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

UNEDITED FINAL REPORT

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Acknowledgments

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In addition to the analyses performed by the core team, phases of specific analyses were performed in collaboration with the Global Land Cover Facility (GLCF) at the University of Maryland, the U.S. National Aeronautics and Space Administration (NASA), 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 (IDS), and the National Commission for Knowledge and Use of Biodiversity of Mexico (CONABIO).

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Table of Contents

List of Tables

List of Figures

List of Acronyms

ADB	Asian Development Bank
AFR	Africa Region
BBC	British Broadcasting Corporation
BMCT	Bwindi Mgahinga Conservation Trust
CABPM	Central American Biodiversity project
CONANP	The National Commission of Natural Protected Areas
COMPACT	Community Management of Protected Areas for Conservation
COMDEKS	Community Development and Knowledge Management for the Satoyama Initiative Programme
CSO	Civil Society Organization
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CBD	Convention on Biological Diversity
DESA	United Nations Department of Economic and Social Affairs
ECA	Europe and Central Asia
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
GLCF	Global Land Cover Facility
GIZ	German Corporation for International Cooperation
IADB	Inter-American Development Bank
IFAD	International Fund for Agricultural Development
ICEMA	Integrated Community-Based Ecosystem Management
IUCN WCPA-SSC	International Union for Conservation of Nature World Commission on Protected Areas Species Survival Commission
KAFRED	Kibale Association for Rural and Environmental Development
KAZA	Kavango-Zambezi
LAC	Latin America and Caribbean Region
LPI	Global Living Planet Index
MKEPP	Mount Kenya East Pilot Project for Natural Resource Management
MET	Ministry of Environment and Tourism
METT	Management Effectiveness Tracking Tool
MAE	Millennium Ecosystem Assessment
MBC	Mexican Biological Corridor
NAMPLACE	Namibia Protected Landscape Conservation Areas
NACOMA	Namibia Coast Biodiversity Conservation and Management
NGO	Non-Governmental Organization
OPS	Overall Performance Study
PA	Protected Area
PAMSU	Protected Areas Management and Sustainable Use
PAME	Protected Area Management Effectiveness
PES	Payment for Ecosystem Services
QCA	Qualitative Comparative Analysis

RBM	Results-based management
RLI	Red List Index
SPAN	Strengthening the Protected Area Network
SCBD	Secretariat of the Convention on Biological Diversity
SINAP	Supplemental of Consolidation of Protected Areas System Project
TAG	Technical Advisory Group
TOC	Theory of Change
TNC	The Nature Conservancy
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNDP-GEF SGP	UNDP-GEF Small Grants Programme
UNDP	United Nations Development Programme
NASA	US National Aeronautics and Space Administration
USAID	United States Agency for International Development
WWF	World Wildlife Fund

Preface

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 sustain- able 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 sup- porting countries in biodiversity conservation initiatives[1]. 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 non-marine PAs and PA systems from 1991 to 2015. This evaluation adopts the OECD-DAC (2002) 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". The evaluation analyzes the extent to which the management and governance approaches supported by 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. The evaluation also explored new methods and approaches to assess the impact of GEF support, several of which have been incorporated into other GEF IEO evaluations. It is so far the most comprehensive global evaluation undertaken on the impact of protected areas on biodiversity, in terms of the diversity of methods used and the scope of inquiry.

While the evaluation covers all relevant operations supported by GEF through all the relevant GEF Agencies, the GEF IEO and the UNDP IEO have undertaken this evaluation jointly[2]. The approach paper was approved by the directors of both offices in June 2013. From the GEF IEO perspective, this is the fourth impact evaluation addressing a specific focal area. For the UNDP IEO, 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. Different analyses were performed in collaboration with the Global Land Cover Facility (GLCF) at the University of Maryland, the US National Aeronautics and Space Administration (NASA), 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 (IDS), and the National Commission for Knowledge and Use of Biodiversity of Mexico (CONABIO). A Technical Advisory Group (TAG) was established, composed of a representative of

[1] Based on GEFF Project Management Information System (PMIS) data as of 28 May 2015

[2] 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 conflicts of interests include: (1) consultants have responded to the joint team managing the evaluation; (2) a Technical Advisory Group (TAG) was established composed by a representative of the World Bank Independent Evaluation Group and three other biodiversity experts; and (3) UNDP IEO staff refrained from evaluating GEF projects in which UNDP was not involved, and GEF IEO staff did not evaluate UNDP projects outside of the GEF partnership

the World Bank Independent Evaluation Group, and three biodiversity and social science experts as peer reviewers of the different 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.

Executive Summary

Background

1. This evaluation assesses the impact of GEF investments in non-marine protected areas (PAs)[3] and PA systems on biodiversity conservation and sustainable use. It is the fourth impact evaluation addressing a specific focal area. The GEF IEO and the UNDP IEO 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 over-arching questions:

   (a) 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?

   (b) 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?

   (c) 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?

2. To answer these questions, data collection and analyses 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.

   (a) The portfolio analysis component included a total of 618 projects in 137 countries, from which 1292 GEF-supported PAs were identified. In-depth analysis was also undertaken on 191 competed projects.

   (b) The global analysis component measured outcomes using forest cover (geospatial analysis of 580 PAs in 73 countries), wildlife populations (88 cases of species in 39 PAs), and Management Effectiveness Tracking Tool (METT) scores (2440 METTs from 1924 PAs in 104 countries) as indicators.

[3] These include projects that had terrestrial PA components even if they also addressed marine issues. "Non-marine" 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 protected areas 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 has allowed the GEF IEO to identify the critical factors that contribute to and hinder the achievement of impact in coastal and marine ecosystems.

(c) 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.

3. The evaluation encountered three main challenges and limitations: substantial information gaps on GEF support, limited time-series data, and difficulties in estimating the counterfactuals. To mitigate the gaps and biases in the datasets, the evaluation used a mix of quantitative, qualitative and spatial methods in data collection and analyses. Evidence was also collected from a mix of sources, combining global datasets, 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, it was possible to identify directions and patterns regarding the extent of GEF's contribution towards biodiversity conservation, and its interaction with the larger social-ecological system.

4. From the start, the evaluation team also took a multidisciplinary approach and reached out to different institutions and individuals with the necessary capacities. A Technical Advisory Group (TAG) 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 different 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. Analyses were performed in collaboration with the Global Land Cover Facility (GLCF) at the University of Maryland, the US National Aeronautics and Space Administration (NASA), 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 (IDS), and the National Commission for Knowledge and Use of Biodiversity of Mexico (CONABIO).

Conclusions

5. 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 the PAs.

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

6. In addition to having identified areas of strength of 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, we focus on presenting 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 GEF is supporting approaches that create global environmental benefits.

Recommendation 1: Ensuring that GEF support targets areas rich in global biodiversity

7. GEF must continue to pursue better ways to ensure that its support is targeted towards globally significant sites with high biodiversity values, and extends to more of these sites. As it has consistently demonstrated, GEF must also continue to adopt the most rigorous scientific criteria in selecting areas for investment, integrating new criteria as more appropriate ones are developed. Going forward, 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 that are important for global environmental benefits.

Recommendation 2: Addressing the socioeconomic conditions that will ensure local community commitment to biodiversity protection

8. While GEF support has resulted in considerable benefits to some sectors of the local population living in and around PAs, at the project level, during design and implementation, GEF needs to have mechanisms to ensure that future projects reach full compliance with the GEF Social Safeguards. GEF needs to expand benefit-sharing across a wider cross-section of the impacted local populations, to better mitigate the unequal distribution of costs and benefits of PA management interventions, with the aim of reducing local pressures on biodiversity stemming from adverse local socioeconomic conditions.

Recommendation 3: Investing in broader governance issues to address large-scale drivers

9. 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 – PA, landscape, PA system, national ministries – that tend to have conflicting development priorities and management objectives with regards to biodiversity conservation. At the minimum, these would be stakeholders undertaking activities that involve environmental protection, natural resource use (e.g. water, land, energy), economic development, and infrastructure development.

Recommendation 4: Developing a more reliable and practical monitoring system to track and assess results at the project and portfolio levels

10. 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, GEF also 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.

11. This 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 that, when combined, 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) is available historically and into the future.

    - Institutionalize the use of geospatial technology for project and portfolio

monitoring when applicable.

- Streamline Management Effectiveness Tracking Tool (METT) reporting requirements to focus on information that can be used in conjunction with existing global datasets and geospatial data to perform meaningful analyses on management effectiveness and biodiversity impacts at a 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 capacities in monitoring parameters that they find useful for improving biodiversity conservation management within their specific context, while still providing key information that can be compared and analyzed at a global level.

- Establish long-term partnerships for biodiversity and socioeconomic monitoring with country institutions that already have this 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. Focus initially on countries with the largest biodiversity 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.

Recommendation 5: Investing in understanding what works and why

12. The GEF partners, including the Independent Evaluation Office, the Secretariat, STAP, 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 GEF has extensive experience over time, and in which better knowledge would significantly enhance the support that GEF provides to countries. These are:

- 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.

1. Evaluation Approach and Method

Objective and key questions

This evaluation assesses the impact of GEF investments in non-marine protected areas (PAs)[4] and PA systems. This evaluation adopts the OECD-DAC (2002) 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". The evaluation analyzes the extent to which the management and governance approaches supported by 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 appropriately assess the complex nature of GEF interventions and address data gaps.

The evaluation had three over-arching questions:

1) 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?

2) 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?

3) 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, we refer to these as "non-marine PAs". These types of PAs were selected because more information was available for assessing changes in biodiversity over the long term, and for

[4] These include projects that had terrestrial PA components even if they also addressed marine issues. "non-marine" 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 protected areas 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 has allowed the GEF IEO to identify the critical factors that contribute to and hinder the achievement of impact in coastal and marine ecosystems.

comparing GEF-supported areas with areas that did not get support. A total of 618 projects[5] involving non-marine interventions in PAs and PA systems comprise the evaluand. 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 are completed or well under implementation, and were therefore designed or completed before the formulation of GEF-5 Biodiversity Strategy 1 and the GEF-6 Program Directions. Nonetheless, there has been sufficient continuity in the strategies and the support provided by GEF (see Chapter 4) to warrant the examination of the extent to which GEF support since 1991 has contributed to 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. Also affecting the ability of the evaluation to determine attribution is the effect of other actors that contribute to the same outcomes. All these factors typically produce non-linear effects in the interacting ecological and social systems (Mayne 1999; 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 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" (TOC), 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 TOC consists of a series of propositions or assumptions of how an intervention will affect change. TOCs are not always made explicit during project design, requiring evaluators to reconstruct one and make it explicit. 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 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 TOC is used in this evaluation as a heuristic to help focus evaluation inquiries in the complex processes that GEF support engages.[6]

Based on a review of literature, the evaluation team's previous field experience, and consultation with biodiversity scientists, the evaluation adopted a TOC to trace the extent to which GEF support contributes

[5] Based on PMIS data as of 22 April 2015.

