOTE: ECA = Europe and Central Asia; LAC = Latin America and the Caribbean.

regulations pertinent to PAs was also frequently reported (69 percent).

PA financial mechanisms introduced through GEF support—such as user fees, revolving funds, and public-private partnerships—were reported to have been mainstreamed in 46 percent of projects. Similarly, management bodies and processes that GEF support helped develop or strengthen—such as PA management councils, law enforcement teams, and community forums—were reported in 45 percent of projects as having been adopted by stakeholders at project end.

Much less frequently reported were instances of replication. GEF-supported management frameworks or approaches were reported to have been replicated in 26 percent of projects, and financial mechanisms in 11 percent of projects. Scaling-up was the least commonly reported process, with a maximum of 11 percent for any type of intervention. This is not a surprising result given that the data were collected either at project end or afterwards. Scaling-up generally requires longer time periods to take effect and needs high-level policy change by the government or widespread adoption by the public or private sector to succeed.

FACTORS AFFECTING PROGRESS TOWARD IMPACT

Factors affecting the extent of progress toward impact were broadly classified into two types: project related and contextual. Table 8.3 presents the three most commonly reported factors of each type contributing to and hindering progress, out of a total of 33 such factors. Government support for project initiatives was the contextual factor cited most frequently, in 61 percent of projects, as the factor that positively contributes to progress toward impact. The project-related contributing factor that emerged most frequently was good engagement with stakeholders (59 percent). Compared to the full OPS5 portfolio, more nonmarine

TABLE 8.3 FACTORS MOST COMMONLY CITED IN TERMINAL EVALUATIONS AS AFFECTING PROGRESS TOWARD IMPACT

Factor type	Contributing to progress		Hindering progress	
	Factor	No. (%)	Factor	No. (%)
Project related	Good engagement of key stakeholders	113 (59)	Poor project design (other than factors below)	58 (30)
	Highly relevant technology/approach	65 (34)	No activities to sustain momentum	48 (25)
	Good coordination with/continuity of previous/current initiatives	65 (34)	Inappropriate/insufficient technology/approach	22 (12)
Contextual	Government support	117 (61)	Other unfavorable political conditions/events	77 (40)
	Previous/current related initiatives (by government, global events, etc.)	71 (37)	Lack of government support	44 (23)
	Other stakeholder support (e.g., donors, private sector)	67 (35)	Unfavorable economic conditions/drivers/events	37 (19)

NOTE: *n* = 191; numbers and percentages represent projects reporting that factor in terminal evaluations.

PA projects cited good engagement of key stakeholders, coordination with other initiatives, and government support as being present and contributing to progress toward impact. The numbers of such projects citing other sources of support from stakeholders as contributing to progress, and unfavorable economic conditions or drivers hindering it, were lower than for the full OPS5 portfolio. Poor project design, cited as a hindering factor in 30 percent of projects, was due to overly ambitious project objectives, unrealistic assumptions about contextual conditions, and lack of capacity in project sites to implement the project as planned. Similar to the full OPS5 portfolio, 25 percent of projects in this analysis did not support any activities that would initiate broader adoption processes or allow outcomes to move forward.

Qualitative comparative analysis showed that for 88 percent of the projects in the OPS5 portfolio where some or most broader adoption processes were under way by project end, the combination of factors contributing to this outcome consisted of broader adoption processes being initiated by the project, support from other stakeholders, and sound project design. Also, 59 percent of such projects either had a combination of broader adoption processes initiated by the project and the existence of previous or current non-GEF initiatives related to project objectives; or a combination of strong government support and good engagement of stakeholders, as long as project design was not poor. A separate analysis showed a combination of four hindering factors in 89 percent of projects where broader adoption had not begun or been planned for by project end: no broader adoption processes had been built into project design, no support from other stakeholders existed, project design was poor, and there was a lack of government support.

BROAD ADOPTION PROCESSES IN VISITED PROTECTED AREAS

Broader adoption of outcomes of GEF projects were observed in 14 out of the 17 GEF supported protected areas that were

visited. Sustaining and mainstreaming were the most common processes reported, with management approaches, community participation in PA management, and community livelihoods being adopted in the most number of PAs.

Of the 17 visited PAs that received GEF support, 14 reported some form of broader adoption taking place, mostly through sustaining and mainstreaming. All PAs that reported mainstreaming, replication, or scaling-up of GEF-supported interventions continued or sustained these interventions within the PA. The types of interventions most commonly sustained or mainstreamed were management approaches, community participation in PA management, and community livelihoods (table 8.4).

In the PAs visited, a combination of civil society, government, and GEF support generally contributed to the mainstreaming of community participation in PA management. Civil society organizations—including NGOs, tourism associations, community forest associations, religious groups, and private sector groups—promoted community engagement. Governments allocated budgets for community engagement activities and adopted co-management approaches. An important factor was a shift in community perspectives regarding the role of PAs in providing resources and opportunities for improved well-being, and a shift in societal perspectives regarding the role of communities as capable stewards of natural resources.

Private forest owner associations organized through the GEF-supported Conservation of Biodiversity in the Albertine Rift Forest Areas of Uganda project (GEF ID 1175), which piloted a corridor approach to conservation, were engaged in testing a payment for ecosystem services model under a smaller GEF-supported project. The Northern Albertine Rift Conservation Group, comprised of several local and international NGOs, have taken these concepts further by working with the same groups and using the lessons learned in a follow-on REDD+ project.[1]

In Vietnam's Ba Be National Park, some of the alternative livelihood models introduced by the GEF have been sustained by some

1 REDD+ goes beyond reducing greenhouse gas emissions from deforestation and degradation (REDD) to include the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks (http://www.un-redd.org/aboutredd).

TABLE 8.4 BROADER ADOPTION IN VISITED PROTECTED AREAS

	Broader adoption	Sustained	Mainstreamed	Replicated	Scaled up
Management approach	10	10	7	4	1
Financial sustainability	5	5	4	3	2
Community participation in PA management	11	11	7	2	0
Community livelihoods	14	14	6	1	1
Mechanisms for dialogue and cooperation	8	8	3	0	0

households 10 years after the completion of the creating protected areas project. This project promoted new economic activities with awareness-raising campaigns and pilot demonstration projects; these included a home-stay ecotourism program, and sustainable bee production and animal husbandry. In support, the government developed infrastructure—including roads, electricity, and schools—and provided credit to local communities. These measures eased tourist access to these areas and provided financial resources to community members.

In Nairobi National Park in Kenya, the GEF Wildlife Conservation Leasing Demonstration project established an ecosystem management approach, including the use of seasonal dispersal areas and migration corridors on adjacent privately owned lands. These management approaches have been replicated in Amboseli National Park and the Mara Triangle next to the Masai Mara Game Reserve. They are now being replicated in neighboring Tanzania, through a project led by the Food and Agriculture Organization of the United Nations and Tanzania's International Livestock Research Institute.

In Mexico, GEF supported the piloting of capacity-building approaches, monitoring and reporting systems, PA financial management, training materials, and advisory councils; these were subsequently replicated across the PA system.

The piloting of a conservation fund in Africa through the BMCT project in Uganda has led to Kenya, Malawi, and Tanzania creating similar funds, some also with GEF support. The creation of a similar fund at the national level—based on lessons learned from the BMCT experience as well as from other funds worldwide—is currently being discussed. The experience of Mexico's GEF-supported trust fund has also provided important design and operational lessons that have been applied by trust funds throughout Latin America (World Bank 2003).

Scaled up from an SGP project, the Extending Wetland Protected Areas through Community Based Conservation Initiatives project (COBWEB; GEF ID 1837) in Uganda demonstrated the use of community conservation areas in wetlands; as of 2014, it was planned to be further scaled up by the Wetlands Department at the national level through another project. Similarly, the landscape co-management approach pioneered in the Mudumu North Complex and the Mudumu Protected Landscape Conservation Area was scaled up throughout the Zambezi region, and has now been scaled up to Namibia's entire PA system (box 8.1).

KEY CHARACTERISTICS OF GEF CATALYTIC SUPPORT

While sharing similarities with the types of support provided by governments and other donors, GEF support was found to give particular attention to a combination of long-term engagement, financial sustainability, and the creation of links across multiple approaches, scales, and stakeholders. In cases where GEF support combined these three elements, they were found to enable adaptability to changing contexts, and contribute to a higher likelihood of broader policy and institutional changes in support of PAs—particularly when channeled directly through government agencies.

In all of the visited PAs and countries, many of the GEF-supported interventions were

BOX 8.1 BROADER ADOPTION OF MANAGEMENT APPROACHES THROUGH GEF AND OTHER STAKEHOLDER SUPPORT

All three of the visited GEF-supported PAs in Namibia (Bwabwata, Etosha, and Mudumu) have adopted changes in management approaches that have also been scaled up to the country's PA system. GEF support introduced new systems to improve management efficiency and provided equipment, training, and technical assistance to the park concessions unit. GEF project coordinators provided technical support to park authorities for the development and implementation of new management plans. The GEF also provided funds and technical and logistical support to facilitate meetings and communications between the PAs and the conservancies. Joint management activities between the local Kyaramacan Association, conservancies, and PAs were made possible through GEF support as well.

A landscape approach to conservation has been mainstreamed as the accepted policy for the parks management agency in all three PAs. Park staff report that the new management plans are actively used to guide activities and management priorities. In Etosha, even though initial efforts to develop a larger landscape conservation approach by linking two PAs (Etosha and Skeleton Coast National Parks) failed, the current deputy director is implementing a landscape conservation and shared management approach through tourism concessions with neighboring conservancies. Efforts are being made to replicate these landscape and co-management approaches in the Zambezi region, with the aim of connecting the Mudumu North and South Complexes with four other landscape conservation areas.

Various contextual factors have contributed to the broader adoption of management approaches. Government policy has gradually shifted from excluding people from PAs to recognizing communities' links to the land and its resources, and a willingness to trust communities as stewards of protected resources. The minister and permanent secretary were committed to negotiation and compromise with communities, and promoted a larger landscape approach. The government provided the park staff with clear guidelines for multiple-zone management and technical support, and developed a new management plan.

Contributions from civil society were also key to the success of management changes. International and national NGOs supported the conservancies by increasing their management capacity, and by developing sustainable and holistic range management practices. Forums provided platforms for information exchange, joint planning, and managing shared resources.

For Namibia, the establishment of conservancies adjacent to PAs, and the zoning of PAs to accommodate multiple-use zones, has contributed to the success of a landscape approach and co-management approach to conservation. The conservancies provide an institutional mechanism for formal cooperation and co-management—e.g., by enabling the translocation and shared management of game between the PA and the conservancies, and by working on high wildlife crime reduction and mitigation. The introduction of multiple-use zone management provides an explicit, legal arrangement for communities to continue to access PAs and their resources, and facilitates the existence of core conservation areas with a higher degree of protection.

found to be similar to those supported by other funders. Having a broader development mandate, governments and bi- and multilateral donors most often invested in large infrastructure investments (e.g., roads in Indonesia, Uganda, and Vietnam; irrigation works in Mexico), and in basic social service programs that improved community well-being (nutritional and health programs in Mexico; schools and access to food and water in Kenya, Namibia, and Uganda). However, as noted elsewhere in

this report, these funders also supported interventions within the context of their environmental programs that improved management capacities through PA staff training, equipment, planning workshops, monitoring systems, and implementation of management approaches. Interventions to increase community engagement through environmental education and provision of livelihoods were also commonly supported, often by funding CSOs to implement such activities. At the national scale, these funders, as well as CSOs that acted as advocacy groups, also supported policy development toward stricter biodiversity protection and greater community participation in PA management. In most of the PAs visited in this study, CSOs played an important role in working with local communities to increase their local environmental knowledge and awareness, and build their capacity to participate in natural resource management, both within and outside the PA.

GEF support was often seen as complementing existing initiatives of government, CSOs, and other donors by funding types of interventions and areas that had received less funding in specific projects. For example, GEF grants for process-oriented activities such as capacity development would often be cofinanced by much larger investments from governments and bilateral and multilateral donors toward more tangible outcomes such as infrastructure and equipment that supported biodiversity-related projects. In all visited countries, GEF support was seen as contributing most effectively toward strengthening the political will of both national and local governments to support conservation through PAs. This occurred through support to policy development and through the leveraging of government funds toward conservation projects where they might not have in the absence of a GEF grant. Particularly in Mexico, Namibia, and Uganda, GEF support in strengthening the national PA government agencies was a factor that helped build political will within the government.

This GEF support complemented pressure from international institutions on national government policy making, especially in Indonesia, where international NGOs implement many biodiversity-related interventions. International NGOs, such as WWF, the Wildlife Conservation Society, and The Nature Conservancy, were influential in all countries visited, both in terms of policy development and in piloting management approaches. Country CSOs were especially influential in Mexico, Namibia, and Uganda. In the case of CSOs, which typically implement smaller projects than bi- and multilateral donors, GEF support often provided the additional funds necessary for existing interventions, such as innovative management approaches, to be tested, replicated, or mainstreamed. The GEF often worked in close cooperation with both international and local NGOs in supporting environmental education activities, facilitating policy development processes, and enabling communication among stakeholders.

More important, GEF support was said to have delivered interventions in a way that allowed greater adaptability to changing circumstances and a higher likelihood of interventions being sustained or scaled up by giving particular attention to the combination of long-term engagement; financial sustainability; and the linking of multiple approaches, scales, and stakeholders (table 8.5).

TABLE 8.5 KEY CHARACTERISTICS OF GEF SUPPORT TO PROTECTED AREAS BY COUNTRY

Characteristic	Colombia	Indonesia	Kenya	Mexico	Namibia	Uganda	Vietnam
Long-term engagement	x			x	x	x	
Financial sustainability	x			x	x	x	
Creation of links across multiple approaches, scales, and stakeholders	x	x	x	x	x	x	x

Long-term engagement

In four of the visited countries (Colombia, Mexico, Namibia, and Uganda), the GEF was found to have invested in a series of linked projects covering a period ranging from 10 to nearly 25 years (table 8.6). These projects tended to target PA systems, although some specific PAs received support continuously over the period. In other cases, a specific PA received support over a long time period both through interventions aimed at the PA system as a whole or through individual, typically medium-size, projects. Some of these investments were designed to be multiphased from the beginning; others were designed based on the results of previous projects. In all cases, the length of support and the phased approach allowed GEF's project partners to learn from project implementation experience, and adapt the design of subsequent projects to suit the country's evolving context and needs. Continuous support over more than a decade also allowed national governments to build sufficient capacity over time to gradually

TABLE 8.6 EXAMPLES OF LONG-TERM GEF INVESTMENT IN VISITED COUNTRIES THROUGH PHASED OR COMPLEMENTARY PROJECTS

Country	GEF-supported project	Project period
Colombia	• Colombian National Protected Areas Conservation Trust Fund (GEF ID 2551) • Colombian National Protected Areas Conservation Trust Fund—Additional financing for the Sustainability of the Macizo Regional Protected Area System (SIRAPM) (GEF ID 3886)	• 2006–11 • 2011-present
Mexico	• Protected Areas Program (GEF ID 62) • Integrated Ecosystem Management in 3 Priority Ecoregions (GEF ID 839) • Consolidation of the Protected Areas Program (SINAP II) (in four tranches: GEF IDs 877, 2078, 2654, 2655)	• 1993–1997 • 2001–10 • 2002–10
Namibia	• Integrated Ecosystem Management in Namibia through the National Conservancy Network (ICEMA) (GEF ID 1590) • Strengthening the Protected Area Network (SPAN) (GEF ID 2492) • Namibia Protected Landscape Conservation Areas Initiative (NAMPLACE) (GEF ID 3737) • Strengthening the Capacity of the Protected Area System to Address New Management Challenges (GEF ID 4729)	• 2004–11 • 2006–12 • 2010–present • 2013–present
Uganda	• Institutional Capacity Building for Protected Areas Management and Sustainable Use (ICB-PAMSU) (GEF ID 101) • Protected Areas Management and Sustainable Use (PAMSU) (GEF ID 1830)	• 1998–2003 • 2002–10

mainstream GEF-supported interventions into their regular budgets. Particularly in Mexico, Namibia, and Uganda, GEF support aimed at strengthening financial and human resource systems resulted in the creation of more functional PA systems.

The World Bank–implemented Institutional Capacity Building for Protected Areas Management and Sustainable Use (ICB-PAMSU) and PAMSU projects (GEF IDs 101 and 1830) in Uganda were originally intended to be a single project in support of the government's conservation and sustainable tourism program. However, in the early 1990s, the implementing institutions were considered too weak to manage the large investments in the PA system that such a project would entail. Thus, it was decided that the blended World Bank loan and GEF grant would be split into two projects, with implementation of the larger second project contingent on successful strengthening of institutions by the first project.

ICB-PAMSU focused on streamlining the PA system's administration. Among other things, it increased professionalism across the system by ensuring that PA staff were paid regularly, and were provided with equitable benefits and appropriate equipment for patrols—thus boosting staff morale and capacity to carry out PA protection. Building on what worked in ICB-PAMSU, the subsequent PAMSU project focused on revenue generation to ensure financial sustainability for the PA system, as well as on increasing wildlife populations and addressing community concerns. To build capacities in financial management, it was designed not to fund any recurrent costs but to instead invest in infrastructure. Due in part to better accounting practices and in part to higher tourist numbers, revenues increased from UgSh 5.8 billion in 2002 to UgSh 26.8 billion by the time the project ended. At present, the Uganda Wildlife Authority—one of the institutions ICB-PAMSU helped build—continues to implement the management and administrative systems that were put in place during the projects, funded by its own revenues.

In Mexico, the GEF has provided support to SINAP for nearly 25 years. The precursor to the four-phase SINAP II project (now known as SINAP I) originally aimed to strengthen PA management in up to 17 Mexican reserves. However, a series of reorganizations in the executing agency and a shortage of funds caused by an economic crisis in Mexico resulted in the project only spending $3.9 million of its allocated $17.8 million by the original project end date in 1995. Project accomplishments were mixed, but the government of Mexico requested an extension. After difficult negotiations, an agreement was reached between the government, the World Bank, and the GEF Secretariat on a four-month extension and for an independent analysis to be conducted on improving implementation and justifying the extension.

The restructured project became an endowment that provided a long-term source of funding sufficiently flexible to hire high-quality staff for, and make timely disbursements to carry out operations in, the PAs. It also provided funds to prepare and conduct workshops and exchanges to transfer the knowledge and systems tested in the 10 PAs financed by the GEF. Over time, this model of learning by doing and knowledge exchange led to a strengthening of Mexico's National Commission on Natural Protected Areas (Comisión Nacional de Áreas Naturales Protegidas, CONANP), a robust institution

which is highly respected in the country's public administration system. SINAP I ended in 2003 with a satisfactory rating.

On the basis of this experience, the GEF provided a second grant to consolidate the national system by extending the number of PAs financed under the endowment to 23. SINAP II was approved in 2003 for a total of $31 million, to be disbursed in four tranches. Now in its fourth tranche, SINAP II has provided long-term continuity that has helped develop a highly functioning PA system and a robust CONANP. In 2008, when the Mexican government decided to bring all CONANP staff under the federal budget, the GEF agreed to use funds previously dedicated to the support of the 23 PAs to CSO-implemented strategic projects supporting PAs. The flexibility of GEF support again facilitated adaptation to changing conditions, and is now supporting emerging grassroots organizations and CSOs in biodiversity conservation.

In Namibia, ICEMA, SPAN, and NAMPLACE were three PA system-level projects implemented almost simultaneously over a long period by the World Bank and UNDP. The three projects complemented each other, with SPAN strengthening the country's PA system, and ICEMA and NAMPLACE helping establish systems for co-management at a landscape level with communities adjacent to PAs. These systems have been adopted into legislation and are being implemented across the PA system. They are reported to have reduced conflict with adjacent communities, as well as to have created a sustainable source of funding for biodiversity conservation.

Long-term GEF support was provided in Colombia in the form of a trust fund that was expanded to include greater support to other PA systems within the country that encompassed conservation mosaics.

Although Indonesia did not receive any long-term support from the GEF for its PA system or any of its nonmarine PAs, it has benefited from the GEF's long-term investment in its marine PA system and adjacent coastal areas.

The UNDP-implemented SGP is another way in which the GEF has made long-term investments at the local level, albeit through disbursements of very small amounts when compared to typical GEF projects. A series of SGP projects within the same area in Uganda allowed partner NGOs to test collaborative management approaches with communities and to eventually advocate for their inclusion in national legislation. Community organizations in the Bwindi and Kibale national parks credited the SGP's continuous technical assistance beyond implementation of their respective small grants for helping build capacities to resolve issues that might otherwise have prevented the outcomes of the grants from being sustained.

Other funders have been providing support for biodiversity conservation, ecotourism development, and community engagement in the visited countries for decades as well. However, these donors typically have a greater say over which specific PAs receive grants and for which types of interventions, rather than giving the national government the prerogative to distribute funds to areas that may have greater needs over time. In Uganda, for example, different national parks are known for their particular sponsors, or bilateral donors and NGOs that have provided support in those same areas through several projects. While this approach has

greatly strengthened capacities in these PAs, other areas that have not attracted any funders have tended to become progressively marginalized over the years. Also, an interview with a bilateral donor in Uganda revealed that, due to a shorter and more strictly enforced project implementation cycle, lessons from older projects typically could not be incorporated into the design of related projects immediately following.

Financial sustainability

Complementing the GEF's long-term investments is its support for building the ability of countries and PAs to continue the interventions and outcomes it has supported, independently and beyond project lifetimes. As this is one of the strategic priorities for the biodiversity focal area, the GEF has supported various approaches to financial sustainability depending on country conditions and priorities. This evaluation found that, typically, these include mechanisms to ensure the availability of long-term resources to conservation and the more efficient and effective use of available resources. Financial sustainability interventions supported by the GEF include trust funds (Colombia, Mexico, and Uganda), streamlined financial systems for PA system management (Mexico, Namibia, and Uganda), and market-based instruments such as establishment of concessions and collection of user fees (Namibia) and payment for ecosystem services (Colombia and Mexico).[2] In Uganda, while the financial system was streamlined at the PA system level, an earlier project created a trust fund at the PA level. In Mexico, the trust fund that GEF support helped establish at the PA system level has contributed to the creation of other funds at the PA level.

Stakeholders interviewed said that financial sustainability has enabled long-term planning and consistent follow-up on initiatives, which project-based funding is not able to do. Among other things, this financial sustainability allows implementation of interventions through a phased approach in which new projects adapt to the results of prior projects, and provides the continuity necessary for achieving impacts that take longer to emerge. In addition, access to financial and technical resources helps raise the profile and credibility of biodiversity-related interventions—in part, resulting in greater and more stable financing from national governments. In Colombia, budget allocations to the national PA system went from $13 million in 2006 to $32 million in 2013, during the implementation of the GEF project. From 1994, when the restructured SINAP I started implementation in Mexico, to 2003 when it ended, the budget for CONANP increased 20-fold. The impact of GEF support in Mexico was such that the SINAP I implementation completion report stated that

> within CONANP, it is said lightly, but seriously, that this project is "the father of the agency", having been the impulse that sparked development of an agency appropriate to the scope and urgency of protected area conservation in Mexico, where before there had been a structure wholly inadequate to the task. (World Bank 2003, 9)[3]

2 During the 1990s in Latin America, The Nature Conservancy promoted the establishment of debt for nature swaps, which were implemented through the Initiative of the Americas. The GEF became a major contributor to most of these endowments, one of which was in Colombia.

3 CONANP is the authority that administers Mexico's national PA system. During separate

The existence of a sustainable financing mechanism also attracts other support—from bilateral donors, private companies, and academic and research institutions—such as provide counterpart funds and technical assistance to PAs. As a result of the GEF providing a grant of $4 million as capital investment for the BMCT Fund in Uganda, USAID provided a supplemental $880,700 grant for the first two years, and the Royal Netherlands government gave $2.7 million over five years (World Bank 2001). Many donors do not create endowment funds themselves for a variety of reasons, including the fact that these funds do not have a concrete, specific, and immediate impact that donors can report back to their boards as a return on investment; and that they require donors to release a large amount of money at one time over which they essentially lose control.

Since the BMCT endowment did not generate enough income in these first few years, these counterpart funds allowed for the establishment of the BMCT institutional framework, and for the implementation of the first round of community projects consisting of schools and other needed infrastructure. Concurrent with growing community acceptance of the national parks—in 1993, local populations were setting fires in the parks out of anger, while by 2007, 58 percent of them had a favorable view of PAs, increasing to 78 percent by 2011 (Ikirezi, Muhanguzi, and Bush 2011)—the BMCT has attracted more than $2.5 million from NGOs, private companies, and other donors for projects (Wieland and Bitariho 2013). The original $4 million in 1995 has grown to almost $7 million as of March 2014. Moreover, the $180,000–$300,000 the endowment generates annually in interest ensures that the BMCT structure has sufficient funds to operate, increasing donors' confidence that their money will be used toward project implementation. The consistent presence of the BMCT also allows it to provide necessary follow-up support to livelihood beneficiaries beyond the typical project cycle.

In Mexico's Monarch Butterfly Biosphere Reserve, the Monarch Butterfly Conservation Trust Fund supported in part by the GEF's SINAP projects has attracted new cofinancing and partnerships among international NGOs, national and state governments, and private investors.

GEF support has not contributed as much to financial sustainability in Indonesia, Kenya, and Vietnam. In these three countries, GEF support has taken place at the PA level only with no support provided at the PA system level. In Kenya, as noted on page 71, it was felt that a fairly robust system had been developed with the help of a World Bank tourism-focused project by the time the first GEF project began implementation in 1996. Thus, GEF biodiversity financing was focused on specific PAs. The projects reviewed entailed the development of sustainable livelihood models and work with local populations. Similarly, in Indonesia and Vietnam, GEF support was mainly invested in piloting landscape management and community engagement approaches around specific PAs.

interviews with the evaluation team, Julia Carabias, Minister of the Environment at the time of CONANP's creation, Javier de la Maza, CONANP's first director, and Ernesto Enkerlin and Luis Tello, subsequent CONANP directors, communicated very similar messages regarding the importance of GEF support to both SINANP and CONANP.

Indonesia only began to receive GEF support toward financial sustainability in 2014; this was for one of its PA subsystems. In Vietnam, the GEF supported the establishment of a $9 million conservation fund in 2009 for 50 special-use forests. Although this fund leveraged cofinancing of $5.1 million from the Netherlands and $1.6 million from the national government, it was designed as a sinking fund that could be accessed on a competitive basis (MoNRE, World Bank, and Sida 2005).

A smaller project established a revolving loan fund specifically to support livelihood models in Ba Be. When field visits for this evaluation took place 10 years after the project ended, some of the models introduced were still being practiced, but the fund had been depleted. Given its low profile and the lack of a broader support structure—unlike the funds in Colombia, Mexico, and Uganda—this fund was not able to attract additional support. Financing for the management of the PA also declined at project closure, as the park could not compete with other pressing needs of the provincial budget. While the project had designed an approach to charge tourist fees to park visitors, the fee system was not endorsed by the provincial people's committee and has not been implemented.

In contrast, a revolving loan fund provided by an SGP project to a community organization adjacent to Kibale in Uganda continues to provide livelihood support to its members. The organization earns enough in ecotourism fees to fund its conservation activities, as well as community projects such as schools and scholarships. Its success has allowed it to attract additional small grants and technical assistance from other donors for specific activities, including from the PA management, which helps market its ecotours.

Creation of links across multiple approaches, scales, and stakeholders

As found in previous evaluations, GEF-supported interventions are typically complex in that activities are implemented at different scales, linking the household, community, PA, and national PA system through a broad unifying framework of biodiversity conservation and sustainable use. For example, local populations are engaged in biodiversity conservation through alternative livelihood options, which often focus on specific households or groups of producers. In Mexico and Vietnam, the SGP has played an important role in supporting CSOs and community groups living in and around PAs to test alternative sources of income, support the creation networks or federations of local organizations to link local producers to certification processes and improve their access to certified markets. In Mexico, the SGP has developed a system of hurricane readiness and response that covers a vast network of vulnerable communities across the Yucatan Peninsula. The federal government has since adopted this system and extended it to three other states in southern Mexico.