[6] The TOC adopted by the evaluation is based on the general framework for GEF's theory of change (TOC) developed by the GEF IEO during the course of the *Impact Evaluation of GEF Support to International Waters in the South China Sea and Adjacent Areas.* The TOC framework is currently being used by other evaluations carried out by the office. The GEF IEO also developed a TOC delineating the chains of causality contained in Objective 1 of the GEF 5 biodiversity focal area as part of OPS 5 (see Annex XX).[6] This TOC was used as the starting point to develop the framework for analysis for this evaluation.

to conditions that lead to an improved biodiversity conservation by restoring, stopping or reducing the loss of biodiversity. The TOC adopted in this evaluation draws from recent approaches to biodiversity conservation, such as the Aichi Biodiversity Targets, which point at the need to integrate social and ecological dimensions.[7]

The evaluation's TOC assumes that improvements in biodiversity conservation will take place when:

1) Adequate and appropriate capacities for PA management are in place and operational;

2) Local communities in or around PAs are engaged in decision-making and natural resource management activities that meet conservation and livelihood goals;

3) There is in place a robust PA governance system that ensures compliance across scales, and which can influence drivers stemming from larger scales, as well as the pressures operating at the local level.

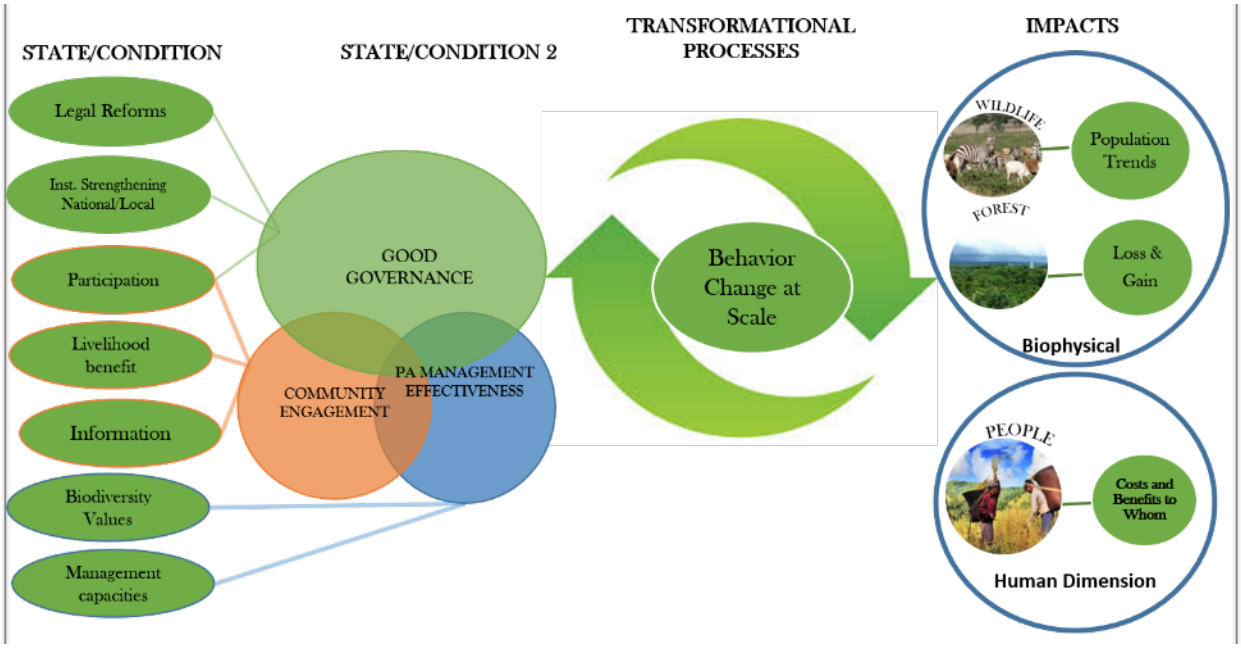

Figure 1 Framework for assessing the impact of GEF support to PAs and PA systems

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 GEF support. The TOC 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 that 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.[8] The effects of GEF support in this category are examined through the nature of interactions taking place between local

[7] https://www.cbd.int/sp/targets/
[8] Social systems refer to any system within the human dimension, such as economic, political and cultural.

communities and the PA. This includes factors such as information-sharing, community engagement in management of biodiversity, as well as issues such as the distribution of costs and benefits of conservation, and the extent to which these issues 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, but also considers the policies and institutional arrangements that must be set 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 scales, for example, 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 [9]. Thus, drivers and institutions at larger scales are also considered a part of the system that the evaluation looks at, as they affect the actions taken by local people, PA management, and other relevant agents.

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

Impacts on biodiversity are 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 circular arrow, 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 that the conditions leading to transformative biodiversity impacts are achieved, and these visible positive effects in turn catalyze more support to provide inputs. However, the circular arrow also signifies 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 systems dynamics. Underlying all these interactions are both project-related and contextual factors that contribute to or hinder progress improvements in biodiversity conservation and sustainable use, which the evaluation seeks to uncover.

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

Evaluation components

The evaluation had three major analytical components: portfolio analysis, global analysis and case study analysis, corresponding with 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 analyses components included, inter alia, assessments of the changes in biodiversity and of 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 protected areas, as information in the GEF Project Management Information System (PMIS) database was not tailored to answer the evaluation questions. In addition to these, the evaluation drew on supplementary information sources, such as peer-reviewed literature, news articles, and local monitoring data. Details on how each method was used are outlined in Annexes.

1. Portfolio Analysis Component

Three main methodological approaches were used in conducting portfolio analysis. First, the GEF PMIS database was analyzed to determine the extent of non-marine 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 1292 PAs supported by GEF was created, which served as the reference for analyses in the other components. Second, an analysis was done to assess how 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 GEF IEO's Fifth Over-all Performance Study (OPS5). Using standardized forms, terminal evaluations reported between 2005 and 2012 were analyzed for progress towards impact at project completion. Progress towards impact includes environmental outcomes, broader adoption of GEF-supported initiatives by stakeholders, and socioeconomic outcomes linked to 191 projects involving non-marine PAs and PA systems.

Table 1 Indicators and methods used for the portfolio analyses

Outcome Indicator	Methodological Approaches	Unit of Analysis (max n)
Extent of support to non-marine 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 towards impact	• Review of terminal evaluations	Project (191)

2. Global Analysis Component

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

The first indicator of forest cover change was assessed through analyzing change in forest loss. Spatial datasets developed by IUCN and UNEP-WCMC (WDPA 2014) and by Hansen et al. (2013) were used to match GEF-supported PAs with polygons that could be spatially analyzed. The PAs analyzed were filtered from the database of 1292 PAs using the minimum threshold for forest cover present in 2000. As forest loss and gain data were only available for the period from 2001 to 2012, the results report forest cover loss and gain within 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. As part of this analysis, a spatial database on forest cover loss and gain was created for more than 30,000 GEF and non-GEF PAs, and in their respective 10-km and 25-km buffer areas. This database enabled comparison of forest change in GEF and non-GEF PAs within the same countries and biomes.

Forest cover loss in GEF-supported PAs was compared to a) country-wide aggregate loss that included both protected and non-protected forest areas, b) loss within their 10-km buffer area, c) loss in the non-GEF PAs and their 10-km buffers within the same country and biome (see Table 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 by 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 dependent variable was done to allow attribution of reduced deforestation to GEF support.

To compare differences in wildlife population trends before, during and after GEF support, the Living Planet Index (McLellan et al. 2014) dataset was used to match GEF-supported PAs with wildlife monitoring time-series data covering the period from 1970 to 2010. 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 protected area. Similar to the forest cover analyses, only projects that started in 2008 or earlier were considered for this analysis. A total of 88 cases of species population time-series from the Living Planet Index were matched with the objectives of 29 GEF projects implemented in 39 PAs.

The Management Tracking Tool (METT) is an instrument to monitor progress towards more effective PA management over time. It consists of 32 indicators addressing different aspects of protected area management. A total of 2,440 METTs 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 METTs were not required before then. To measure change in METT scores over time, only 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. METTs were collected from the GEF Secretariat, and the GEF agencies, and catalogued. A database of METTs for GEF-supported PAs was created as part of the evaluation.

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

Table 2 Indicators and methods used for the global analyses

Outcome Indicator	Method/s 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 (35351)	• Non-supported 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 the second derivatives of the fitted model • Principal Components Analysis • Tree analysis (Regression Trees and Random Forests)	Species populations time series cases by protected area (88)	• Trends before and after GEF support
METT score	• Linear regression • Mixed and fixed effects modeling	Protected area (1924)	• Change over time

3. 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 multiple-scale approach, and the mechanisms at work between the interventions, the larger social-ecological system[10], and the observed outcomes. Interviews and field visits were carried out in 7 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 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 (QCA) was used as a systematic way to identify combinations of factors leading to some of observed outcomes. QCA 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.

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 directly or indirectly); 3) stability of country, where access was possible and relatively safe; 4) existence of protected areas without GEF support; and 5) long-term and extensive GEF engagement--as shown by the number of completed GEF-supported biodiversity projects and high amount of GEF investment--to allow for the assessment of cumulative impacts over time. Both GEF-supported and non-GEF PAs were visited to identify and compare factors affecting the extent of biodiversity outcomes. The PAs selected included a mix of those

[10] Ibid.

considered to be more successful and 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 task team leaders of GEF projects 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 PAs using data for the period 1990 to 2012.[11] Other analyses were also done with remote sensing data up to 50-cm resolution to identify drivers of deforestation in specific areas.

Table 3 Indicators and methods used for the case study analyses

Outcome Indicator	Method/s 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	Protected area (17)	• More successful and less successful PAs • Similar non-supported PAs
Management effectiveness (PAs and PA systems)	• Analysis and synthesis of qualitative data • Qualitative Comparative Analysis	Protected area (17) Protected area system (4)	• More successful and less successful PAs • More functional and less functional PA systems • Non-supported PAs and PA systems
Types of community interactions with PA	• Analysis and synthesis of qualitative data	Protected area (17)	• More successful and less successful PAs • Similar non-supported PAs

Mitigating methodological challenges and limitations

Given the global scope of the evaluation, as well as the long period of GEF support and complex nature of the interventions, the evaluation encountered several methodological challenges. These included having to create usable databases out of differently formatted, incomplete, and sometimes inconsistent data from various sources that needed to be standardized, validated, and matched with each other. 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

[11] Forest loss data from Hansen et al. 2013; Kim et al. 2014.