Given the vast array of conditions that exist among partner countries, the GEF has adopted a very flexible approach to project planning and implementation that responds to the conditions and needs of specific countries and PAs. One of the ways the GEF addresses needs at different scales and through different channels is by having different funding modalities, primarily full- and medium-size projects and small grants. In all visited countries, the GEF has supported

PA—and sometimes PA system—capacity strengthening through full-size projects, while simultaneously addressing local community concerns through SGP grants or medium-size projects. While full-size projects typically include components that support the interactions between PA staff and local communities, small grant components are sometimes embedded in full-size projects.

The broad unifying framework of GEF support, coupled with the different support modalities, allows the GEF to support different types of approaches through different stakeholders to best suit the context. For example, GEF support combines payment for ecosystem services with PA management through conservation mosaics or biological corridors in Colombia, Uganda, and Vietnam. Much of what the GEF supports is innovative for the specific context. Governments typically find these innovative approaches too risky or "soft" for investment, preferring instead to direct limited funds toward more tangible, and more basic, infrastructure and services. When innovative approaches are demonstrated to be successful, governments are more willing to fund their scaling-up at the national level. In this way, different global technologies and standards are integrated into country activities.

By supporting multiple approaches, GEF support also links multiple scales through multiple stakeholders that otherwise would not interact over a longer period of time. At 12 of the 17 visited GEF-supported PAs, the GEF was found to have contributed toward leveraging other external support and/or forging effective relations with local governments. In four of the seven visited countries, the GEF was found to have contributed to some extent toward increasing or improving CSO and private sector collaboration with the government at the national level, although the other three countries reported that no such contributions had taken place.

In the visited PAs, relationships and collaboration had been forged largely through process-oriented activities such as consultations, planning sessions, and exchange workshops. These activities were credited with facilitating interactions that sped up the adoption of innovative management approaches. In Colombia, GEF-supported interventions were seen as "seed" initiatives by various people interviewed. They indicated that GEF support helped develop various conservation models and tools that helped bring different stakeholders together.

Of greater consequence is how GEF support creates these links by enabling opportunities for dialogue and collaboration. In all visited countries, GEF support sought to promote collaboration between communities and PA management staff. In Colombia, Kenya, Mexico, Uganda, and Vietnam, this collaboration explicitly included ethnic minorities. Approaches were also introduced in these countries to facilitate exchange of information and dispute resolution among the various stakeholders. These approaches have resulted in collaborative engagements that have significantly reduced pressures to biodiversity in Mount Kenya and in Sierra de Manantlán, Sian Ka'an, and the Monarch Butterfly Biosphere Reserve in Mexico. In Lambusango and Aketajawe-Lolobata in Indonesia, the GEF supported the establishment of multistakeholder forums that fostered dialogue among adjacent communities, PA management staff, local

governments, and NGOs, among others. These forums helped raise environmental awareness and increased vigilance among community members against illegal logging activities.

In Ba Be, and subsequently in other special-use forests, the GEF supported collaborative law enforcement between village police and army patrols. In Namibia, the translocation of game from PAs into conservancies supported by ICEMA was an important catalyst for the emergence of lasting collaboration in the Mudumu North Complex. Conservancies started working together to monitor the introduced game as these moved between their respective areas of jurisdiction. Conservancy game guards and Ministry of Environment and Tourism rangers also started working together to monitor the reintroduced wildlife. Meanwhile, the SPAN project supported meetings, food, and fuel for some of the initial monitoring patrols, along with some technical support to the Mudumu North Complex activities. This support was vital, as it enabled mutual trust to develop, which led to further cooperation on other activities.

The SGP has been another means for GEF support to help bring stakeholders together, especially community organizations and NGOs, and to link community activities with national-level initiatives (GEF IEO and UNDP IEO 2008; GEF IEO and UNDP IEO 2015). The GEF has also frequently provided bottom-up support to community groups living in or around the same PAs supported through its full- and medium-size projects. While the levels of coordination between SGP country programs and other GEF projects vary, the SGP has by and large been a very effective mechanism for reaching community groups via an overall framework that seeks to promote conservation and sustainable use but that is also more responsive to the perspectives and objectives of community groups.

Due to greater investment of GEF support in long-term, process-oriented activities that link multiple stakeholders and scales, some outcomes and impacts of GEF support tend to be more difficult to measure, and may not show evidence of occurring by the time an individual project ends. This difficulty in attributing direct and tangible impacts to interventions was often cited as the reason governments and other donors tend to shy away from these types of interventions. This circumstance makes GEF support of such activities particularly critical. Efforts by other donors including international NGOs to replicate landscape management approaches in Khaudum in Namibia and Lake Nakuru in Kenya, for example, failed to take off due to a lack of sustained funding to facilitate meetings among different stakeholders in these socially complex PAs.

Large cofinancing requirements are another important tool by which GEF projects catalyze collaboration among different stakeholders. In all cases observed, cofinancing around a GEF project has helped coordinate investments and support to PAs—and has helped reduce duplication with existing initiatives of governments and other funders, such as bilateral donors, CSOs, and the private sector. For example, in Uganda, funds intended for PA infrastructure and equipment in Kibale National Park were reallocated instead to an adjacent wildlife reserve, as similar infrastructure and equipment had already been funded by USAID, the Netherlands, and IUCN. Long-term financial sustainability initiatives supported

by the GEF in Colombia, Mexico, and Uganda have been particularly effective in coordinating and rationalizing funding to PAs and PA systems. Nevertheless, it is important to acknowledge that the longer the time scales and the higher the administrative or geographical scale, the more the effects of GEF support are regulated with other factors, such as the structure of PA systems and the extent of political will in the countries.

Linking multiple stakeholders and interventions across time has allowed the GEF to provide opportunities for people to continue working on similar interventions in different capacities, as with government or other donors. These opportunities have enabled the development of synergistic relationships between different GEF projects, as well as with other interventions. For example, in Namibia, the same government staff participated in similar roles in projects supported by the GEF and Germany's KfW Development Bank, the other large funder of environmental projects in the country; two national-scale GEF projects shared the same policy adviser. Similarly, the consistent involvement of the same GEF agency staff in Uganda over a long period allowed in-depth knowledge of the local context to be built within the agency, allowing staff to provide technical assistance that took into account unique country and PA dynamics.

This continuity of personnel linking time periods, interventions, and government agencies has facilitated communication and application of knowledge across these boundaries, while preventing duplicative support in the case of parallel projects.

As the qualitative comparative analysis revealed, the presence of champions is important in developing functional PA systems, especially in advocating for adequate government financing. In Mexico, Namibia, and Uganda, continuity of personnel had a more pronounced effect when government staff who took on the role of champions were directly involved in the projects. In many cases, these people were not necessarily champions in the charismatic sense, but rather individuals in decision-making or implementation roles committed to the conservation agenda over the long term; their collective efforts ensured that interventions were effective at each step of the causal chain. Having worked within the government, these individuals already had in-depth knowledge of critical governance issues at both the PA and PA system levels—and a strong vision and commitment to resolving these issues over the long term. These champions then moved across the system in different capacities to implement or design related projects. In Mexico and Namibia, the GEF's role was reported as being especially important in leading to successful outcomes by providing the resources, visibility, and external support to national institutions led by highly credible key individuals who could push the conservation agenda forward.

Unlike bilateral donors and CSOs, the GEF, as the official financial mechanism of the CBD, primarily executes its larger projects through government agencies, normally to fund planned or existing national initiatives. This approach has helped build capacities within agencies, and increased ownership and the likelihood of sustainability. In Namibia, the GEF channeled its support to the Ministry of Environment and Tourism at a time when other donors were providing support through NGOs. This support helped to reestablish the ministry's leadership in

community-based natural resource management in the country, and provided important resources and capacities for the ministry's support of conservancies.

Bilateral donors—such as USAID in Colombia, Kenya, Mexico, Namibia, and Uganda, and the German Agency for International Cooperation (GIZ) in Kenya and Vietnam—typically provide funds and support through CSOs or consulting firms that comprise project management teams, with a new team created for each project. Direct support to governments from bilateral donors and development banks is more commonly directed toward infrastructure, equipment, and other improvements, much like support provided by the national government itself. Only in Indonesia and Vietnam was GEF support implemented in a similar manner (i.e., through NGOs or a project management unit dedicated to the GEF project). However, the GEF did not provide long-term support directly to government agencies or give sufficient attention to financial sustainability; thus, links among stakeholders tended to weaken once the projects had ended. In both countries, forest management is shared by the local governments, which tend to prioritize budgets for basic services and infrastructure over biodiversity conservation. Management of national PAs is decentralized to the provincial offices of national PA agencies. Poor engagement with local government officials and lack of a broader support framework at the national scale, due in part to the absence of GEF or other donor support to the PA system, contributed to this outcome.[4] None of the GEF-supported interventions in these countries were adopted at higher scales as intended.

The presence of mechanisms that linked PA-level interventions to the broader PA system was found to be critical to broader adoption of local outcomes and the lessons of GEF support.

4 Long-term GEF support has been provided at the PA system level in Indonesia, but only for its marine PAs. In Vietnam, a conservation fund was established through GEF support at the national level, but this project as a whole focused on increasing forest plantations and sustainable use of biodiversity by adjacent communities rather than strengthening the capacities of the PA system itself.

CHAPTER 9

CONCLUSIONS, OPPORTUNITIES, AND RECOMMENDATIONS

CONCLUSIONS

Conclusion 1: Loss of global biodiversity continues at an alarming rate, driven largely by habitat loss due to multiple development pressures. Since the pilot phase, GEF strategies have increasingly targeted these development pressures beyond PAs.

Over the past several decades, approaches to biodiversity protection have become more comprehensive and directed at drivers of biodiversity loss. Yet recent studies on changes in species abundance, population trends, and the risk of extinctions all show significant declines. Available estimates indicate that the present global species extinction rate is 100–10,000 times higher than the natural rate of extinction. And the deterioration of the world's biodiversity is projected to continue or even to increase in the future. The anthropogenic causes of biodiversity loss—especially anticipated demographic changes and climate change—will continue to place unprecedented stress on the planet's resources. Unless threats to biodiversity are comprehensively addressed, the possibility exists that some ecosystems may undergo abrupt and substantial changes to their structures and functioning.

Globally, a core conservation strategy has been the establishment of PAs, with evidence showing that—on balance—they have been effective in slowing the rate of biodiversity loss. Increasingly, PAs are becoming places of last refuge for many species, especially charismatic megafauna, while also provisioning ecosystem services such as water and air purification and contributing benefits to local human populations. Nonetheless, the coverage of those areas significant for biodiversity and those that are ecologically representative has not advanced as much as the increase in the total area covered. Moreover, PAs remain woefully underresourced, and recent large expansions in PAs globally risks widening current financial shortfalls.

Mainstreaming biodiversity and its funding into development planning through national policy and decision-making frameworks is crucial. Equally important is that PAs be strengthened through strategic expansion, effective management, and sustainable financing to support biodiversity conservation. If strengthened to a level where they can adequately address the variety of challenges facing them, PAs can continue to serve as pillars of conservation efforts in the 21st century. As the largest funder of

PA systems in the world, the GEF plays a vital role in this regard.

Since its pilot phase beginning in 1991, the GEF has adopted a comprehensive approach to biodiversity conservation that has included financing to help reduce pressures by providing economic and social benefits to communities in adjacent landscapes. Over time, GEF strategies have evolved in tandem with CBD strategies to focus not only on factors affecting PA management, but also on large-scale governance issues and root causes of biodiversity loss. This focus is seen in the shift in priorities from the establishment of individual PAs during the pilot phase toward the sustainability of PA systems and networks, and the mainstreaming of biodiversity in productive landscapes and production sectors starting in GEF-4, and now toward interventions targeting very specific drivers through the integrated approach pilots in GEF-6.

Conclusion 2: GEF support is contributing to biodiversity conservation by helping lower habitat loss in PAs as indicated by less forest cover loss in GEF-supported PAs compared to PAs not supported by the GEF. GEF-supported PAs also generally show positive trends in species populations and reduced pressures to biodiversity at the site level.

Over the past 24 years, the GEF has directly invested $3.4 billion in 137 countries, and leveraged an additional $10.6 billion in cofinancing toward nonmarine interventions in PAs, PA systems, and their adjacent landscapes.[1] The GEF has helped protect at least 2,785,350 km^2 of the world's nonmarine ecosystems. Of the 1,292 GEF-supported PAs identified by the evaluation,[2] 58 percent have been classified as key biodiversity areas, currently the highest scientific standard used to assess global biodiversity significance. Thirty-one percent of the PAs, while not classified as key biodiversity areas, have received one or more international designations for high biodiversity and/or cultural value.[3]

The evaluation faced significant challenges in assessing the impact of the support provided by the GEF due to data gaps in both GEF information systems and existing biodiversity and geospatial global databases. Nevertheless, by adopting mixed methods that used multiple data sets pertaining to different scales (PA, country, and global levels), the evaluation was able to identify trends indicating that GEF support is contributing to lower habitat loss in PAs—especially when considering findings that forest cover loss in GEF-supported PAs is lower than in PAs not supported by the GEF.

From 2001 to 2012, the time period for which geospatial information was available for this analysis, GEF-supported PAs lost up to four times less forest cover than the countrywide aggregate, and at least two times less than PAs that were not supported by the GEF in the same biomes and

1 Values adjusted for inflation at 2015 values.

2 These were identified from METT assessments submitted as of January 2013, and project documents CEO-endorsed or approved as of April 2015.

3 These are: WWF priority area, CI biodiversity hotspot, Important Bird Area, Ramsar site, Alliance for Zero Extinction site, and/or UNESCO World Heritage Site. The remaining 11 percent of PAs were found to have various levels of local or national designation, indicating high biodiversity value to their respective countries.

countries. Choosing a country where highly reliable data on GEF support were available, analyses show that GEF-supported PAs in Mexico avoided up to 23 percent forest loss from 2001 to 2012 compared to PAs that did not directly receive GEF support during this period, with results varying across biomes and ecoregions. Analysis of forest cover loss over a five-year period using commercially available high-resolution satellite data for the Mesoamerican Corridor in Mexico indicates that two GEF-supported *ejidos* had less forest loss and more forest gain when compared with two *ejidos* that did not receive support.

Another analysis looked at 88 cases of species in 39 GEF-supported PAs, supported by 29 projects, where conservation of these species was linked with project objectives. The analysis found that 45 percent of these cases had a positive trend in wildlife abundance, 39 percent presented no change, and 16 percent showed negative trends. In PAs where conservation of a particular species was not strongly linked with GEF project objectives, there was a greater incidence of the species population trend not changing or becoming worse.

Information obtained through field visits indicates that GEF support has helped reduce threats to biodiversity at the site level. In all visited GEF-supported PAs for which information was available, biodiversity protection activities were taking place. Ten of these 14 PAs reported reduction of destructive activities; in six, clear links were established between these reductions and GEF support.

The evaluation also carried out an assessment of environmental impacts of 191 completed projects included in OPS5. The study found that, at project end, 71 percent had reported positive environmental impacts. While none of these findings alone present conclusive evidence, taken as a whole, they indicate that GEF support is making important contributions to biodiversity conservation.

Conclusion 3: GEF support has helped build capacities that address key factors affecting biodiversity conservation in PAs, mainly in the areas of PA management, support from local populations, and sustainable financing. Sustainable financing of PAs remains a concern.

Information gathered through the METT indicates that GEF-supported PAs tend to have well-established legal status, boundaries, and design. Improvements over time were greatest in process-related aspects such as management planning, law enforcement, PA regulation, and resource inventory. Improvements over time were least apparent in aspects related to community participation in PA decision making.

Increased management effectiveness was reported in 13 of the 17 GEF-supported PAs visited; this took the form of improved law enforcement and compliance with PA regulations. Key contributing factors to improved law enforcement and compliance with regulations were found to be a combination of strong management capacities and community engagement activities, which the GEF has supported to a significant extent in the majority of PAs. In the case of the 17 visited PAs, GEF support in 11 was assessed as having contributed to the development of such factors as dedicated PA staff and leadership, perception of concrete benefits from the PAs by adjacent communities, and synergistic

relationships with other donors and local government. Stronger management capacities were evidenced in expanded PA staff skills, upgraded equipment and infrastructure, stable funding for PA operations, and monitoring and reporting systems for both management and biodiversity targets.

Resources from GEF, national and local governments, NGOs, and bilateral donors in combination all helped strengthen these capacities. The evaluation found that a consistent source of funding is critical to effective PA operations. PAs that benefited from sustainable financing mechanisms, or relatively stable sources of revenue, were able to fund operational costs without being highly dependent on national government budget allocations.

The financial sustainability of PAs remains a critical concern. Only in a few of the visited PAs did governments increase official PA budgets. The GEF was reported to have a moderate or high contribution toward securing adequate funding for PA operations in 9 of the 17 PAs (53 percent); in 5, this led to financial sustainability.

Community engagement through the adoption of co-management approaches in visited PAs has resulted in increased community participation in management activities, such as ecosystem restoration and law enforcement. In many cases, PA management activities have produced social and economic benefits that have helped improve community attitudes toward the PA and their willingness to cooperate with PA staff. Sixteen of the 17 GEF-supported PAs visited for this evaluation reported increased community participation in PA management, with 14 indicating that GEF support had made a direct contribution to improved community engagement. Generally, in the PAs visited, a combination of civil society, government, and GEF support have contributed to mainstreaming of community participation in PA management. Governments play an important role by enacting legislation or regulations, and allocating budgets to PAs for community engagement. Two other prominent factors are the shift in community perspectives regarding the role of PAs in providing resources and opportunities for improved well-being, and the shift in societal perspectives regarding the role of communities as capable stewards of natural resources.

Conclusion 4: GEF support is contributing to large-scale change in biodiversity governance in countries by investing in PA systems, including legal frameworks that increase community engagement. Through interventions at the PA level, GEF support is also helping catalyze gradual changes in governance and management approaches that help reduce biodiversity degradation.

As mentioned, GEF strategies have become more comprehensive in addressing biodiversity concerns, moving beyond individual PAs through mainstreaming interventions, and through the current integrated approach pilots. One of the earliest ways in which GEF support dealt with systemic challenges to governance at the PA level was by helping strengthen the country's PA system. As of 2008, the GEF had invested in the PA systems or subsystems of 57 countries. These investments have supported policy development and management capacities, and promoted the implementation of innovative management approaches and sustainable financing mechanisms. In the four visited countries that received support at

this scale, the GEF was credited for having contributed to policy making grounded in scientific research and broad stakeholder consultation, improved human resource management, and greater financial transparency and efficiency. Sustainable financing mechanisms established with support from the GEF in three of the countries continue to function. These have allowed the national government to eventually take on the costs of sustaining the PA system and to leverage funds from other donors. Innovative management approaches introduced through pilots at the PA level have also been adopted systemwide.

In many cases, interventions implemented at the PA level are part of a larger systemwide intervention. An analysis of the 191 completed projects from the OPS5 cohort indicates that 95 percent of these projects reported some broader adoption or positive environmental impact in the form of threat reduction or improvement of biodiversity in PAs by project end. Nonetheless, the type, extent, and speed of change vary greatly. The most common factors affecting the extent of broader adoption of the outcomes of GEF support were extent of government support, extent of engagement of stakeholders, deficiencies in project design, and extent to which projects carried out activities supporting broader adoption. Of the 17 visited PAs that received GEF support, 14 reported some form of broader adoption taking place. All PAs that reported mainstreaming, replication, or scaling-up of GEF-supported interventions also continued or sustained these interventions within the PA. The types of intervention most commonly sustained or mainstreamed were management approaches, community participation in PA management activities, and community livelihoods.

Changes to the national legal framework led to stricter protection of all or parts of seven PAs, in three of which the GEF had played an important role. The GEF contributed to some of these changes by facilitating communication between stakeholders and by supporting the development of new legislation. In Mount Kenya, the GEF orchestrated the first meeting of all relevant agencies, and supported implementation of the first community forest associations.

Changes in the legal framework for communities to access or manage land and resources were often found to coincide with increased community participation, even in nonsupported PAs. In 11 of the 17 PAs visited, community participation has been formally mainstreamed through the PA's adoption of a co-management approach or through broader legislation. GEF support in Nairobi National Park is credited with influencing the devolvement of responsibilities for wildlife to local people in Kenya's Wildlife Act of 2013. Similarly, a series of GEF-funded projects in Namibia supported assistance to develop new policies permitting multiple-use zones, and outlined guidance on working with neighboring communities.

Conclusion 5: While sharing important characteristics with governments and other donors, GEF support allows adaptability and higher likelihood of broader adoption in cases where it pays particular attention to three key elements in combination: long-term engagement; financial sustainability; and creation of links across multiple approaches, stakeholders, and scales.

GEF support in visited countries often complemented existing initiatives of government, CSOs, and other donors by funding

types of interventions and geographical areas that had received less support. More important, GEF support was said to have delivered interventions in a way that allowed greater adaptability to changing circumstances, and a higher likelihood of interventions being sustained or scaled up, such as through longer-term projects implemented directly by government staff. This effect was noted especially in Mexico, Namibia, and Uganda. In these countries, this type of support allowed the creation of more functional PA systems that continue to remain functional beyond the term of GEF support.

Longer-term projects enabled the testing and scaling-up of innovative management approaches that other funders—especially governments—found too risky for investment. One notable type of intervention most funders have shied away from is sustainable financing mechanisms, especially in the form of trust funds. The GEF also invests in promoting the adoption of multiple innovative approaches that have been introduced by different stakeholders, rather than any single approach. GEF funding was found to give greater attention to creating links between different scales and among different stakeholders who otherwise would not interact over a longer period of time. This result was accomplished mainly through process-oriented activities that would yield benefits in the long term such as training, consultation and planning processes, and exchange workshops; these were credited with facilitating dialogue that sped up the adoption of innovative management approaches.

GEF support often linked PA-level interventions with higher-scale initiatives, facilitating the exchange of lessons across the system. While CSOs and bilateral donors support similar interventions directed toward building capacities and promoting dialogue, their typically shorter project durations coupled with less flexible project implementation arrangements often mean that these activities do not continue beyond the project's lifetime—especially when this type of support was not implemented directly by government staff.

GEF cofinancing requirements often served to attract investments by other funders toward more tangible outcomes such as infrastructure and equipment in biodiversity-related projects, complementing GEF projects that focused more on process-oriented activities. In general, the cofinancing requirements by GEF projects helped catalyze collaboration between different stakeholders, which helped coordinate GEF spending with the funding of governments and other donors.

In cases where the GEF did not provide long-term support directly to government agencies or give sufficient attention to financial sustainability, links between scales or among stakeholders tended to become weaker once the project ended. This finding was noted particularly at the PA level in Indonesia and Vietnam, as well as in other impact evaluations undertaken by the GEF IEO. In cases where countries do not request support at the system level, the GEF is also unable to deliver interventions in this manner.

OPPORTUNITIES AND RECOMMENDATIONS FOR ACHIEVING GREATER IMPACT

Besides identifying areas of strength in GEF support to PAs, the evaluation also

identified five areas of opportunities with corresponding recommendations that will help achieve and demonstrate greater impact of GEF projects. Some of these areas are straightforward, and thus recommendations are specific. But in other cases, the challenges are complex, with no one solution and with several dimensions that need to be tackled simultaneously. In these cases, the focus is on presenting the opportunities to address such challenges, and some specific actions that could be initially taken. All were found to be critical for developing better ways to address the challenges driving biodiversity degradation, and to assess the extent to which the GEF is supporting approaches that create global environmental benefits.

Ensuring that GEF support targets areas rich in global biodiversity

The great majority of PAs financed by he GEF have international designations indicating their global biodiversity value. The GEF-6 programming document indicates that the GEF will adopt a more systematic and rigorous approach to selecting areas for investment through the use of key biodiversity area criteria (GEF 2014). Other considerations are also important. Climate change; PA downgrading, downsizing, and degazettement; and the inadequacy of existing PA networks in representing species richness have made PAs highly dynamic. They therefore cannot be assumed to have permanent boundaries, or to have boundaries that exactly coincide with biodiversity values.

Recommendation 1: Ensure best targeting of GEF support by using geospatial technology combined with the latest scientific criteria for site selection. The GEF must continue to pursue best methods to ensure that its support is targeted toward globally significant sites with high biodiversity values, and that support extends to more of these sites. As it has consistently demonstrated, the GEF must also continue to adopt the most rigorous scientific criteria in selecting areas for investment, integrating new and more appropriate criteria such as climate change vulnerability as they are developed.

Going forward, the GEF should consider the following.

- Include not only biodiversity values as criteria, but also considerations such as climate change vulnerability and ecological impacts of climate change. Geospatial information and technology can be used when prioritizing and approving projects.

- Use recently developed technologies that are capable of integrating multiple sources of data and types of criteria (e.g., key biodiversity area, species richness, climate change vulnerability), and that allow for more systematic and rigorous analysis for allocating investments in areas important for global environmental benefits.

Addressing the socioeconomic conditions that will ensure local community commitment to biodiversity protection

Through its work in the visited PAs, the GEF has struck an appropriate balance in its engagement with local communities. The trajectory of PA projects over the past 20 years shows a shift toward greater interaction and increased social and economic benefits accruing to affected communities

within and adjacent to these PAs. Such benefits have increased without overwhelming the core focus of the GEF toward biodiversity conservation and sustainable use—especially since GEF support has frequently helped attract government funding and support from other donors to address basic community needs, improve infrastructure, and increase economic opportunities in local communities. Efforts supported by the GEF, including co-management arrangements, the leveraging of resources for infrastructure, small-scale job creation, and environmental awareness raising, have been reported to increase community cooperation and compliance with PA regulations. In some instances, they have been linked to reduced overexploitation of PA resources.

While socioeconomic benefits have been generated for some sectors of the local population, unequal distribution of benefits has frequently occurred due to geographic and socioeconomic differences among adjacent communities and their residents. Even within areas where community benefits are evident, field visits showed that the extent to which different groups benefit from the same intervention varies. This is an area of concern that relates to the GEF social safeguards that were put in place in 2013, as community perceptions that PAs undermine livelihoods can contribute to the persistence of local pressures on biodiversity.

Recommendation 2: Mitigate unequal distribution of costs and benefits to local communities. At the project level, during design and implementation, the GEF needs mechanisms to ensure that future projects reach full compliance with its social safeguards. The GEF needs to expand benefit sharing across a wider cross-section of affected local populations and better mitigate the unequal distribution of costs and benefits of PA management interventions, such as those arising from geographical and socioeconomic differences among and within communities adjacent to PAs. The aim should be to reduce local pressures on biodiversity stemming from adverse local socioeconomic conditions.

Investing in broader governance issues to address large-scale drivers

Despite the progress made as a result of GEF contributions to management and governance, high demand for wildlife products and lack of livelihood options for growing local populations continue to threaten biodiversity in visited PAs. The recent upsurge in wildlife poaching in Africa and forest clearing in Latin America to support terrorism and drug-trafficking activities are examples of how transnational economic drivers are able to overpower the strides made in improving law enforcement capacities, governance frameworks, and global environmental awareness. Moreover, legally sanctioned activities such as tourism, agriculture, timber production, and mining within or adjacent to PAs, when not aligned with the PA's management objectives can often have a similar effect in reversing or limiting the positive impacts of interventions. Some of these pressures—such as those that are legally sanctioned—are the result of conflicting priorities and lack of effective coordination among government agencies that are concerned with distinct sectors yet have administrative jurisdictions over the same geographical areas or natural resources. This situation pertained in the visited countries where PA systems were managed by different government units and at different scales of governance, such as in Indonesia, Uganda, and Vietnam. In other

instances, lack of appropriate interagency coordination prevents mitigation of large-scale, transnational drivers, such as those involving illicit activities.