GEF-related databases helped mitigate some challenges and allowed the evaluation to confidently address some issues, big 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 PAs supported; in other 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 towards these countries and institutions, and may underrepresent those for which less information could be obtained. On the other hand, since GEF support itself is 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 analyses 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, for example, 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 global databases, as many sites receiving GEF support are not registered by the countries in the WDPA. Many of these are state, municipal, communal or private PAs. Similar to the bias in documented GEF-supported PAs, global databases also have systemic biases arising from the extent to which local monitoring data is available, for example, again skewing the distribution away from countries and sites that lack data.

The set of PAs analyzed therefore do not represent the global extent of GEF support, but rather that which fits the constraints imposed by the global datasets. As illustrated in the section 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 the 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 pre-defined “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 the overestimation of GEF’s 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 and, 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 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 towards good examples in the selection process. As seen in Tables 2 and 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 just relying on one 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 done in two of the PAs to verify the pressures of deforestation that 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 datasets, the evaluation used a mix of quantitative, qualitative and spatial methods in data collection and analyses. Evidence was also collected from a mix of sources, combining global datasets, 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 are 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 GEF's contribution towards biodiversity conservation, and its interaction with the larger social-ecological system.

From the start, the evaluation team also 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 consulted at key stages of the evaluation to provide technical feedback and verification.. A Technical Advisory Group (TAG) comprised of evaluation, social science and biodiversity experts from within the GEF partnership and external institutions was also 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 (GLCF) at the University of Maryland, the US National Aeronautics and Space Administration (NASA), 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). While the diversity in expertise has made the evaluation richer, in some cases, differences in perspectives and assumptions contributed to delays.

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 protected areas, with evidence showing that, on balance, they have been effective at slowing the rate of biodiversity loss. Nonetheless, protected areas remain woefully under resourced and require substantial strengthening if they are to continue protecting biodiversity in the future. Recent large expansion in protected areas globally risk widening current financial shortfalls.

This chapter provides an overview of the current global biodiversity trends and explores the principal issues driving biodiversity loss. The effectiveness of the non-marine protected areas as a conservation tool is then presented as well as the evolution of the approaches for their conservation and management. Finally, the chapter concludes by outlining some of the future challenges facing biodiversity conservation and describes the proposed solutions on how to strengthen non-marine protected areas to ensure that they continue serving their purpose in the twenty first 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, p. 3). Influential scientific assessments have demonstrated biodiversity's vital importance – its immeasurable intrinsic value and the critical role it plays in providing ecosystem services on which all humans depend (Duraiappah et al. 2005 in Millennium Ecosystem Assessment [MAE], 2005a). Despite a continued increase in our 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 a startling 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 and largely exists for cultivated plants and domesticated animals that are relevant to agriculture (Secretariat of the CBD [SCBD], 2014). Indeed, most of the available indicators that measure the state and trends in the 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 (LPI), for the period 1970 – 2010, show a 52 percent decline in vertebrate populations from terrestrial, freshwater and marine systems. The terrestrial LPI, 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).

The available estimates on the global species extinction rates indicate that the present extinction rate is in the range of 100 to 1000 times pre-human extinction levels and future rates are likely to be 10,000 times higher than the natural rate of extinction (De Vos et al. 2015). Data from the Red List Index (RLI) show a significant decrease, since 1980, in the four taxonomic groups assessed, i.e., birds, mammals, amphibians and corals (IUCN, 2015). This implies that for these four groups an 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 RLI for Plants, revealed that one in five of plant species are threatened with extinction and a further 8 percent are classified as near threatened (Planets Under Pressure 2012,5).

Modification, and often degradation, of the terrestrial ecosystems is well documented. Anthropogenic actions have greatly altered many of the world's terrestrial ecosystems to satisfy human need 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 8000 years (CBD, 2015a). Between 20 and 50 percent of the land area in nine 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).

The recent estimates of the observed changes in the forested ecosystems, as measured by the global forest cover change between 2000 and 2012, show a substantial forest loss of 2.3 million square kilometers (Hansen et al., 2013). However, ambiguity in defining the term 'forest' and lack of an international consensus introduce uncertainty to the measurement and monitoring of forest cover at a global scale, and pose challenges to conservation policy (Sexton et al. 2015). 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 the annual forest loss of all countries in the world. As such, Brazil was an important exception to the overall trend of forest loss, with a number of other countries, e.g., Indonesia, Malaysia and Paraguay, continuing to show an increase in forest loss (Hansen et al., 2013, Kim et. al 2015).

Deforestation, as measured through changes in the forest canopy, represents only one aspect of decline in the forested ecosystems. Understanding the scale and the extent of other mechanisms of change such as forest degradation and fragmentation, although historically a challenging task (Miettinen et al., 2014, Sinclair et. al 2015), provides insights into the magnitude of the deterioration occurring inside the forests. Unsustainable collection of forest products, for instance, may continue even if the forest cover remains essentially intact (Wilkie et al., 2011). Overexploitation of forest resources or unsustainable hunting can considerably reduce the animal populations. In some cases these populations can remain present in the community but essentially be reduced to such an extent as to be ecologically extinct, resulting in the so called 'half-empty forest' (Redford & 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 the 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 reduce species persistence, richness, and

trophic dynamics (Haddad et al., 2015). It can also reduce connectivity by limiting species movement between the remaining forest areas (Laurance et al., 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 within a kilometer of the forest's edge (Haddad et al., 2015). Moreover, the 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, none 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 are classified as highly fragmented (White et al., 2000). As with the forested ecosystems, there are strong regional variations. In some areas, such as Mongolia and South American Campos, the 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 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 protected areas, 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 from 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 (Lee et al. 2007; Beaumont, L. J. et al. 2011; Mokany, K. et al. 2013; Settele et al., 2014). Table 4 below provides a brief summary of each direct driver of biodiversity loss and ecosystem degradation.

Table 4 Overview of the 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 ❖ Of relevance to protected areas, degradation of habitat between protected areas may also reduce their connectivity (Caro et al., 2014) ❖ Fragmentation of protected areas due to habitat loss, agricultural encroachment, road and fences construction can decrease biodiversity by lowering 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) ❖ The Ecological Footprint shows that annual demand for resources has consistently exceeded the capacity of the Earth 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 the protected areas, 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 protected areas. Hunting, poaching and illegal trade of megafauna is of particular concern as they often fulfill important ecological roles within ecosystems, for instance elephants' role as 'ecosystem engineers' (Wilkie et al., 2011)
POLLUTION	❖ Within terrestrial ecosystems excess nutrients, e.g., reactive nitrogen, can impact species composition, cause nutrient disorders and have toxic effects on plants (SCDB, 2014) ❖ Nutrient pollution may also increase the dominance of invasive alien plants and decrease the diversity of plant communities (SCDB, 2014) ❖ Pesticides can be toxic, in some cases lethal, to a host of organisms and pose risks to non-target species including birds, beneficial insects, and plants (Mitra et al., 2011) ❖ Other sources of pollution, such as plastic and heavy metals present an additional pressure
INVASIVE ALIEN SPECIES	❖ Historically, invasive alien species (IAS) have contributed to more than half of the animal extinctions for which cause is known (SCBD, 2014), especially on islands ❖ IAS have invaded native biota in almost every ecosystem type on Earth and in all biomes (CBD, 2015b) ❖ IAS 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, 2015b) ;lobal impact of IAS 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 towards 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 21st century many species may be impacted through reduction in their populations, vigor and viability, as they will be unable to move fast 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)

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 'protected areas'.

The pivotal role of protected areas in CBD is detailed in Article 8, the Programme of Work on Protected Areas and its Strategic Plan for 2011 – 2020. Notably, the Strategic Plan contained twenty key targets that are commonly referred to as the Aichi Biodiversity Targets. Target 11 of the Aichi Biodiversity Targets is directly linked to protected areas. By 2020, it calls for "…at least 17 percent of terrestrial and inland water areas and 10 percent 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 landscape and seascape" (CBD, 2010a). In addition, the other targets, if achieved, should positively impact the world's protected areas.

The CBD defines a protected area 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, protected areas have formed a core component of the global conservation efforts. The past two decades have seen an extraordinary increase in the number of protected areas worldwide. In 1993, protected areas covered around four percent of the globe (CBD, 2010a). In 2014, they cover 15.4 percent of the Earth's terrestrial surface, with 197,368 protected areas on 20.6 million km^2 (Juffe-Bignoli et al., 2014). This number only includes those protected areas included in the IUCN's database on protected areas and would be much greater if other protected areas, such as those established by indigenous people or private enterprises, were incorporated (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, protected areas were sited in places with low economic interest, higher elevations, and low human density and not necessarily in those locations of significant importance for biodiversity (Joppa & Pfaff, 2009; Watson et al., 2014). An assessment of protected area coverage of Important Bird Areas (IBAs) and the Alliance for Zero Extinction (AZE) sites show that globally, 49% of IBAs and 51% of AZEs 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). Recent assessments of the protected area coverage of key biodiversity areas (KBA) show that only about a fifth of the Important Bird and Biodiversity Areas and the Alliance for Zero Extinction Sites are completely covered by protected areas (Juffe-Bignoli et al., 2014). Additionally, ecological representativeness of the global protected area estate is inadequate, as studies show that less than half of terrestrial ecoregions have at least 17 percent of their extent covered by protected areas (Juffe-Bignoli et al., 2014). Lastly, a global analysis of threatened birds, mammals and amphibians has found that 17 percent of these are not found in any protected area; while of those found inside the protected areas 85 percent do not have sufficient population size to ensure their long-term survival (Venter et al., 2014).

The empirical evidence on effectiveness of protected areas in conserving biodiversity has been mixed, although generally more positive results are reported. Protected areas 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 protected areas have successfully conserved habitats (e.g., Geldmann et al., 2013) and that species' local extinction rate was lower in protected areas than outside them (Karanth et al. 2010). A Living Planet Index (LPI) of protected areas, that measures the trends in populations that occur inside terrestrial protected areas, shows an overall decline of 18 percent between 1970 and 2010, which is less than half the rate of decline

in the overall terrestrial LPI, i.e., 39 percent. This suggests that species population inside protected areas 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 protected areas do deliver positive biodiversity outcomes (Juffe-Bignoli et al., 2014), but the evidence base remains limited.

Terrestrial protected areas are not immune to pressures that occur outside their boundaries. The land use dynamics of a protected area's surrounding landscape can influence what happens inside a protected areas (DeFries et al., 2005). These can weaken the protected areas' ability to fulfil their core function of nature protection. Threats to PAs can be of different sources, which Caro et al. (2014) broadly identified as global (e.g. climate change), external (e.g. population pressure, degazettement[12]), and internal (e.g. deforestation, wildlife exploitation). Furthermore, species and habitats are seldom impacted by only one threat at a time, and climate change in particular is anticipated to synergistically interact with and amplify other threats, such as the spread of invasive species (Hulme et al., 2006).

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

Lastly, many protected areas operate under challenging national circumstances that often involve legal and policy constraints. Some of the key issues include substantial under resourcing of protected areas, poor governance, political corruption and armed conflict (Watson et al., 2014). The funding for protected areas management is often lacking or is inadequate to meet the needs and, as such, presents a major challenge to effective management of protected areas. A global assessment of relative levels of underfunding for conservation spending suggest that 40 most severely underfunded countries contain 32% 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 protected area system was US$30 billion a year, but the current expenditures amount to only US$6.5 billion per year (CBD, 2010b).

Evolution of Approaches to Protected Areas Conservation and Management

Although the concept of protected areas 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 protected areas management treated them as government owned and managed areas that are set aside for protection and thus excluded local communities (Phillips, 2003). This model was widely adopted around the world, often leading to conflicts (Brandon et al., 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 government. If

[12] Loss of legal protection for an entire national park or other protected area

protected areas 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 (Bertzky et al., 2012; Terborgh 2004). Ervin et al. (2010), drawing from experience from the UNDP/GEF protected areas 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 protected areas gives much greater attention to participatory management and working with the people who live in and around the protected areas, especially where poverty is an important issue. Further, the modern conservation approach to protected areas 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 protected areas (Phillips, 2003). Recognizing the utility of a variety of approaches to the management of protected areas, IUCN developed a system of protected area categories in 1978. Several decades of experience led to a somewhat revised system released in 2008 (Dudley et al., 2014) that is now widely adopted (Annex 2).

In 2006, the GEF EO produced a report (GEF EO 2006) that addressed precisely this interaction between biodiversity conservation and indigenous communities, and concluded that, in instances in which 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 EO evaluated the UNDP contribution to environmental management for poverty reduction. The evaluation 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 development and poverty reduction programs have significant effects on the environment. It notes 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 EO, 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 protected area management take into account the plurality of conservation, social and economic needs that protected areas 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 protected areas can build a stronger positive link between protected areas and efforts to alleviate poverty. Building this link is both practical and ethical. In practical terms, protected areas 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 to 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. The first is through an overall increase in human population, from the current 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 & Bruinsma, 2012). The second is through the rising affluence of humankind, as nearly 3 billion people are expected to enter the global middle class by 2030 with the resultant changes to their lifestyles and diets (Kharas & Gertz, 2010). The third, is the 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, protected areas 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., 2006). Increasingly, protected areas 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 protected areas (Watson et al., 2014).

In addition to their environmental benefits, protected areas 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 protected areas are continually expanding to encompass a much wider set of roles than originally envisaged. These 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 wellbeing (Sandwith et al., 2014).

3. GEF Support to Biodiversity Conservation and Protected Areas

Since its inception, GEF support for protected areas 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.

Since the pilot phase starting in 1991, GEF has adopted a comprehensive approach to biodiversity conservation. The Operational Programs developed in 1995 for GEF-1 and GEF-2 were explicit about GEF support being closely linked to the relevant conventions, with the Convention on Biological Diversity (CBD) being the most relevant for this evaluation[13] (Mee et al. 2008). 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, promotion of local participation and integrated conservation, and the application of geospatial technology for PA management. The 2004 Biodiversity Program Study indicated that 75% of GEF biodiversity projects since the Pilot Phase in 1991 included some PA elements (GEF EO 2004).

The Strategic Priorities for Biodiversity for GEF-3 (2002-2006) had an explicit focus on providing support for a representative range of ecosystem types, or biomes. Both GEF-4 (2007-2011) and GEF-5 (2011-2015) Biodiversity Focal Area programming have evolved in tandem with the CBD strategies by giving more attention to the management and sustainability of PA systems and networks, rather than establishing or supporting individual PAs (GEF EO 2012b). GEF-4 Strategic Priorities began to make more explicit GEF's support 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). In GEF-5, the Focal Area Objectives also explicitly address broader drivers by reducing the threats to globally significant biodiversity, supporting the sustainable use of biodiversity, and mainstreaming biodiversity conservation in production landscapes/seascapes and sectors. The GEF-6 Programing Directions have a strong focus on addressing drivers to better to 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 long-term loss of biodiversity.

Thus, while on 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 (GEF EO 2006, UNDP 2009, Ervin et al. 2010). The integration of PA management with management of their surrounding areas has been considered important in the GEF, because it can provide benefits to both biodiversity and human well-being (Miller et al. 2012).

[13] The foundation for GEF support to protected areas is clearly stated in Article 8 of the CBD (see Annex 3).

As indicated in Table 5, GEF has provided more funding support to PAs through projects that combine PA and landscape/ seascape management or production landscapes/ seascapes only (US $3.3B) compared to projects that only focus on PAs (US$ 1B)[14]. 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 that GEF has taken over the years.

Table 5 GEF funding for PAs by Operational Phase

	PA Only		Landscape/ Seascape		Multifocal	
GEF Phase	No. of Projects	Grant Amount (US$)	No. of Projects	Grant Amount (US$)	No. of Projects	Grant Amount (US$)
Pilot Phase	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	50	550,155,255
Grand Total	**240**	**1,031,507,969**	**593**	**3,364,306,899**	**150**	**1,083,294,402**

It should be noted that the articulation of this poverty-environment nexus has not been easy. A 2010 evaluation assessing UNDP's efforts to bridge this poverty-environment nexus showed that while UNDP's environmental programming, largely through GEF funding, had seen a measure of success integrating human/community imperatives, there was far less integration of environmental imperatives into its poverty alleviation programmes. Since that time, UNDP has made a concerted effort to better integrate this programming[15]. (Table 6)

Table 6 GEF funding to PAs by Implementing Agency

	PA Only		Landscape/ Seascape		Multifocal*	
Agency	No. of Projects	Grant Amount (US$)	No. of Projects	Grant Amount (US$)	No. of Projects	Grant Amount (US$)
World Bank	80	370,969,050	220	1,345,299,183	75	515,436,782
UNDP	138	441,444,444	250	933,322,136	48	223,218,763
UNEP	15	30,401,844	60	211,513,250	20	82,643,900
ADB	1	2,250,000	15	87,014,052	8	44,333,592
FAO	3	9,079,000	26	115,208,859	11	67,913,143

[14] Values adjusted for inflation at 2015 rates.

[15] . The 2014-2017 UNDP Strategic Plan includes 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 sub-national to the national level, including protected, indigenous and community conserved areas. Consistent with its mission, grants in support of PAs implemented by UNDP also include interventions related to landscape/seascape management

IADB	3	10,660,000	10	66,206,310	5	48,956,310
IFAD	0	0	12	39,391,436	8	28,898,709
Grand Total	240	864,804,338	593	2,797,955,227	175	1,011,401,200

*Subset of Landscape/ seascape projects

GEF financing of non-marine protected areas and protected area systems

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 in 1991, GEF has funded 618 projects[16] related to non-marine PAs and PA systems. Seventy-five percent of these were full-size projects, while 25% were 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 US$ 3.4 billion in direct funding, and leveraged US$ 12.0 billion in co-financing[17] to 137 countries[18].

Seven GEF implementing agencies[19] contributed to the GEF biodiversity work on PAs in their capacities as lead agencies. Two agencies dominate the portfolio as they have implemented 87% of all the projects: UNDP (50%) and the World Bank (37%). In addition, UNDP and the World Bank combined have received 90% of the total GEF project funding (Table 7). UNEP implemented 7% of the projects from the portfolio while the remaining four agencies (ADB, FAO, IADB and IFAD) together implemented approximately 6% of the projects[20].

Table 7 GEF funding for non-marine PAs and PA systems by Implementing Agency

Lead IA		GEF Project Grant (US$)	% of grant total	Co-financing (US$)	% of cofinancing total
World Bank	231	$1,727,499,535	50.9%	$5,936,343,026	49.7%
UNDP	306	$1,334,672,938	39.3%	$4,117,280,147	34.3%
ADB	10	$60,131,308	1.7%	$947,330,002	7.8%
UNEP	44	$147,343,715	4.3%	$423,018,549	3.5%
IADB	9	$61,946,256	1.8%	$282,954,683	2.3%
FAO	12	$42,265,114	1.2%	$182,866,963	1.5%
IFAD	6	$19,569,399	0.6%	$110,074,620	0.9%

[16] Includes only full-size and medium-size projects that have reached at least CEO endorsement/ approval stage, and does not include enabling activities or small grants funded through the GEF-UNDP SGP.
[17] Values adjusted for inflation at 2015 rates.
[18] Excluding global and regional projects (n=529)
[19] Two additional agencies, IFC (3 projects) and UNESCO (1 project) helped implement a small number of projects but were not the lead agency.
[20] Amounts do not include support delivered through enabling activities, the UNDP-GEF Small Grants Programme (SGP), 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.

Grand Total	618	$3,393,428,265	100	$11,999,867,990	100

Since the GEF Pilot Phase, when 42 projects received a total of US$ 392 million in GEF grants, the number of projects in support of non-marine 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 being funded. In GEF-5, the number of projects sharply declined to 95, although the grant amount (US$ 545 million) is similar to funding levels for GEF-4 (US$ 560 million)[21]. Table 8 below shows that projects in GEF-2 and GEF-5 had higher average funding per project compared to the other replenishment periods. The biggest total grant for non-marine PAs and PA systems was disbursed during GEF-3 at US$ 702 million, or 21% of total GEF funding, for 147 projects.

Table 8 GEF funding for non-marine PAs and PA systems by Operational Phase

GEF Operational Phase	# of Projects	% of Projects	GEF Project Grant CEO approve/endorse 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%
Grand Total	618	100	$3,393,428,265	100

GEF-supported PA-related projects have been implemented in all four GEF regions (Table 9). However, of this number, 35 countries (26%) have only had one project implemented within their borders since 1991. The largest grants and number of projects addressing non-marine PAs and PA systems were implemented in Mexico (20 projects, US$ 192.2M), Brazil (17 projects, US$ 182.3M), and China (25 projects, US$ 125.4M). All together, these three countries have received 21% of GEF funding related to non-marine PAs and PA systems.

Latin America and the Caribbean as a region has received the highest amount of funding (35% of the total grant amount), although the number of projects was nearly equal to that implemented in Africa, which received 28% of total funding. These two regions also had similar amounts of co-financing at 28% and 29% respectively.

Table 9 GEF funding to non-marine PAs and PA 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%

[21] Values adjusted for inflation at 2015 rates

Global / Multiple-country projects	$162,339,275	5%
TOTAL	$3,393,428,265	100%

GEF has helped protect 2,785,350 km^2 of the world's non-marine protected areas, 58% of which are Key Biodiversity Areas.