GEF support was found to have contributed least in helping coordinate mandates such as those between national and local governments, and between biodiversity conservation–oriented and resource exploitation–oriented government units. In at least two instances (Sierra de Manantlán and the Mesoamerican Biodiversity Corridor), GEF support in Mexico was found to have formed intersectoral bodies at the PA and landscape levels through which decisions on public investments successfully coordinated conservation and economic development priorities. Similarly, much of the accomplishments in recent years in curbing illicit logging in the Monarch Butterfly Biosphere Reserve are related to effective interagency coordination. While the GEF's role was not central in this latter case, it does illustrate the importance of interagency coordination in reducing such pressures. Intersectoral coordination is being used as an intervention at a global scale through the GEF-6 integrated approach pilots, albeit for very specific biodiversity drivers rather than a discrete ecological unit.

Recommendation 3: Coordinate with mandates beyond environmental sectors to address large-scale drivers. The GEF should invest more in interventions that enable dialogue and joint decision making not only among multiple stakeholders in and around PAs, but also stakeholders representing different sectors and operating at different scales, which tend to have conflicting development priorities and management objectives with regard to biodiversity conservation. At a minimum, these would be stakeholders involved in environmental protection, natural resource use, economic development, and infrastructure development; this would be especially important for those involved in mining, agriculture, energy, tourism, and security, among others.

Developing a more reliable and practical monitoring system to track and assess results at the project and portfolio levels

Collecting, storing, and analyzing the data required to meaningfully assess the impact of biodiversity projects is often seen as mission creep: the spending of resources outside of essential areas. PA managers are often reluctant to divert scarce resources away from management actions to monitoring and evaluation (Kapos et al. 2008). The GEF has provided considerable support to biodiversity monitoring using the METT, which is required as part of a project's regular reporting processes. But use of the METT has seen mixed results, with some countries modifying the questions to suit their purposes, others preferring to use different tracking instruments, and still others using it only to comply with GEF project requirements. Capacities to fill out the METT also vary across PAs, making the quality of the data collected uncertain or uneven at best. Of the 2,440 METT assessments submitted between 2004 and 2014, 20 percent had only half or less than half of the 30 questions answered.

The composition of stakeholders present during the completion of the METT was found to affect the total score; the presence of PA managers and staff were correlated with higher METT scores; and the presence

of local community members, CSOs, and external experts with lower scores. Furthermore, while the METT was designed to assess improvements in management effectiveness over time, only 14 percent of the 1,924 PAs that had submitted METT assessments could be analyzed for this purpose, as only a single METT assessment had been completed for the remainder during the course of the GEF project.

Many of the documents submitted at project approval or completion, including terminal evaluations, did not provide basic information on which PAs were supported by the project, through which types of interventions, and over which time periods. This lack of information made the task of assessing impact more difficult, as the evaluation could not always identify the specific areas the GEF had supported.

Assessing the extent to which GEF support produced change is in itself challenging given the multiple factors affecting such processes. Part of the problem is also related to the inherent complications in measuring the outcomes and impacts of long-term, process-oriented activities that link different scales. In many cases, it takes time for change to become evident. In complex systems that cut across many scales and incorporate a multitude of actors, monitoring systems that are designed to provide information for those operating at broader scales do not really work for stakeholders at operating at other scales (Soberón and Peterson 2015).

The GEF has the opportunity to strengthen its monitoring system and databases in the Secretariat to improve the information on results of GEF support to biodiversity conservation and sustainable use. Changes over the last 10–15 years open up opportunities to address some of the GEF's challenges in results monitoring and assessment by drawing on multiple information sources, and building partnerships with competent institutions at the global and country levels

While the METT has been adapted over time to make it more robust and allow for assessment of outcomes, the GEF has the opportunity to streamline monitoring requirements placed on projects by identifying a few key indicators that are useful for global analyses, which at the same time can be reliably provided by project and PA managers. Other information such as that having to do with changes in biophysical conditions can be obtained globally through partnerships with multilateral institutions, research and academic institutions, or NGOs that are already compiling information relevant to the GEF, and have the capacity and mandate to continue the work beyond the duration of a GEF project.

Opportunities also exist to establish partnerships with national institutions for monitoring in GEF projects on aspects such as species population trends, which can also feed into specialized global databases. In this way, the GEF would ensure access to more reliable field information (e.g., species population, biodiversity richness, socioeconomic conditions). It would also support country institutional capacities, and in so doing would help build strong national advocates of biodiversity conservation. These changes will not necessarily require additional resources; a reduced project monitoring burden would free up financing for partnerships with country institutions.

Recommendation 4: Streamline project reporting requirements. The GEF should

ensure that basic information on its support to PAs (where, what, and when) is available historically and into the future. At the same time, it needs to reduce the reporting burden on projects, countries, and Agencies by adopting a mixed methods approach to results monitoring that draws on geospatial technology, global databases, and locally gathered information.

Some of this information would still need to be generated by projects, but more attention should be given to opportunities where use of remote sensing information and other global databases is appropriate.

This streamlining of project reporting requirements is likely to be a complex process that will take time and consultation with the various GEF partners. Following are specific actions that could be taken in the short term. In combination, they could reduce reporting requirements, while making data more useful to meet monitoring objectives at the global, country, and PA levels:

- Through documents submitted at project approval and completion, ensure that existing databases within the GEF Secretariat include, at the minimum, basic information on GEF support to PAs (where, what, and when).

- Institutionalize the use of geospatial technology for project and portfolio monitoring when applicable.

- Streamline METT reporting requirements to focus on information that can be used in conjunction with existing global data sets and geospatial data to perform meaningful analyses on management effectiveness and biodiversity impacts at the global level. At the same time, support countries in adapting the METT to make it more appropriate to their capacities and information needs. This will help build country capacity in monitoring parameters they find useful for improving biodiversity conservation management within their own context, while providing key information for comparison and analysis at the global level.

- Establish long-term partnerships with country institutions that already have biodiversity and socioeconomic monitoring as their mandate. This will allow results of GEF projects within a country to be monitored consistently and analyzed periodically before, during, and beyond the life of a project. Local and national databases developed through these partnerships can then feed into global databases. The focus should initially be on countries with the largest biodiversity System for Transparent Allocation of Resources (STAR) allocations and established capacities.

- Establish partnerships with research institutes or agencies that specialize in biodiversity data management and can regularly provide geospatial information or other global information relevant to GEF support to biodiversity, including data on PA attributes and locations, species range maps, forest change data, and population time-series data.

Investing in understanding what works and why

The GEF has made important contributions to biodiversity conservation by helping countries improve their PAs and by supporting the development of PA systems.

Given the vast engagement in PA support around the world over the last 20 years, the GEF is in a privileged position to draw from this extensive experience to improve its approaches to PA and PA system support. One important lesson derived from this evaluation is that the GEF has enabled country adaptability to changing contexts, and contributed to broader policy and institutional changes in support of biodiversity conservation through PAs when (1) its support takes place over a long period of time; (2) it gives attention to financial sustainability; (3) it supports processes linking approaches, stakeholders, and scales; and (4) all of these take place in the context of direct support to government agencies.

Knowledge gaps remain in several key areas affecting biodiversity conservation in PAs and adjacent landscapes; filling these gaps would lead to a better understanding that could increase GEF impact.

Recommendation 5: Create a program for learning what works, for whom, and under what conditions The GEF partners—including the IEO, the Secretariat, the Scientific and Technical Advisory Panel, and the Agencies—should jointly develop and implement a program that will generate evidence on what works, for whom, and under what conditions.

An evidence base can be built by drawing on a mix of methods and approaches appropriate to the types of interventions and contexts in which GEF support is being delivered. This evaluation has identified three critical areas in which the GEF has extensive experience over time, and in which better knowledge would significantly enhance the support the GEF provides to countries:

- How to more fully and equitably address local livelihood needs in ways that contribute to or do not undermine biodiversity conservation and sustainable use
- How to catalyze the changes needed for biodiversity conservation and sustainable use to take place at a large scale
- How to support biodiversity conservation and sustainable use in ways that produce multiple environmental and socioeconomic benefits

ANNEX A

METT QUESTIONS

Category	Notes
1 Legal status (Context)	0 = The protected area is not gazette 1 = There is agreement that the protected area should be gazetted 2 = The protected area is in the process of being gazetted 3 = The protected area has been formally gazetted/covenanted
2 Protected area regulations (Planning)	0 = There are no regulations 1 = Regulations with major weaknesses 2 = Regulations with some weaknesses or gaps 3 = Regulations provide an excellent basis for management
3 Law enforcement (Input)	0 = No effective capacity/resources 1 = There are major deficiencies in staff capacity/resources 2 = The staff have acceptable capacity/resources 3 = The staff have excellent capacity/resources
4 Protected area objectives (Planning)	0 = No firm objectives have been agreed for the protected area 1 = Objectives exist, but not managed according to these 2 = Objectives exist, but is only partially managed according to these 3 = Objectives exist, and is managed to meet these
5 Protected area design (Planning)	0 = Inadequacies in protected area design mean achieving the major objectives of the protected area is very difficult 1 = Inadequacies in protected area design mean that achievement of major objectives is difficult but some mitigating actions are being taken 2 = Protected area design is not significantly constraining achievement of objectives, but could be improved 3 = Protected area design helps achievement of objectives; it is appropriate for species and habitat conservation
6 Protected area boundary (Process)	0 = The boundary of the protected area is not known 1 = The boundary of the protected area is known by the management authority but is not known by local residents 2 = The boundary of the protected area is known but is not demarcated 3 = The boundary of the protected area is known and is appropriately demarcated

Category	Notes
7 Management plan (Planning)	0 = There is no management plan 1 = Management plan is not being implemented 2 = Management plan is partially implemented 3 = A management plan exists and is being implemented
8 Regular work plan (Planning/output)	0 = No regular work plan exists 1 = Work plan exists, but few of the activities are implemented 2 = Work plan exists and many activities are implemented 3 = Work plan exists and all activities are implemented
9 Resource inventory (Input)	0 = There is little or no information available on the critical habitats, species, and cultural values of the protected area 1 = Information is not sufficient to support planning and decision making 2 = Information is sufficient for most key areas 3 = Information is sufficient to support all areas
10 Research (Process)	0 = There is no survey or research work taking place 1 = There is a small amount of survey and research work 2 = There is considerable survey and research work 3 = There is a comprehensive, integrated research program
11 Resource management (Process)	0 = Active resource management is not being undertaken 1 = Very few of the requirements for active management are being implemented 2 = Many of the requirements for active management are being implemented 3 = Requirements for active management are being substantially or fully implemented
12 Staff numbers (Input)	0 = There are no staff 1 = Staff numbers are inadequate 2 = Staff numbers are below optimum 3 = Staff numbers are adequate
13 Personal management (Input/process)	0 = Problems with personnel management constrain achievement of major management objectives 1 = Problems with personnel management partially constrain achievement of major management objectives 2 = Personnel management is adequate for achievement of major management objectives but could be improved 3 = Personnel management is excellent and aids achievement of major management objectives
14 Staff training (Input/process)	0 = Staff lack the skills needed for protected area management 1 = Staff training and skills are low relative to the needs 2 = Staff training and skills are adequate, but could be further improved to fully achieve management objectives 3 = Staff training and skills are aligned with management needs
15 Current budget (Input)	0 = There is no budget 1 = The available budget is inadequate for basic management needs 2 = The available budget is acceptable but could be further improved 3 = The available budget is sufficient
16 Security of budget (Input)	0 = Wholly reliant on outside or highly variable funding 1 = There is very little secure budget 2 = There is a reasonably secure core budget 3 = There is a secure budget
17 Management of budget (Process)	0 = Budget management is very poor and significantly undermines effectiveness 1 = Budget management is poor and constrains effectiveness 2 = Budget management is adequate but could be improved 3 = Budget management is excellent and meets management needs

Category	Notes
18 Equipment (Input)	0 = There are little or no equipment and facilities 1 = There are some equipment and facilities, but these are inadequate 2 = There are equipment and facilities, but still some gaps 3 = There are adequate equipment and facilities
19 Maintenance of equipment (Process)	0 = There is little or no maintenance of equipment and facilities 1 = There is some ad hoc maintenance of equipment and facilities 2 = There is basic maintenance of equipment and facilities 3 = Equipment and facilities are well maintained
20 Education program (Process)	0 = There is no education and awareness program 1 = There is a limited and ad hoc education and awareness program 2 = There is an education and awareness program, but it only partly meets needs 3 = There is an appropriate and implemented education and awareness program
21 State and comm. neighbors (Process)	0 = There is no contact between managers and neighboring official 1 = There is contact between managers and neighboring official, but little or no cooperation 2 = There is contact between managers and neighboring official, but only some cooperation 3 = There is regular contact between managers and neighboring official
22 Indigenous peoples (Process)	0 = Indigenous and traditional peoples have no input into decisions 1 = Indigenous and traditional peoples have some input into discussions 2 = Indigenous and traditional peoples directly contribute to some decisions 3 = Indigenous and traditional peoples directly participate in all relevant decisions
23 Local communities (Process)	0 = Local communities have no input into decisions 1 = Local communities have some input into decisions 2 = Local communities directly contribute to some relevant decisions 3 = Local communities directly participate in all relevant decisions
24 Visitor facilities (Outputs)	0 = There are no visitor facilities and services despite an identified need 1 = Visitor facilities and services are inappropriate for current levels of visitation 2 = Visitor facilities and services are adequate for current levels of visitation, but could be improved 3 = Visitor facilities and services are excellent for current levels of visitation
25 Commercial tourism (Process)	0 = There is little or no contact between managers and tourism operators 1 = There is contact between managers and tourism operators, but this is largely confined to administrative or regulatory matters 2 = There is limited cooperation between managers and tourism operators to enhance visitor experiences and maintain protected area values 3 = There is good cooperation between managers and tourism operators to enhance visitor experiences and maintain protected area values
26 Fees	0 = Although fees are theoretically applied, they are not collected 1 = Fees are collected, but make no contribution to the protected area 2 = Fees are collected, and make some contribution to the protected area 3 = Fees are collected and make a substantial contribution to the protected area