From a review of project documents and Management Effectiveness Tracking Tool (METT) forms, a total of 1292 non-marine PAs were identified to have been supported by GEF in 119 countries, covering a total area of 2,785,350 km^2. Fifty-one percent of the PAs (n=664) were found in tropical biomes. Of the 1292 GEF-supported PAs identified by the evaluation[22], 58% have been classified as Key Biodiversity Areas (KBAs). Globally, KBAs 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)[23]. Thirty-one percent of GEF-supported PAs in the evaluated cohort, while not classified as KBAs, have received one or more international designations for high biodiversity and/ or cultural value as a WWF priority area, CI biodiversity hotspot, Alliance for Zero Extinction site, Important Bird Area, Ramsar site, or UNESCO World Heritage Site (Annex 2). The remaining 11% of PAs were found to have various levels of local or national designation, indicating high biodiversity value to their respective countries. These do not include PAs supported by GEF that are not registered by countries in the World Database on Protected Areas (WDPA), such as municipal or private PAs, which also constitute a large area. These also do not include PAs that were not specifically named in project documents, but nevertheless received GEF funding.

[22] These were identified from METTs submitted as of January 2013, and from project documents CEO-endorsed or –approved as of April 2015.

[23] KBAs 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 also has globally standardized sub-criteria and thresholds.

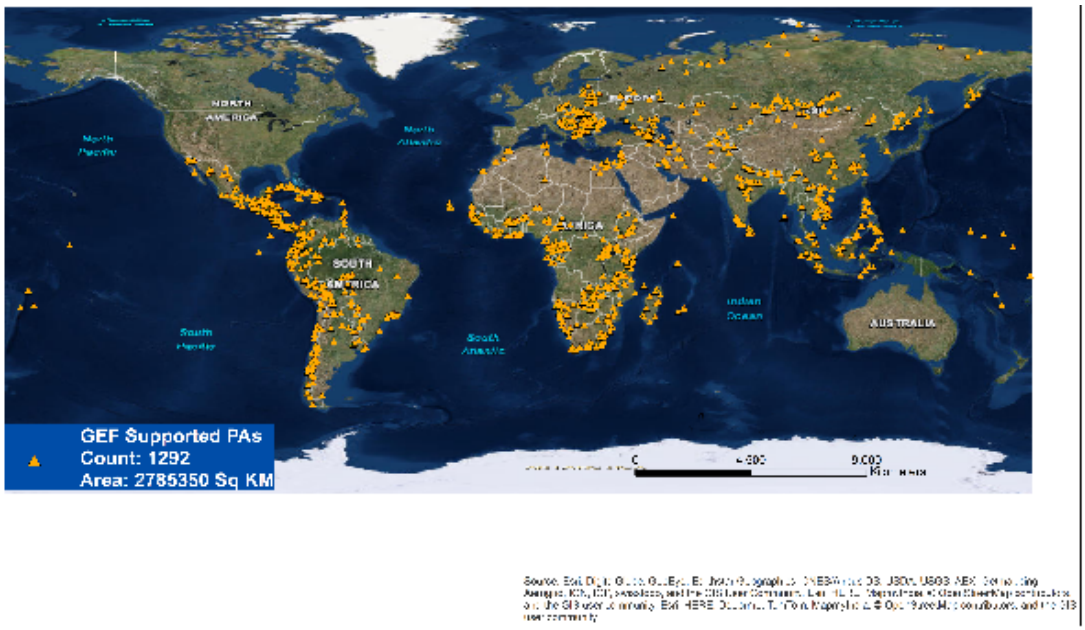

Figure 2 Location of GEF- Supported PAs

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 a global scale, namely changes in forest cover and trends in wildlife populations. Given the ready availability of spatial information regarding both the PAs and landscapes where GEF provided support, Mexico was selected as a case study for which a detailed analysis of forest cover change was performed using propensity score matching. Information from a subset of 191 projects that were included in the GEF 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 country-wide aggregate, and at least two times less than PAs that were not supported by GEF in the same biomes and countries.

At a global scale, over the period from 2001 to 2012, the aggregate median percent loss in 580 GEF-supported forested PAs in 73 countries was 1.2%, while the country-wide aggregate loss, which included both protected and non-protected forests, was 4.1%[24] (see Annex 3 for individual country figures).

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 GEF and their respective 10-km buffers. Median percent forest loss was found to be 2.4 times less in GEF-supported PAs (0.9%) than in non-GEF PAs (2.3%) within the same biome. Furthermore, the 10-km buffers of GEF-supported PAs (3.4%) had 1.3 times less forest loss than the respective buffers of the same non-GEF PAs (4.5%). GEF-supported PAs therefore had 3.6 times less percent forest cover loss than their buffer areas; on the other hand, 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 buffer areas. This means that over-all, GEF supported PAs fared better than non-GEF supported PAs and non-protected forests during the decade.

Table 10 Comparison of forest cover loss in GEF and non-GEF PAs and their respective 10-km buffers within the same country and biome

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

[24] "Forested" in this analysis is defined as a polygon that meets these two criteria for the baseline year of 2000: 1) at least 1km^2 of forest area, and 2) at least 10% forest cover. Out of 1109 non-overlapping GEF-supported terrestrial PAs, 580 met these two criteria. These PAs are limited to those identified from project document reviews and Management Effectiveness Tracking Tools (METTs), and that could be found in the World Database on Protected Areas (WDPA).

On the other hand, increase in forest cover over the same period was marginally higher (0.1%) in non-GEF PAs on average than in GEF-supported PAs. This marginal difference therefore 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. However, 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 natural or plantation species (Lepers et al., 2005). Non-GEF PAs in South Africa had maximum gains, with 5 out of the 12 PAs showing more than 50% 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 Wyenburg, 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%) was in Ibera, a protected reserve in Argentina, while the second highest gain (16%) was in Krka-donji tok, a protected landscape in Croatia. The gain in Ibera is most likely due to better protection of native forests as well as plantations by private landowners who own 60% of the land within the reserve (The Conservation Land Trust, 2015); 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 GEF-supported PAs were in the tropical & subtropical moist broadleaf forest biome (n=199), which also saw the greatest forest loss in terms of area at 6,219.03 km^2 (Table 11). These results are consistent with the global trend where 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) (Table 10). In terms of percent loss in forest cover, GEF-supported PAs in the tropical & subtropical coniferous biome had the largest loss at 6.22%, followed by the tropical & subtropical dry broadleaf forests biome at 2.57%. Again, the temperate coniferous forest biome had the smallest loss in terms of percent at 0.58 % (Table 11).

Table 11 Highest and lowest estimates of forest loss in GEF PAs by biome

Biome Name	Number of GEF PAs	Forest Area in 2000 (km^2)	Forest loss 2001-2012 (km^2)	Forest loss 2001-2012 (%)
Tropical & Subtropical Moist Broadleaf Forests	199	382864.50	6219.03 (H)	1.62
Tropical & Subtropical Coniferous Forests	22	33527.81	2087.01 (H)	6.22
Tropical & Subtropical Dry Broadleaf Forests	39	72640.73	1866.83 (H)	2.57
Deserts & Xeric Shrublands	7	1691.13	28.02 (L)	1.66
Temperate Coniferous Forests	7	3035.45	17.66 (L)	0.58

Loss across countries

Forest loss in the GEF-supported PAs varied widely within countries. In terms of percent forest loss, Turkey had the lowest (0.02%) while Nicaragua had the highest (9.7%) (Table 11). In terms of forest area loss, again Nicaragua had the largest loss at 2672.773 km^2 (n=24), followed by Indonesia at 1931.118 km^2 (n=15); again, Turkey had the lowest loss in forest area (Table 12). While the broader trend of forest loss in the GEF-supported PAs indicate 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, are related to over-all 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 (Table 11), 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 et al. 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 Protected Areas Act or develop a PA financing mechanism as planned. Thus, the project's terminal evaluation concluded that while PA management in the country improved, it was to a lesser extent than could have been expected given the scale of degradation (Montez and Cerez 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 seen in Tables 12 and 13, 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% of the reserve having minimal ecological risks from natural disasters, hydroelectric power plant construction, road construction and human activities (Özsahin and Kaymaz 2013). Camili Biosphere Reserve was one of the four pilot sites of the Turkish government project titled "Biodiversity and Natural Resources Management Project" supported by the GEF from 2000 to 2008. Project activities included training and awareness-raising, development of participatory management plans, alternative income generation and eco-tourism 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).

Table 12 Highest and lowest percent forest loss in GEF PAs by country

Country	Number of GEF PAs	Forest Area(2000)	Loss from 2001-2012 (%)	Biome(s)
Nicaragua	24	27320.52	9.78 (H)	Tropical & Subtropical Moist Broadleaf Forests; Tropical & Subtropical Dry Broadleaf Forests; Tropical & Subtropical Coniferous Forests; Mangroves
Honduras	11	18998.90	8.60 (H)	Tropical & Subtropical Moist Broadleaf Forests; Tropical & Subtropical Dry Broadleaf Forests; Tropical & Subtropical Coniferous Forests;
Guatemala	8	11663.91	8.16 (H)	Tropical & Subtropical Moist Broadleaf Forests; Tropical &

				Subtropical Coniferous Forests;
Suriname	2	12114.4	**0.06 (L)**	Tropical & Subtropical Moist Broadleaf Forests
Turkey	1	175.4	**0.02 (L)**	Temperate Grasslands, Savannas & Shrublands

Table 13 Highest and lowest forest area loss by country

Country	N	Forest Area(2000)	Loss from 2001-2012 (km^2)	Biome(s)
Nicaragua	24	27320.52	**2672.77 (H)**	Tropical & Subtropical Moist Broadleaf Forests; Tropical & Subtropical Dry Broadleaf Forests; Tropical & Subtropical Coniferous Forests; Mangroves
Indonesia	15	63587.64	**1931.11 (H)**	Tropical & Subtropical Moist Broadleaf Forests; Mangroves
Honduras	11	18998.90	**1635.26 (H)**	Tropical & Subtropical Moist Broadleaf Forests; Tropical & Subtropical Dry Broadleaf Forests; Tropical & Subtropical Coniferous Forests;
Tunisia	1	20.16	**0.02 (L)**	Mediterranean Forests, Woodlands & Scrub
Sierra Leone	1	12.29	**0.01 (L)**	Tropical & Subtropical Grasslands, Savannas & Shrublands

Loss over period of GEF support

No statistically significant difference was seen when comparing aggregate forest loss rates during the period of GEF support with that of the periods before (n=290, t=-0.16, p>0.05), and after GEF support (n=273, t=-1.73, p>0.05). The average difference in forest loss rate before, during and after project implementation was a median value of -0.006% per year, indicating almost no change between these periods. But these results should be interpreted with caution. Increasing the sample size to ensure more robust statistical results was limited due to the lack of spatial information on PAs 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. For analyses that attempted to compare differences between periods with and without GEF support, only PAs that received support no earlier than 2003 (for the analysis of before vs. during GEF support), or that stopped receiving support no later than 2008 (for the analysis of during vs. after GEF support) could be included in the samples. Due to the globally consistent 30-m resolution forest loss data being available only for the period of 2001 to 2012, no time-series comparisons could be made for PAs that were supported fully within or before this period. The

small sample sizes and large variance in forest cover loss across GEF-supported PAs and countries preclude the generalization of these results using the global average.

However, examining individual cases of PAs shows differences in forest loss rates between the periods before and during GEF support ranging from an annual increase in forest loss of 2.86% in Ranobe PK-32, a PA in Madagascar, to an annual decrease of 8.68% in Ubsunurskaya Kotlovina Nature Reserve in Russia. The increase in rate of forest loss in Ranobe PK-32 in Madagascar may be partly explained by the over-all country-wide and local factors – forest clearance for subsistence farming, small-scale disturbances associated with selective logging, and cutting of trees for fuelwood, charcoal and building materials within PAs (Sussman et al. 1994; Allnutt et al. 2013). Also because of Ranobe PK-32's location in the spiny forest ecoregion, which has one of the fastest rates of forest loss[25] among the different forest types (Harper et al. 2007; Quesne and Razafindralambo. 2012).The terminal evaluation of the national-scale Third Environment Programme (GEF 1884) 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; the whole project was rated marginally satisfactory (Quesne and Razafindralambo. 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 increase in frequency of fires (Lepers et al. 2005; Achard et al. 2006; Shishikin et al 2012). GEF support (GEF ID 1177) was delivered as one of three parallel projects in three adjacent countries spanned by the Altai-Sayan ecoregion. Direct support 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 at terminal evaluation (Kasparek 2011).

Contextual factors contributing to loss

A linear mixed effects model was used to understand the influence of 15 contextual variables[26] on forest loss rates. Higher terrain ruggedness, mean terrain elevation and road density were correlated with lower forest loss rates within GEF-supported PAs. The most reasonable explanation on 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 et al. 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 (gRoads 2001). Although roads in forested areas can lead to deforestation (Laurance and Williamson 2001; Mäki et al. 2001), increasing road density could be an indicator of over-all development in feasible economic activities and governance institutions, thus strengthening law enforcement in the PA, and reducing the dependence on timber-based products to sustain the local economy (Chomitz 2006). While elevation and roads do influence forest loss, their impacts have been context-specific and found to vary across different

[25] Rate of deforestation between 1990-2000 was 1.2% in spiny forests, the highest among all forest cover types, however, the accuracy of the figure is small due to image availability issues (Harper et al. 2007).

[26] These were: Terrain Ruggedness, Terrain Elevation (mean), Road Density,% Natural Land Cover, Human population, Human footprint (HII), PA size, Age of PA, Year of project start, Biome- Tropical/Temperate, Biome – Mediterranean Forests, % forest cover in PA, % forest cover in buffer, Implementing agency, Project type - MSP or FSP

time periods (Nagendra et al. 2003). None of the other contextual or project-related variables showed statistically significant correlations.

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 GEF by quasi-experimental means. Mexico was chosen as a case study, given the ready availability of spatial information regarding both the PAs and landscapes where GEF provided support.

> *Choosing a country where highly reliable data on GEF support was available, analyses show that GEF-supported PAs in Mexico avoided up to 23% 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[27] showed that GEF-funded PAs in Mexico have 23% less forest loss than PAs not funded by GEF over the period from 2001 to 2012[28] (SE=0.0059, n=1,329,135,351 pixels). Among the representative biomes, GEF-funded PAs in the tropical and subtropical coniferous forest biome saw the greatest advantage, with 28% less forest loss compared to non-GEF PAs in this biome (SE=0.02, n=1636 pixels). GEF-supported PAs in tropical and subtropical dry broadleaf forests had the second highest percentage of avoided forest loss at 24% (n=30897 pixels). However, non-GEF PAs conserved 20% more forest in the mangrove biome compared to GEF-funded PAs (n=518 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 Ria Lagartos PA, for example, was initially verified through both field interviews and Digital Globe images at 50-cm(Figure 3). Non-GEF PAs included in this analysis were found to have very different demographics and income sources, thus resulting in lower pressures.

[27] Variables used for matching: Forest Cover Percent (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 Population Density

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

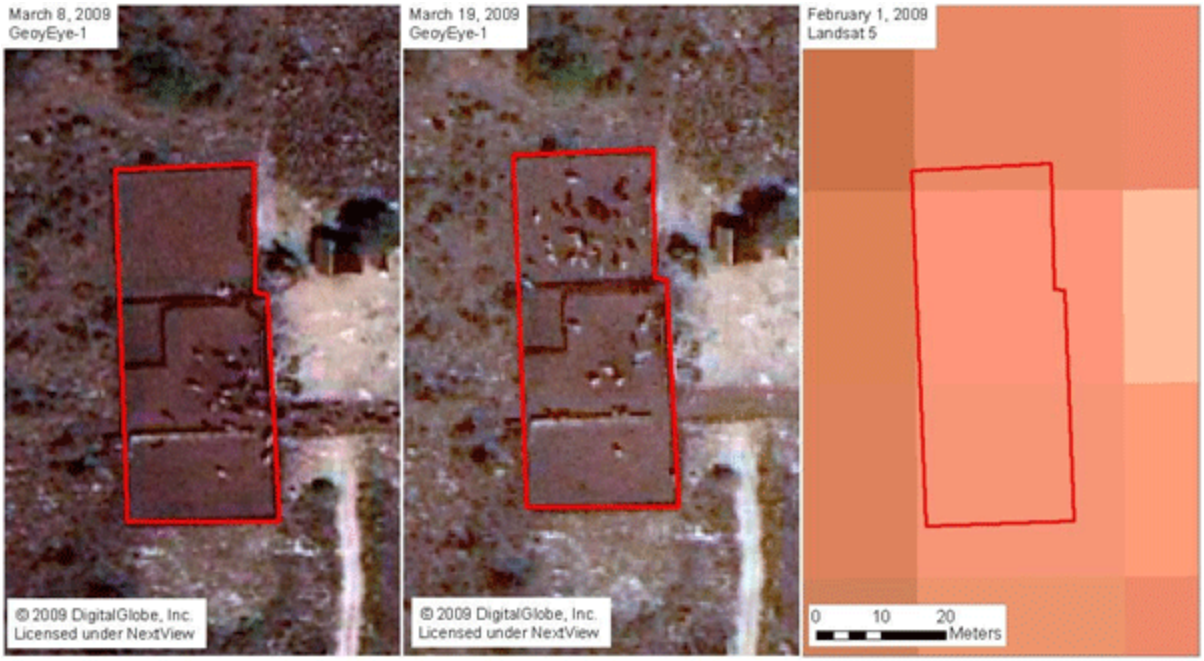

Figure 3 High resolution examples of animal pen identification along with Landsat data for comparison

Note: Figure 3 shows the Landsat sub-pixel information which can be quantified with the use of commercial satellite data. This enables the drivers of land encroachment to be determined and represents a powerful tool that can be used in combination with Landsat data.

Among the ecoregions, GEF-funded PAs were particularly better preserved in the Yucatan moist forests ecoregion, where 65% forest loss was avoided in comparison to non-GEF PAs (n=16260 pixels). GEF PAs cover 10% (7236 km^2) of this ecoregion. GEF-supported PAs were least common in the tropical and subtropical moist broadleaf forest ecoregion, therefore not enough appropriate counterfactual pixels could be identified for these areas to perform the analysis.

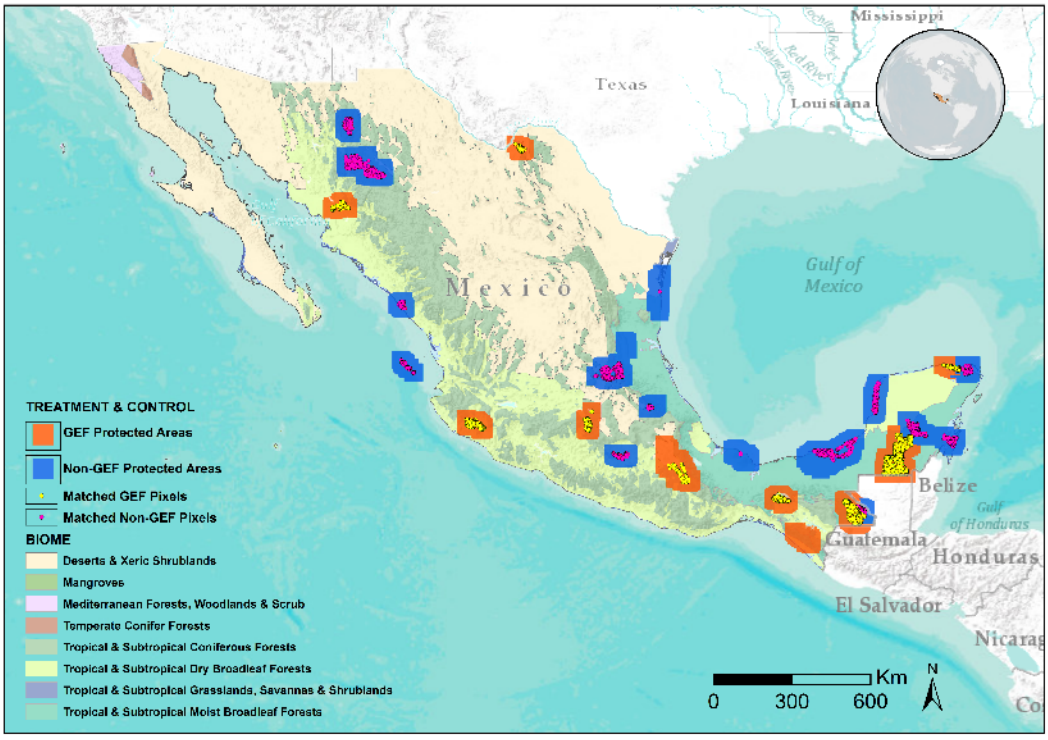

Figure 4 Location of GEF and Non-GEF Protected Areas in Mexico

> *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 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, also in Mexico. *Ejidos*[29] have mixed land uses, where communities have rights to pursue agricultural as well as forestry activities. High-resolution SPOT5[30] satellite data (up to 2.5 m) from 2005 to 2010 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,* Nuevo Becal and 20 de Noviembre and two non-supported ones, Laguna Om and Buenavista, indicate that the average forest cover loss in non-supported *ejidos* (0.035%) is more than ten times higher than that in GEF-supported *ejidos* (0.002%). Considering that these *ejidos* cover large areas that span from 131.5 to 845.0 km², these values are considerable. In addition, GEF-supported *ejidos* showed high forest growth (5.22 km² and 2.28 km² respectively), while in non-supported *ejidos*, growth was negligible *(*0.05 km²). Factors affecting forest loss in non-supported

[29] An *ejido* is an area of land owned and worked by a group of small farmers in accordance with the Agrarian Reform Law.
[30] SPOT or Satellite for Observation of Earth is a commercial satellite which offers high-resolution images up to 2.5m.

ejidos included selling of land to large agricultural firms, invasive species growth attributed to recurrent burning of agricultural and livestock lands, and land use changes due to urbanization. Invasive ferns when dried are also very combustible, and thus represent a high risk for forest fires in the dry season. Despite having considerable areas of forest land and high potential for tourist development, these non-supported *ejidos* lacked the resources, permits and know-how to exploit them.