Category	Notes
27 Condition assessment (Outcome)	0 = Many important biodiversity, ecological, or cultural values are being severely degraded 1 = Some biodiversity, ecological, or cultural values are being severely degraded 2 = Some biodiversity, ecological, and cultural values are being partially degraded but the most important values have not been significantly impacted 3 = Biodiversity, ecological, and cultural values are predominantly intact
28 Access assessment (Output)	0 = Protection systems are ineffective in controlling access or use of the reserve in accordance with objectives 1 = Protection systems are only partially effective in controlling access or use of the reserve 2 = Protection systems are moderately effective in controlling access or use of the reserve 3 = Protection systems are largely or wholly effective in controlling access or use of the reserve
29 Economic benefit assessment (Outcome)	0 = The protected area does not deliver economic benefits to local communities 1 = Potential economic benefits are recognized; plans are being developed 2 = There is some flow of economic benefits to local communities 3 = There is a major flow of economic benefits to local communities
30 Monitoring and evaluation (Planning/ Process)	0 = There is no monitoring and evaluation 1 = There is some ad hoc monitoring and evaluation, but no overall strategy 2 = There is an agreed and implemented monitoring and evaluation system, but results do not feed back into management 3 = A good monitoring and evaluation system exists, and is well implemented

ANNEX B

GEF-SUPPORTED PROTECTED AREA OVERLAPPING AREAS OF HIGH BIODIVERSITY VALUE

Biodiversity value criterion					No. of PAs
WWF priority area	Alliance for Zero Extinction site	CI biodiversity hot spot	Key biodiversity area	Important Bird Area	
					151
■					121
		■			108
			■		4
			■	■	172
	■		■		1
	■		■	■	3
■			■		6
■			■	■	129
■	■		■		3
■	■		■	■	7
		■	■		7
		■	■	■	121
	■	■	■		6
	■	■	■	■	15
■		■			153
■		■	■		32
■		■	■	■	200
■	■	■			5
■	■	■	■		4
■	■	■	■	■	44
Total GEF-supported PAs					1,292

ANNEX C

FOREST AREA LOSS IN GEF-SUPPORTED PROTECTED AREAS

Country	Number of PAs	Forest area, 2000 (km^2)	Forest area loss, 2000–12 (km^2)	GEF PA forest % loss, 2000–12	Country forest % loss
Albania	3	101.437	2.425	2.39	4.47
Argentina	5	3,629.043	262.756	7.24	10.63
Armenia	3	405.900	0.435	0.11	0.56
Azerbaijan	2	787.689	6.921	0.88	0.53
Bangladesh	1	18.351	0.820	4.47	2.69
Bulgaria	1	2,396.380	34.350	1.43	1.83
Belarus	4	953.783	24.371	2.56	4.54
Belize	10	2,394.266	37.510	1.57	6.86
Bolivia	15	101,712.758	1191.924	1.17	4.55
Brazil	28	61,824.000	419.147	0.68	6.45
Bhutan	2	2,070.310	10.258	0.50	0.46
Central African Republic	1	11,923.701	103.167	0.87	0.93
Chile	21	13,343.018	65.071	0.49	6.10
China	22	12,270.563	108.195	0.89	3.61
Côte d'Ivoire	3	5,522.565	359.197	6.50	7.54
Cameroon	8	16,285.811	11.714	0.07	1.30
Republic of the Congo	7	30,130.581	111.822	0.37	1.08
Colombia	29	32,156.401	146.762	0.46	3.04
Costa Rica	24	7,141.516	42.621	0.60	4.14
Cuba	6	1,714.846	20.130	1.17	4.05
Czech Republic	6	1,779.261	135.889	7.64	5.31
Ecuador	10	23,342.256	123.641	0.53	2.72
Ethiopia	6	9,119.417	225.141	2.47	1.89
Georgia	4	355.702	0.440	0.12	0.27

Country	Number of PAs	Forest area, 2000 (km^2)	Forest area loss, 2000–12 (km^2)	GEF PA forest % loss, 2000–12	Country forest % loss
Ghana	2	403.164	8.208	2.04	6.11
Guinea	3	598.955	6.162	1.03	2.86
Guinea-Bissau	4	1,832.432	67.167	3.67	4.26
Guatemala	8	11,663.911	952.302	8.16	11.39
Honduras	11	18,998.904	1,635.266	8.61	6.16
Croatia	7	1,580.763	13.638	0.86	1.64
Indonesia	15	63,587.642	1,931.118	3.04	9.70
India	5	1,525.644	5.555	0.36	2.09
Jamaica	1	221.809	0.754	0.34	4.19
Jordan	1	2.579	0	0	0.18
Kazakhstan	3	1,348.416	1.385	0.10	1.16
Kenya	11	885.043	12.806	1.45	6.60
Kyrgyzstan	1	57.701	0.038	0.07	0.33
Cambodia	7	11,800.776	562.940	4.78	13.68
Laos	1	1,664.639	26.954	1.62	6.10
Liberia	1	1,557.508	1.673	0.11	4.20
Sri Lanka	13	2,357.182	8.920	0.38	2.33
Lithuania	4	563.907	25.769	4.57	7.86
Madagascar	10	8,786.473	633.127	7.21	7.44
Mexico	24	32,231.012	494.470	1.53	4.10
Macedonia	13	543.644	11.418	2.10	3.64
Mozambique	3	12,241.790	157.592	1.29	5.75
Malawi	1	97.677	7.151	7.32	4.82
Malaysia	9	9,910.254	103.368	1.04	15.96
Nicaragua	24	27,320.523	2,672.773	9.78	10.41
Nepal	6	3,186.283	12.667	0.40	0.71
Pakistan	1	51.327	0.067	0.13	0.93
Panama	17	14,604.704	245.541	1.68	4.62
Peru	15	98,809.703	332.427	0.34	1.95
Philippines	11	4,795.603	57.319	1.20	3.30
Paraguay	5	2,430.596	33.696	1.39	15.00
Romania	7	1,877.838	106.500	5.67	2.89
Russia	30	53,121.919	803.938	1.51	4.14
Rwanda	3	1,511.411	5.809	0.39	2.86
Senegal	1	19.757	0.137	0.69	3.52

Country	Number of PAs	Forest area, 2000 (km^2)	Forest area loss, 2000–12 (km^2)	GEF PA forest % loss, 2000–12	Country forest % loss
Sierra Leone	1	12.298	0.011	0.09	3.42
El Salvador	6	542.530	23.047	4.25	5.46
Suriname	2	12,114.363	7.815	0.06	0.52
Slovakia	3	540.917	18.396	3.40	5.13
Tunisia	1	20.163	0.027	0.13	4.00
Turkey	1	175.397	0.052	0.03	2.86
Tanzania	12	35,218.393	427.975	1.22	4.89
Uganda	11	7,598.419	91.325	1.20	4.34
Ukraine	3	836.948	7.217	0.86	4.95
Venezuela	4	59,869.402	257.593	0.43	2.16
Vietnam	16	6115.131	371.100	6.07	6.98
South Africa	9	1,935.998	87.288	4.51	14.36
Zambia	11	19,185.144	218.013	1.14	3.43
Zimbabwe	1	132.595	7.238	5.46	8.26

REFERENCES

Achard, Frédéric, Danilo Mollicone, Hans-Jürgen Stibig, Dmitry Aksenov, Lars Laestadius, Zengyuan Li, Peter Popatov, and Alexey Yaroshenko. 2006. "Areas of Rapid Forest-Cover Change in Boreal Eurasia." *Forest Ecology and Management* 237 (1–3): 322–34.

Alexandratos, Nikos, and Jelle Bruinsma. 2012. "World Agriculture towards 2030/2050: The 2012 Revision." ESA Working Paper No. 12-03. Rome, Food and Agriculture Organization of the United Nations.

Allnutt, Thomas F., Gregory P. Asner, Christopher D. Golden, and George V. N. Powell. 2013. "Mapping Recent Deforestation and Forest Disturbance in Northeastern Madagascar." *Tropical Conservation Science* 6 (1): 1–15.

Baastel. 2012. "UNDP/GEF Support to Madagascar's Environmental Programme—Phase III (EP III)—Support to the Protected Area Network and Strategic Zones: Terminal Evaluation." Le Groupe-conseil baastel s.p.r.l, Brussels.

Bao, Tran Quoc, Vu Van Dzung, Philip Edwards, and Josef Margraf. 2005. "Creating Protected Areas for Resource Conservation Using Landscape Ecology (PARC)." Report of the Final Evaluation Mission. United Nations Development Programme.

Beaumont, Linda J., Andrew Pitman, Sarah Perkins, Niklaus E. Zimmermann, Nigel G. Yoccoz, and Wilfried Thuiller. 2011. "Impacts of Climate Change on the World's Most Exceptional Ecoregions." *Proceedings of the National Academy of Sciences* 108 (6): 2306–11.

Berkes, Fikret, and Carl Folke. 1998. *Linking Social and Ecological Systems for Resilience and Sustainability: Management Practices and Social Mechanisms for Building Resilience*. Cambridge, UK: Cambridge University Press.

Bernard, E., L. A. O. Penna, and E. Ara´Ujo. 2014. "Downgrading, Downsizing, Degazettement, and Reclassification of Protected Areas in Brazil." *Conservation Biology* 28 (4): 939–50.

Bezaury-Creel, Juan E. 2003. "El Uso de los Derechos de Desarrollo Transferibles, como Herramienta de Conservación en México: El caso de la Reserva de la Biosfera Sian Ka'an, Quintana Roo." The Nature Conservancy, Mexico Program.

Blomley, T., A. Namara, A. McNeilage, P. Franks, H. Rainer, A. Donaldson, R. Malpas, W. Olupot, J. Baker, C. Sandbrook, R. Bitahiro, and M. Infield. 2010. *Development and Gorillas?: Assessing Fifteen Years of Integrated Conservation and Development in South-Western Uganda*. London: International Institute for Environment and Development.

Brandon, Katrina, Kent H. Redford, and Steven Sanderson. 1998. *Parks in Peril: People, Politics, and Protected Areas*. Washington, DC: Island Press.

———. 2012. "Desarrollo local participativo y buena gobernanza ambiental: ¿una combinación viable? La experiencia de una Reserva de la Biosfera mexicana." *Medio Ambiente y Urbanización* 76 (1): 211–42.

Brenner, Ludger, and Hubert Job. 2012. "Challenges to Actor-Oriented Environmental Governance: Examples from Three Mexican Biosphere Reserves." *Tijdschrift Voor Economische En Sociale Geografie* 103 (1): 1–19.

Butchart, Stuart H. M., Jörn P. W. Scharlemann, Mike I. Evans, Suhel Quader, Salvatore Aricò, Julius Arinaitwe, Mark Balman, et al. 2012. "Protecting Important Sites for Biodiversity Contributes to Meeting Global Conservation Targets." *PLoS ONE* 7 (3): e32529.

Butchart, Stuart HM, Alison J. Stattersfield, Leon A. Bennun, Sue M. Shutes, H. Resit Akçakaya, Jonathan EM Baillie, Simon N. Stuart, Craig Hilton-Taylor, and Georgina M. Mace. 2004. "Measuring Global Trends in the Status of Biodiversity: Red List Indices for Birds." *PLoS Biology* 2 (12): e383.

Carabias, Julia, Javier de la Maza, and Rosaura Cadena, eds. 2003. *Capacidades Necesarias para el Manejo de Áreas Protegidas: América Latina y el Caribe*. IUCN World Commission on Protected Areas.

Caro, Tim, Grace K. Charles, Dena J. Clink, Jason Riggio, Alexandra Weill, and Carolyn Whitesell. 2014. "Terrestrial Protected Areas: Threats and Solutions." RMRS-P-71. USDA Forest Service, Washington, DC.

CBD (Convention on Biological Diversity). 1992. "Full Text of the Convention on Biological Diversity."

———. 2010."The Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets." Vol. UNEP/CBD/COP/ DEC/X/2. Nagoya, Japan.

Chomitz, Kenneth M. 2007. "At Loggerheads?: Agricultural Expansion, Poverty Reduction, and Environment in the Tropical Forests." Policy Research Report 1-308. World Bank, Washington, DC.

Craigie, Ian D., Jonathan E. M. Baillie, Andrew Balmford, Chris Carbone, Ben Collen, Rhys E. Green, and Jon M. Hutton. 2010. "Large Mammal Population Declines in Africa's Protected Areas." *Biological Conservation* 143 (9): 2221–28.

Dale, V. H., R. V. O'Neill, M. Pedlowski, and F. Soutworth. 1993. "Causes and Effects of Land-Use Change in Central Rondônia, Brazil." *Photogrammetric Engineering and Remote Sensing* 59 (6): 997–1005.

DeFries, Ruth, Andrew Hansen, Adrian C. Newton, and Matthew C. Hansen. 2005. "Increasing Isolation of Protected Areas in Tropical Forests over the Past Twenty Years." *Ecological Applications* 15 (1): 19–26.

de la Maza Elvira, R. 1999. "Una Historia de las Áreas Naturales Protegidas en México." *Gaceta Ecológica* 51: 15–34.

De Vos, Jurriaan M., Lucas N. Joppa, John L. Gittleman, Patrick R. Stephens, and Stuart L. Pimm. 2015. "Estimating the Normal Background Rate of Species Extinction: Background Rate of Extinction." *Conservation Biology* 29 (2): 452–62.

Doyon, Sabrina. 2008. "La Construcción Social Del Espacio: El Caso de La Reserva de La Biosfera de Ria Lagartos, Yucatán, México." Oriol Beltrán, José. J. Pascual E Ismael Vaccaro (coord.), *Patrimonialización de La Naturaleza: El Marco Social de Las Políticas Ambientales*. Donostia: Ankulegui, FAAEE, 289–306.

Dudley, Nigel, Craig Groves, Kent H. Redford, and Sue Stolton. 2014. "Where Now for Protected Areas? Setting the Stage for the 2014 World Parks Congress." *Oryx* 48 (04): 496–503.

Güven Eken, Leon Bennun, Thomas M. Brooks, Will Darwall, Lincoln D. C. Fishpool, Matt Foster, David Knox, Penny Langhammer, Paul Matiku, Elizabeth Radford, Paul Salaman, Wes Sechrest, Michael L. Smith, Sacha Spector, and Andrew Tordoff. 2004. "Key Biodiversity Areas as Site Conservation Targets." *BioScience* 54 (12): 1110–18.

Emerton, Lucy, Kishore Rao, Xuan Nguyen, Nguyen Huu Tu, and Tran Quoc Bao. 2003. "Covering the Costs of Viet Nam's Protected Areas: Summary of Lessons Learned, PARC Project VIE/95/G31&031." Government of Viet Nam (FPD)/UNOPS/UNDP/IUCN.

Ervin, J., N. Sekhran, A. Dinu, S. Gidda, M. Vergeichik, and J. Mee. 2010. *Protected Areas*

for the 21st Century: Lessons from UNDP/GEF's Portfolio. New York: United Nations Development Programme.

Executive Board of UNDP and UNFPA (United Nations Development Board and United Nations Population Fund). 2008. "UNDP Strategic Plan, 2008–2011: Accelerating Global Progress on Human Development." United Nations, Geneva.

Fitz-Gibbon, C. T., and L. Morris. 1996. "Theory-Based Evaluation." *Evaluation Practice* 17 (2): 177–84.

Fraga, Julia. 2006. "Local Perspectives in Conservation Politics: The Case of the Ría Lagartos Biosphere Reserve, Yucatán, México." *Landscape and Urban Planning* 74 (3–4): 285–95.

Garcia, J.R., and A. Zazueta. 2015. "Going Beyond Mixed Methods to Mixed Approaches: A Systems Perspective for Asking the Right Questions." *IDS Bulletin* 46: 30–43.

García-Frapolli, Eduardo, Gabriel Ramos-Fernández, Eduardo Galicia, and Arturo Serrano. 2009. "The Complex Reality of Biodiversity Conservation through Natural Protected Area Policy: Three Cases from the Yucatan Peninsula, Mexico." *Land Use Policy* 26 (3): 715– 22.

GEF (Global Environment Facility). 2011. "GEF Policies on Environmental and Social Safeguard Standards and Gender Mainstreaming." GEF, Washington, DC.

———. 2012. "Financing the Achievement of the Aichi Targets." GEF, Washington, DC.

———. 2014. "GEF-6 Programming Directions." Extract from GEF Assembly Document GEF/A.5/07/Rev.01. GEF, Washington, DC.

———. 2015. *Instrument for the Establishment of the Restructured Global Environment Facility.* Washington, DC: GEF.

GEF IEO. (Global Environment Facility Independent Evaluation Office; formerly GEF Evaluation Office). 2006. *The Role of Local Benefits in Global Environmental Programs*. Evaluation Report 30. Washington, DC: GEF IEO.

———. 2014. *OPS5: Final Report: At the Crossroads for Higher Impact.* Evaluation Report 86. Washington, DC: GEF IEO.

GEF IEO and UNDP IEO (Global Environmental Facility Evaluation Office and United Nations Development Programme Evaluation Office). 2008. *Joint Evaluation of the GEF Small Grants Programme.* Evaluation Report No. 39. Washington, DC: GEF IEO.

———. 2015. *Joint GEF-UNDP Evaluation of the Small Grants Programme*. Evaluation Report No. 97. Washington, DC: GEF IEO and UNDP IEO.

GEF OME (Global Environment Facility Office of Monitoring and Evaluation). 2004. *GEF Biodiversity Program Study 2004.* Washington, DC: GEF OME.

GEF Secretariat (Global Environment Facility Secretariat). 2014. *Guidelines for the Implementation of the Public Involvement Policy.* Washington, DC: GEF.

Geldmann, Jonas, Megan Barnes, Lauren Coad, Ian D. Craigie, Marc Hockings, and Neil D. Burgess. 2013. "Effectiveness of Terrestrial Protected Areas in Reducing Habitat Loss and Population Declines." *Biological Conservation* 161 (May): 230–38.

Gibson, Luke, Tien Ming Lee, Lian Pin Koh, Barry W. Brook, Toby A. Gardner, Jos Barlow, Carlos A. Peres, et al. 2011. "Primary Forests Are Irreplaceable for Sustaining Tropical Biodiversity." *Nature* 478 (7369): 378–81.

Gourdji, Sharon, Mathias Craig, Rebekah Shirley, D. P. de Leon Barido, E. Campos, M. Giraldo, M. Lopez, A. Pereira de Lucena, M. Luger, and D. M. Kammen. 2013. "Sustainable Development Opportunities at the Climate, Land, Energy, and Water Nexus in Nicaragua." Working Paper 33. University of California, Berkeley.

Graf, S. H., E. Santana, E. J. Jardel, Martín Gómez, and S. García-Ruvalcaba. 2003. "La Reserva de La Biosfera Sierra de Manantlán,

México." In J. Carabias, J. de la Maza, and R. Cadena, eds., *Capacidades Necesarias para el Manejo de Áreas Protegidas: América Latina y el Caribe*, 135–53. IUCN World Commission on Protected Areas.

Green, Glen M., and Robert W. Sussman. 1990. "Deforestation History of the Eastern Rain Forests of Madagascar from Satellite Images." *Science* 248 (4952): 212–15.

Grundy, Isla, and Rachel Wynberg. 2001. "Integration of Biodiversity into National Forest Planning Programmes: The Case of South Africa."

Haddad, Nick M., Lars A. Brudvig, Jean Clobert, Kendi F. Davies, Andrew Gonzalez, Robert D. Holt, Thomas E. Lovejoy, et al. 2015. "Habitat Fragmentation and Its Lasting Impact on Earth's Ecosystems." *Science Advances* 1 (2): e1500052.

Halffter, Gonzalo. 2011. "Reservas de la Biosfera: Problemas y Oportunidades en México." *Acta Zoológica Mexicana* 27 (1): 177–89.

Hansen, Matthew C., Peter V. Potapov, Rebecca Moore, Matt Hancher, S. A. Turubanova, Alexandra Tyukavina, David Thau, S. V. Stehman, S. J. Goetz, and T. R. Loveland, et al. 2013. "High-Resolution Global Maps of 21st-Century Forest Cover Change." *Science* 342 (6160): 850–53.

Harper, Grady J., Marc K. Steininger, Compton J. Tucker, Daniel Juhn, and Frank Hawkins. 2007. "Fifty Years of Deforestation and Forest Fragmentation in Madagascar." *Environmental Conservation* 34 (04): 325–33.

Hassan, Rashid M., R.J. Scholes, Neville Ash, and Millennium Ecosystem Assessment (Program), eds. 2005. *Ecosystems and Human Well-Being: Current State and Trends: Findings of the Condition and Trends Working Group of the Millennium Ecosystem Assessment*. The Millennium Ecosystem Assessment Series, v. 1. Washington, DC: Island Press.

Hockings, Marc. 2003. "Systems for Assessing the Effectiveness of Management in Protected Areas." *BioScience* 53 (9): 823–32.

Hulme, Philip E. 2006. "Beyond Control: Wider Implications for the Management of Biological Invasions." *Journal of Applied Ecology* 43 (5): 835–47.

IEG (Independent Evaluation Group). 2011. "The Mesoamerican Biological Corridor." *Regional Program Review* 5 (2).

Ikirezi, M., G. Muhanguzi, and G. Bush. 2011. "Local Attitudes and Impacts of Community Conservation and Development around Bwindi & Mgahinga Conservation Area." CARE International in Uganda.

Joppa, Lucas N., and Alexander Pfaff. 2009. "High and Far: Biases in the Location of Protected Areas." *PLoS ONE* 4 (12): e8273.

Juffe-Bignoli, D., N. D. Burgess, H. Bingham, E. M. S. Belle, M. G. de Lima, M. Deguignet, B. Bertzky, A. N. Milam, J. Martinez-Lopez, and E. Lewis. 2014. *Protected Planet Report 2014*. Cambridge, UK: United Nations Environment Programme World Conservation Monitoring Centre.

Kapos, Valerie, Andrew Balmford, Rosalind Aveling, Philip Bubb, Peter Carey, Abigail Entwistle, John Hopkins, et al. 2008. "Calibrating Conservation: New Tools for Measuring Success." *Conservation Letters* 1 (4): 155–64.

Karanth, Krithi K., James D. Nichols, K. Ullas Karanth, James E. Hines, and Norman L. Christensen. 2010. "The Shrinking Ark: Patterns of Large Mammal Extinctions in India." *Proceedings of the Royal Society of London B: Biological Sciences* 277 (1690): 1971–79.

Kasparek, Max. 2011. "Biodiversity Conservation in the Russian Portion of the Altai-Sayan Ecoregion." Project Final Evaluation Report PIMS 1685. UNDP/GEF/Government of the Russian Federation.

Kew Royal Botanical Gardens. 2012. "Plants under Pressure—a Global Assessment. IUCN Sampled Red List Index for Plants."

Kharas, Homi, and Geoffrey Gertz. 2010. "The New Global Middle Class: A Cross-over from West to East." Draft chapter. Wolfensohn

Center for Development at Brookings Institute, Washington, DC.

Kim, Do-Hyung, Joseph O. Sexton, John R. Townshend. 2015. "Accelerated Deforestation in the Humid Tropics from the 1990s to the 2000s." *Geophysical Research Letters* 42 (9): 3495–501.

Krausmann, Fridolin, Karl-Heinz Erb, Simone Gingrich, Helmut Haberl, Alberte Bondeau, Veronika Gaube, Christian Lauk, Christoph Plutzar, and Timothy D. Searchinger. 2013. "Global Human Appropriation of Net Primary Production Doubled in the 20th Century." *Proceedings of the National Academy of Sciences* 110 (25): 10324–29.

Laurance, William F., Anna Peletier-Jellema, Bart Geenen, Harko Koster, Pita Verweij, Pitou Van Dijck, Thomas E. Lovejoy, Judith Schleicher, and Marijke Van Kuijk. 2015. "Reducing the Global Environmental Impacts of Rapid Infrastructure Expansion." *Current Biology* 25 (7): R259–62.

Laurance, William F., and Diana C. Useche. 2009. "Environmental Synergisms and Extinctions of Tropical Species." *Conservation Biology* 23 (6): 1427–37.

Laurance, William F., D. Carolina Useche, Julio Rendeiro, Margareta Kalka, Corey J. A. Bradshaw,Sean P. Sloan, Susan G. Laurance, et al. 2012. "Averting Biodiversity Collapse in Tropical Forest Protected Areas." *Nature* 489 (7415): 290–94.

Laurance, William F., and G. Bruce Williamson. 2001. "Positive Feedbacks among Forest Fragmentation, Drought, and Climate Change in the Amazon." *Conservation Biology* 15 (6): 1529–35.

Leadley, Paul W., Cornelia B. Krug, Rob Alkemade, Henrique M. Pereira, U. Rashid Sumaila, Matt Walpole, Alexandra Marques, et al. 2014. *Progress towards the Aichi Biodiversity Targets: An Assessment of Biodiversity Trends, Policy Scenarios and Key Actions*. Technical Series 78. Montreal: Secretariat of the Convention on Biological Diversity.

Lee, Hannah, Guy Midgley, Sandy Andelman, Miguel Araújo, Greg Hughes, Enrique Martinez- Meyer, Richard Pearson, and Paul Williams. 2007. "Protected Area Needs in a Changing Climate." *Frontiers in Ecology and the Environment* 5 (3): 131–38.

Lepers, Erika, Eric F. Lambin, Anthony C. Janetos, Ruth DeFries, Frederic Achard, Navin Ramankutty, and Robert J. Scholes. 2005. "A Synthesis of Information on Rapid Land-Cover Change for the Period 1981–2000." *BioScience* 55 (2): 115–24.

Mace, Georgina, Taylor Ricketts, and Robin Abell. 2015. "Chapter 4: Biodiversity." In Millennium Ecosystem Assessment, *Ecosystems and Human Well-being: Current State and Trends*. Washington, DC: Island Press.

Mäki, Sanna, Risto Kalliola, and Kai Vuorinen. 2001. "Road Construction in the Peruvian Amazon: Process, Causes and Consequences." *Environmental Conservation* 28 (3): 199–214.

Mascia, Michael B, and Sharon Pailler. 2011. "Protected Area Downgrading, Downsizing, and Degazettement (PADDD) and Its Conservation Implications." *Conservation Letters* 4 (1): 9–20.

Mascia, Michael B., Sharon Pailler, Michele L. Thieme, Andy Rowe, Madeleine C. Bottrill, Finn Danielsen, Jonas Geldmann, Robin Naidoo, et al. 2014."Commonalities and Complementarities among Approaches to Conservation Monitoring and Evaluation." *Biological Conservation* 169 (January): 258–67.

McGrath, Matt. 2014. "Drug Trafficking Is Speeding Deforestation in Central America." *BBC News* January 30.

Mayne, John. 2001. "Addressing Attribution through Contribution Analysis: Using Performance Measures Sensibly." *Canadian Journal of Program Evaluation* 16 (1): 1–24.

McElwee, Pamela. 2006. "Displacement and Relocation Redux: Stories from Southeast Asia." *Conservation and Society* 4: 396–403.

McLellan, R., L. Iyengar, B. Jeffries, and N. Oerlemans, eds. 2014. *Living Planet Report 2014: Species and Spaces, People and Places*. Gland: WWF International.

McShane, Thomas O., Paul D. Hirsch, Tran Chi Trung, Alexander N. Songorwa, Ann Kinzig, Bruno Monteferri, David Mutekanga, Hoang Van Thang, Juan Luis Dammert, and Manuel Pulgar-Vidal. 2011. "Hard Choices: Making Trade-Offs between Biodiversity Conservation and Human Well-Being." *Biological Conservation* 144 (3): 966–72.

McSweeney, Kendra, Erik A. Nielsen, Matthew J. Taylor, David J. Wrathall, Zoe Pearson, Ophelia Wang, and Spencer T. Plumb. 2014. "Drug Policy as Conservation Policy: Narco-Deforestation." *Science* 343 (6170): 489–90.

MEA (Millennium Ecosystem Assessment). 2005. *Ecosystems and Human Well-Being: Biodiversity Synthesis*. Washington, DC: Island Press.