In the two *ejidos* where GEF supported the mainstreaming of biodiversity-friendly productive activities as part of a larger-scale intervention in the Mesoamerican Biological Corridor (see Box 1), forestry activities were much more prominent. Their forests were also much better managed with no presence of invasive ferns. This analysis indicates that GEF-supported *ejidos* had opportunities to carry out a variety of biodiversity-friendly enterprises; non-supported *ejidos* lacking these opportunities were faced with having to adopt more destructive activities, creating a negatively reinforcing cycle of deforestation.

Trends in Species Populations Outcomes

An analysis of 88 cases of species population time-series, which included 29 projects implemented in 39 GEF-supported PAs, shows that 45% had a 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 PAs. As such, changes in wildlife abundance are one of the most tangible and appropriate metrics of conservation impact available, and was therefore used as one method to assess GEF's impact on non-marine PAs. Species population time series in the Living Planet Index (LPI) 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 the management of the protected area and, ultimately, to the goals of the GEF projects.

The likelihood of a project impacting a species population time series was determined against the following criteria: (1) **High** – the project goals were specifically related to the species in question, there was some evidence that the activities in the project happened in the PA in question and/or the species would likely have been the focus of management, based on the public profile of the species, its IUCN category and biology; (2) **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. Only those population time series determined to have either 'high' or 'moderate' possibility of impact were included in the analysis; and (3) **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.

A total of 88 cases of species population time-series from the Living Planet Index were matched with the objectives of 29 GEF projects implemented in 39 PAs. Of the 88 cases, 40 (45%) had a positive trend in wildlife abundance, 34 (39%) presented no change, and 14 (16%) 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 over-all trend of the population could still

be downward after the project was initiated, but it was considered positive if the rate of decline slowed down 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 the 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 to 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, where in 6, clear links were established between these reductions and GEF support.

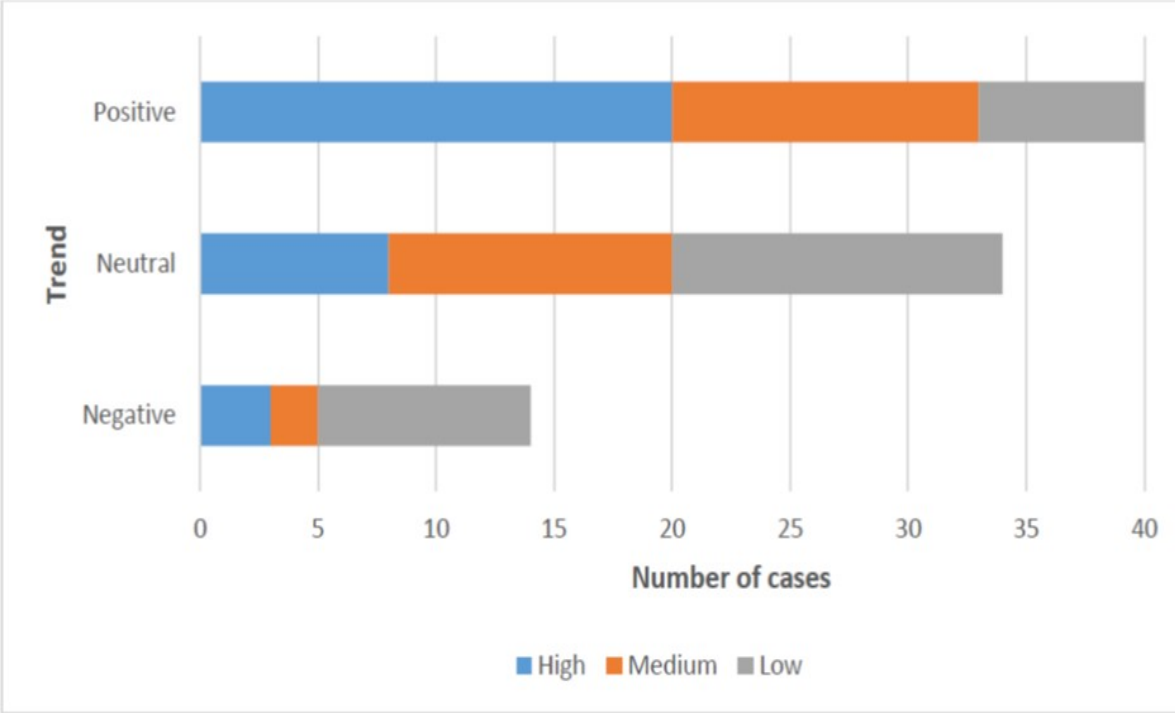

Figure 5 Distribution of species population outcomes by the level of GEF contribution

An example of a case with a positive outcome in species population trend is shown in Figure 6. In this case, African elephants (*Loxodonta africana*) in Queen Elizabeth National Park in Uganda showed a clear and positive trend after the start of the project, the "Protected Areas Management and Sustainable Use (PAMSU)" 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 over-all operating costs of the institutions managing these resources. Despite the project being national in scope, Queen Elizabeth National Park was identified as a project site in the project document, and elephants are 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 was considered to be high.

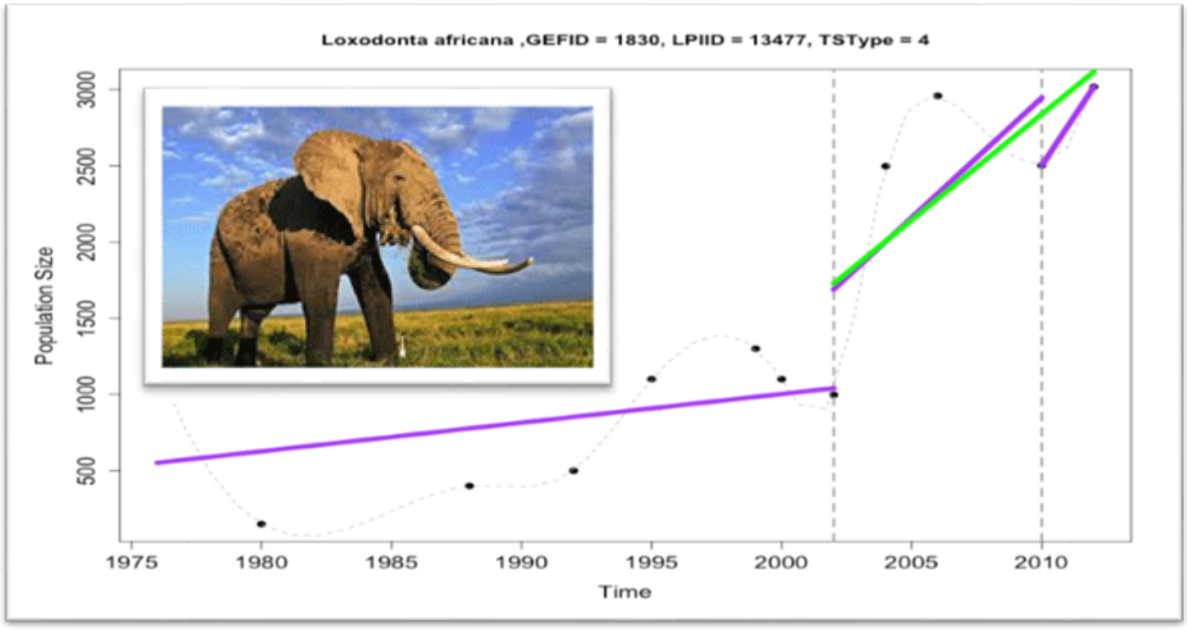

Figure 6 A population time series for African Elephant from Queen Elizabeth National Park in Uganda

Note: Dotted lines indicate project start and end points.

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

Due to lack of information in project documents on the specific PAs that GEF supported, the analysis also 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 other actors already influencing the species population trend prior to the specific project period that the analysis looked at. No project-related or contextual variables[31] tested proved to be significant in explaining the outcomes. 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, but this result was not consistent in all three models used, and should be interpreted with caution.

The GEF often supports PA systems at the regional, national and international (more than one country) scale. These kinds of projects are usually designed to build capacity for the management of PAs. For these projects it was very difficult to assess if the 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.

[31] Contextual variables used for PCA and analysis were: 1) Slope; 2) Elevation; 3) Road Density; 4) Human population density; 5) Human footprint; 6) Protected area size; 7) Age of protected area; 8) Biome; 9) Child malnutrition rate; 10) IUCN Category of PA; and 11) IUCN Red List Category of species. Project-related variables included implementing agency, project size and region.

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 impacted 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 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 therefore 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 that GEF has supported. These results are complemented by field visits and interviews to assess which factors, causal links and behaviors might be at play, leading to the outcomes.

Box 1 The Mesoamerican Biodiversity Corridor: Addressing drivers of environmental degradation, from landscapes to farms

The Mesoamerican Biodiversity Corridor: Addressing drivers of environmental degradation, from landscapes to farms

While broad in scope, GEF support to landscape management has been quite diverse and has included such things as the introduction of sustainable forestry management, and biodiversity-friendly alternative economic activities, such as payment for ecosystem services and mainstreaming of biodiversity considerations in public spending. One example is the Mesoamerican Biological Corridor (MBC), which covers 768,990 km², representing 30% of the land mass of six Central American countries and five southern states of Mexico. The objective of the corridor is to conserve the biological integrity of a set of national biodiversity corridors to allow for ecological connectivity throughout the region (Summit of the Central American Heads of State 1997). The GEF has supported the MBC for nearly 20 years (IEG 2011). In Mexico, GEF support started in 2000 and had as an additional objective of mainstreaming biodiversity into landscape management. The MBC in Mexico covers 6.8 million ha of land, connecting 23 PAs areas spanning 2.8 million ha in four states in southern Mexico. One objective of the project was to introduce biodiversity-friendly productive activities in 15% 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 drawing from the National Forest Inventory indicate a drop in deforestation from 1.5 to 1% yearly for the four states during the periods 1993 to 2002 and 2002 to 2007. While these changes are not fully attributed to the project, they are likely linked to the project. From 2005 to 2009, the project and its co-financers supported biodiversity-friendly production in 22,580 ha, and reached more than 40,000 producers. It also helped redirect around US$ 35 million of other government agency funding (nine times the funding provided by GEF funds) to 233 biodiversity-friendly sub-projects in 680 communities across the five states (World Bank 2010). The project helped mitigate drivers affecting biodiversity by helping establish the National and State Corridor Councils, where government institutions collaborate with NGOs 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% 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 enough to attribute the reduced rates of deforestation to GEF support.