Mee, Laurence D., Holly T. Dublin, and Anton A. Eberhard. 2008. "Evaluating the Global Environment Facility: A Goodwill Gesture or a Serious Attempt to Deliver Global Benefits?" *Global Environmental Change* 18 (4): 800–810.

Miettinen, Jukka, Hans-Jürgen Stibig, and Frédéric Achard. 2014. "Remote Sensing of Forest Degradation in Southeast Asia—Aiming for a Regional View through 5–30 M Satellite Data." *Global Ecology and Conservation* 2 (December): 24–36.

Miller, James R., et al. 2012. "Nature Reserves as Catalysts for Landscape Change." *Frontiers in Ecology and Environment* 10 (3): 144–52.

Mitra, Anindita, Chandranath Chatterjee, and Fatik B. Mandal. 2011. "Synthetic Chemical Pesticides and Their Effects on Birds." *Research Journal on Environmental Toxicology* 5: 81–96.

Mokany, Karel, Thomas D. Harwood, and Simon Ferrier. 2013. "Comparing Habitat Configuration Strategies for Retaining Biodiversity under Climate Change." *Journal of Applied Ecology* 50 (2): 519– 27.

MoNRE, World Bank, and Sida (Ministry of Environment and Natural Resources, World Bank, and the Swedish International Development Cooperation Agency). 2005. *Vietnam Environment Monitor 2005: Biodiversity.*

Montes, Ninette, and Patricio Jerez. 2013. "Terminal Evaluation Project SINAP SDC-132-2012 Nicaragua, Central America."

Moore, H. M., H. R. Fox, M. C. Harrouni, and Nagendra, Harini, Jane Southworth, and Catherine Tucker. 2003. "Accessibility as a Determinant of Landscape Transformation in Western Honduras: Linking Pattern and Process." *Landscape Ecology* 18 (2): 141–58.

Nuwer, Rachel. 2015. "In Vietnam, Rampant Wildlife Smuggling Prompts Little Concern." *New York Times*, March 30.

Olson, David M., Eric Dinerstein, Eric D. Wikramanayake, Neil D. Burgess, George V. N. Powell, Emma C. Underwood, Jennifer A. D'amico, et al. 2001. "Terrestrial Ecoregions of the World: A New Map of Life on Earth A New Global Map of Terrestrial Ecoregions Provides an Innovative Tool for Conserving Biodiversity." *BioScience* 51 (11): 933–38.

Organisation for Economic Co-operation and Development Development Assistance Committee. 2002. "Glossary of Key Terms in Evaluation and Results Based Management."

Otieno, Charles. 2014. "Politics and Compliance with the Uganda Forestry Policy 2001." *International Journal of Research* 1 (4): 524–39.

Özşahin, E., and Ç. K. Kaymaz. 2013. "Ecological Impact Assessment and Analysis of Camili (Macahel) Biosphere Reserve Area (Artvin, NE), Turkey." *Global Advanced Research Journal of Geography and Regional Planning* 2 (6): 121–38.

Phillips, Adrian. 2003. "Turning Ideas on Their Head: A New Paradigm for Protected Areas." *George Wright Forum* 20:8–32.

Pilgrim, Sarah, and Jules N. Pretty. 2010. *Nature and Culture: Rebuilding Lost Connections.* Earthscan.

Potapov, Peter, Aleksey Yaroshenko, Svetlana Turubanova, Maxim Dubinin, Lars Laestadius, Christoph Thies, Dmitry Aksenov, Aleksey Egorov, Yelena Yesipova, and Igor Glushkov. 2008. "Mapping the World's Intact Forest Landscapes by Remote Sensing." *Ecology and Society* 13 (2): 51.

Pullin, A. S., et al. 2013. "Human Well-Being Impacts of Terrestrial Protected Areas." *Environ. Evid.* 2 (19).

Rambaldi, Giacomo, Sahlee Bugna, and Martin Geiger. 2001. "Review of the Protected Area System of Vietnam." *Asean Biodiversity* 1 (4): 43–51.

Redford, Kent H., and Peter Feinsinger. 2001. "The Half-Empty Forest: Sustainable Use and the Ecology of Interactions." *Conservation of Exploited Species.* Conservation Biology Series 6: 370–99. Cambridge, UK.

Redo, D. J., H. R. Grau, T. M. Aide, and M. L. Clark. 2012. "Asymmetric Forest Transition Driven by the Interaction of Socioeconomic Development and Environmental Heterogeneity in Central America." *Proceedings of the National Academy of Sciences* 109 (23): 8839–44.

Robinson, John. 2015. "Livelihoods, Jobs, and the Illegal Wildlife Trade." *National Geographic Voices*.

Rodrigues, Ana S. L., Sandy J. Andelman, Mohamed I. Bakarr, Luigi Boitani, Thomas M. Brooks, Richard M. Cowling, Lincoln D. C. Fishpool, et al. 2004. "Effectiveness of the Global Protected Area Network in Representing Species Diversity." *Nature* 428 (6983): 640–43.

Rudel, Thomas K., Oliver T. Coomes, Emilio Moran, Frederic Achard, Arild Angelsen, Jianchu Xu, and Eric Lambin. 2005. "Forest Transitions: Towards a Global Understanding of Land Use Change." *Global Environmental Change* 15 (1): 23–31.

Rudnick, Doborah, Sadie J. Ryan, Paul Beier, Samual A. Cushman, Fred Dieffenbach, Clinton Epps, Leah R. Gerber, et al. 2012. "The Role of Landscape Connectivity in Planning and Implementing Conservation and Restoration Priorities. Issues in Ecology." Issues in Ecology Report No. 16. Ecological Society of America, Washington, DC.

Sala, Osvaldo E., F. Stuart Chapin, Iii, Juan J. Armesto, Eric Berlow, Janine Bloomfield, Rodolfo Dirzo, et al. 2000. "Global Biodiversity Scenarios for the Year 2100." *Science* 287 (5459): 1770–74.

Sandwith, Trevor, Ernesto Enkerlin, Kathy MacKinnon, Diana Allen, Angela Andrade, and el at. 2014. "The Promise of Sydney: An Editorial Essay." *Parks Journal* 20.1 (March).

Sarukhán, J., P. Koleff, J. Carabias, J. Soberón, R. Dirzo, J. Llorente-Bousquets, G. Halffter, R. González, I. March, and A. Mohar. 2009. "Capital Natural de México: Conocimiento Actual, Evaluación Y Perspectivas de Sustentabilidad." Síntesis.

SCBD (Secretariat of the Convention on Biological Diversity). 2010. *Global Biodiversity Outlook 3*.

———. 2014. Global Biodiversity Outlook 4: A Mid-Term Assessment of Progress towards the Implementation of the Strategic Plan for Biodiversity 2011–2020. Montreal: SCBD.

———. 2015. "Protected Areas." Living in Harmony with Nature fact sheet.

Scherl, Lea, et al. 2004. *Can Protected Areas Contribute to Poverty Reduction? Opportunities and Limitations*. Gland: IUCN.

Şekercioğlu, Çağan H., Sean Anderson, Erol Akçay, Raşit Bilgin, Özgün Emre Can, Gürkan Semiz, Çağatay Tavşanoğlu, et al. 2011. "Turkey's Globally Important Biodiversity in Crisis." *Biological Conservation* 144 (12): 2752–69.

Settele, Josef, Robert Scholes, Richard A. Betts, Stuart Bunn, Paul Leadley, Daniel Nepstad, Jonathan T. Overpeck, and Miguel Angel Taboada. 2014. "Terrestrial and Inland Water Systems." In *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects*: 271–359. Cambridge, UK: Cambridge University Press.

Shishikin, A. S., A. A. Onuchin, and A. N. Sukachev, eds. 2012. *Fire Danger Mitigation: A Strategy for Protected Areas of the Altai-Sayan Ecoregion*. Krasnoyarsk, Russia: V.N. Sukachev Institute of Forests.

Smith, Katherine F., Michael Behrens, Lisa M. Schloegel, Nina Marano, Stas Burgiel, and Peter Daszak. 2009. "Reducing the Risks of the Wildlife Trade." *Science* 324 (5927): 594.

Soberón, Jorge, and A. Townsend Peterson. 2015. "Biodiversity Governance: A Tower of Babel of Scales and Cultures." *PLoS Biol* 13 (3): e1002108.

Stephenson, P.J., Neil D. Burgess, Laura Jungmann, Jonathan Loh, Sheila O'Connor, Thomasina Oldfield, Will Reidhead, and Aurélie Shapiro. 2015. "Overcoming the Challenges to Conservation Monitoring: Integrating Data from in-Situ Reporting and Global Data Sets to Measure Impact and Performance." *Biodiversity* 6 (2-3): 68–85.

Stockholm Resilience Centre. 2015. "A Social-Ecological Lens for the Future—Stockholm Resilience Centre."

Stolton, Sue, M. Hockings, N. Dudley, K. MacKinnon, T. Whitten, and F. Leverington. 2007. "Reporting Progress in Protected Areas: A Site-Level Management Effectiveness Tracking Tool." Gland, Switzerland: WWF.

Sussman, Robert W., Glen M. Green, and Linda K. Sussman. 1994. "Satellite Imagery, Human Ecology, Anthropology, and Deforestation in Madagascar." *Human Ecology* 22 (3): 333– 54.

Terborgh, John. 2004. *Requiem for Nature.* Island Press, Washington D.C.

Tucker, Catherine M. 2004. "Community Institutions and Forest Management in Mexico's Monarch Butterfly Reserve." *Society & Natural Resources* 17 (7): 569–87.

Twinamatsiko, Medard, Julia Baker, Mariel Harrison, Mahboobeh Shirkhorshidi, Robert Bitariho, Michelle Wieland, Stephen Asuma, E. J. Milner-Gulland, Phil Franks, and Dilys Roe. 2014. "Linking Conservation, Equity and Poverty Alleviation Understanding Profiles and Motivations of Resource Users and Local Perceptions of Governance at Bwindi Impenetrable National Park." Research report. London: International Institute for Environment and Development.

UN DESA (United Nations Department of Economic and Social Affairs, Population Division). 2013. "World Population Prospects: The 2012 Revision, Highlights and Advance Tables." Working Paper No. ESA/P/WP.228. UN Publications, New York.

———. 2014. *World Urbanization Prospects: The 2014 Revision, Highlights.* ST/ESA/SER.A/352. New York: United Nations.

UNDP (United Nations Development Programme). 2014a. *Changing with the World. UNDP Strategic Plan 2014–17*. New York: UNDP.

UNDP IEO (United Nations Development Programme Independent Evaluation Office). 2010. *Evaluation of UNDP Contribution to Environmental Management for Poverty Reduction: The Poverty-Environment Nexus*. New York: UNDP.

UNEP-WCMC (United Nations Environment Programme World Conservation Monitoring Centre). 2012. *Protected Planet Report 2012: Tracking Progress Towards Global Targets for Protected Areas*. Cambridge, UK: UNEP.

van den Berg, R., and Todd, D. 2011. "The Full Road to Impact: The Experience of the Global Environment Facility Fourth Overall Performance Study." *Journal of Development Effectiveness* 3 (3): 389–413.

Venter, Oscar, Richard A. Fuller, Daniel B. Segan, Josie Carwardine, Thomas Brooks, Stuart H. M. Butchart, Moreno Di Marco, et al. 2014. "Targeting Global Protected Area Expansion for Imperiled Biodiversity." *PLoS Biol* 12 (6): e1001891.

Vidal, Omar, José López-García, and Eduardo Rendón-Salinas. 2014. "Trends in Deforestation and Forest Degradation after a Decade of Monitoring in the Monarch Butterfly Biosphere Reserve in Mexico." *Conservation Biology* 28 (1): 177–86.

Waldron, Anthony, Arne O. Mooers, Daniel C. Miller, Nate Nibbelink, David Redding, Tyler S. Kuhn, J. Timmons Roberts, and John L. Gittleman. 2013. "Targeting Global Conservation Funding to Limit Immediate Biodiversity Declines." *Proceedings of the National Academy of Sciences* 110 (29): 12144–48.

Watson, James E. M., Nigel Dudley, Daniel B. Segan, and Marc Hockings. 2014. "The Performance and Potential of Protected Areas." *Nature* 515 (7525): 67–73.

Weiss, C. H. 1997. "Theory-Based Evaluation: Past, Present, and Future." *New Directions for Evaluation* 76 (Winter): 41–55.

White, Robin, Siobhan Murray, and Mark Rohweder. 2000. *Pilot Analysis of Global Ecosystems: Grasslands Ecosystems*. Washington, DC: World Resources Institution.

Wieland, Michelle, and Robert Bitariho. 2013. "A Stakeholder Assessment of Fifteen Years of BMCT Interventions." Key Findings Report. Bwindi Mgahinga Conservation Trust.

Wilkie, David S., Elizabeth L. Bennett, Carlos A. Peres, and Andrew A. Cunningham. 2011. "The Empty Forest Revisited." *Annals of the New York Academy of Sciences* 1223 (1): 120–28.

World Bank. 2001. "Implementation Completion Report (TF-28670): Bwindi Impenetrable National Park and Mgahinga Gorilla National Park Conservation Project." Report No. 22129. Environment and Social Development Unit, Africa Regional Office.

———. 2003. "Implementation Completion Report (TF-28678)." Report No. 27191, World Bank, Washington, DC.

———. 2010a. "Implementation Completion and Results Report: Consolidation of The Protected Areas System (SINAP II) Project (P065988, TF-50311, P106103 and P112327)." Report No. ICR00001702. World Bank, Washington, DC.

———. 2010b. "Implementation Completion and Results Report: Mexico Mesoamerican Biological Corridor Project (TF-24371)." Report No. ICR00001329. World Bank, Washington, DC.

———. 2015. "Implementation Completion and Results Report: Colombia National Protected Areas Conservation Trust Fund Project." Report No. ICR00002533. World Bank, Washington, DC.

Zazueta, Aaron, and Jeneen R. Garcia. 2014. "Multiple Actors and Confounding Factors." *Evaluating Environment in International Development* 194.

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