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[32] may be observed as early as the implementation period. Reviews of terminal evaluations of 191 projects implemented in non-marine PAs that were included in OPS5[33] showed that a total of 68% of projects reported some positive environmental outcomes by project end. Reduction in environmental threats was reported in 45% of projects, such as stricter ecosystem protection or a decrease in destructive activities; 23% further reported an improvement in environmental conditions, such as in habitat cover and species population counts. However, 12% of projects reported worsening biodiversity conditions despite GEF intervention or imminent threats to achieved positive outcomes due to pressures from 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 due to successful protection.

At least 70% of projects in each region reported some positive environmental outcomes, except for Africa, where only 57% did. Most global projects did not demonstrate positive environmental impacts, as these were often designed to have a research or communications focus, which are not expected to produce direct impacts on the environment but instead catalyze processes and produce information that lead to the design of lower-scale interventions with this aim.

Table 14 Reported environmental impact at GEF project completion

	AFR	Asia	ECA	LAC	Global Projects
Positive Environmental Impact	57%	72%	77%	70%	71%
No Positive Environmental Impact	43%	28%	23%	30%	29%

The 32% of terminal evaluations that did not report positive environmental outcomes do not necessarily mean that these projects did not generate any environmental impact. Terminal evaluations were not required to document environmental changes even if they may have 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 are much longer 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 entire biodiversity focal area portfolio analyzed for OPS5 (n=191), 65% 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 15 shows the results

[32] The goal of the GEF is to achieve environmental impact or outcomes, which is 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 actions of humans (local communities, societies, economies); and (2) environmental status: changes in the status of the environment

[33] 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.

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

Table 15 Type of environmental outcomes recorded at project completion

Type of Environmental Impact	Quantified Value	No. of Projects Reporting (n=125)
Habitat and Species Conservation		
Area of new protected areas (ha)	187,155,172*	50
Number of new protected areas	446**	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 (non-marine) (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

*Of these, 25.05 million ha correspond to a total of 297 newly established PAs. **The area and number of new PAs do not coincide, as some TEs would only report either total area (ha) of new PAs or number of new PAs, but not both.

5. Management Effectiveness

Management Effectiveness at a Global Scale

The Management Effectiveness Tracking Tool (METT) is part of a suite of approaches designed to help understand Protected Area Management Effectiveness (PAME). PAME schemes are used in many parts of the world to evaluate the strengths and weaknesses of protected area 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 METT is one of the most widely used management-assessment tools for PAs worldwide (Stolton et al. 2003). 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 1). It collects information on: (1) objectives; (2) threats; (3) budgets; (4) staffing; (5) size; and (6) designations of PAs. For each question, assessors in the field assign a score based on a four point scale, 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 the submission of a METT for each PA that a project supports at least three time during the project period (baseline, midterm and end) to monitor progress towards more effective PA management over time. METTs submitted for GEF-supported PAs were analyzed to assess management effectiveness in GEF-supported PAs, as well as 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 Management Effectiveness Tracking Tool (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 regulations, and resource inventory.*

A total of 2440 METTs were analyzed from 1924 PAs in 104 countries, of which 352 PAs had multiple METTs (Figure 7). UNDP was the implementing agency submitting the majority of the METTs in the dataset (n=1281). A METT has 30 individual questions, but only 20% of assessments had only half or less than half of the 30 questions answered. It should also be noted that since its mandatory reporting in 2004, this evaluation found in an initial study that 65% of required PAs (n=1865) had submitted METTs at least once during the project period[34]; only 24% of PAs supported by completed projects (n=290) also submitted a METT at project end, for which a time-series analysis could be done. Some 46% of the METTs came from Latin America and the Caribbean, especially Mexico, while Asia was the least represented region with only 11% of METTs. As the majority of GEF-supported PAs are also found in this region, global results may therefore be more representative of Latin America and the Caribbean rather than all regions

[34] For more recent, ongoing projects as of 2013, submission of at least one METT was found among 72% of PAs (n=1575). 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.

on average. It is also expected that the METTs available for analyses are skewed towards PAs that are better managed and countries that have higher capacities, as filling out the METT and ensuring that it is submitted to a global repository requires certain capacities that less effectively managed PAs may not have.

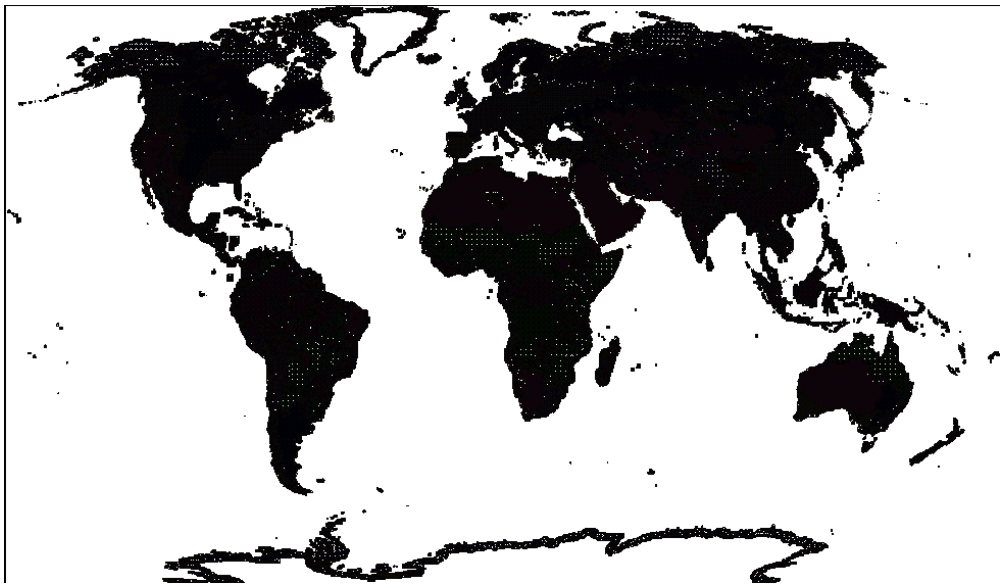

Figure 7 Location of PAs with submitted METTs

Standardizing only METTs that had more than half the questions answered, the over-all mean METT score of all GEF-supported PAs was 0.47 on a scale of 0 to 1. The highest individual mean scores were found to be for legal status, PA boundaries, and PA design. The lowest mean scores were found for the contributions of commercial tourism to PA management, and involvement of local communities and indigenous people in PA decision-making. Ten contextual variables[35], selected based on those factors from the literature identified as likely to impact PA outcomes, were tested against over-all scores and did not yield any statistically significant correlations. 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 to 1) when community members, NGOs and external experts were present (Figure 8). This result shows a significant effect of the stakeholders present when METTs were conducted, and suggests that factors other than just the quality and level of management in the PA impact the METT scores.

[35] The ten tested variables include: slope (median); elevation (mean); road density; human population; human footprint; log (size); age of PA; year of METT assessment; log (staff); and log (budget).

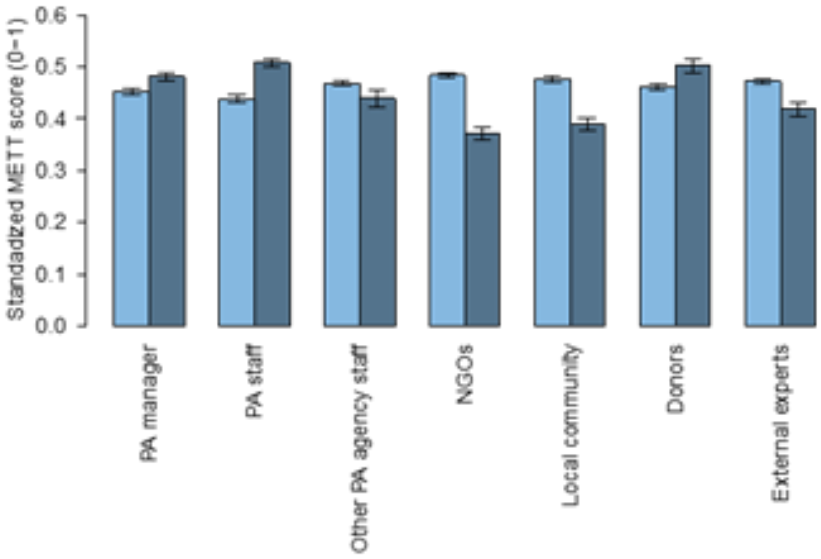

Figure 8 The difference in the mean standardized scores depending on who was present when the METT assessments were concluded

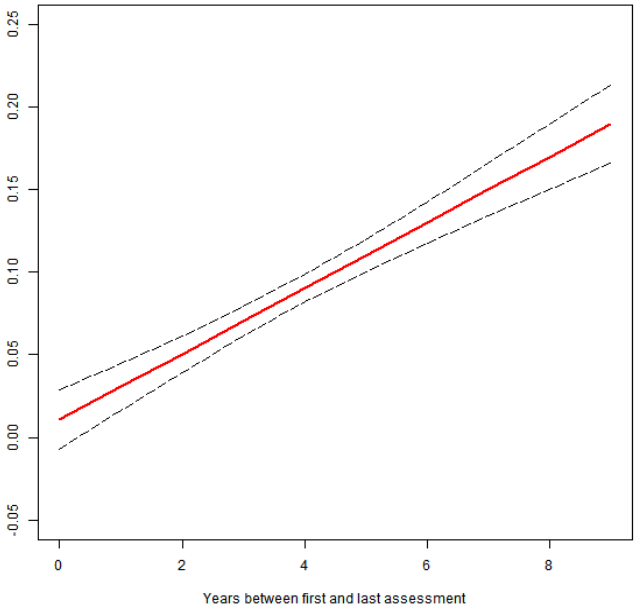

Figure 9 Estimated correlation between the number of years between assessments and changes in scores. Dotted lines represent 95% confidence interval.

Only 275 GEF-supported PAs of the 1924 that were identified, or 14%, had repeat METT assessments that could be analyzed for changes in management effectiveness over time. Of these, 70% saw improvements in the total score, 27% experienced declines, and 3% 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 (SE=0.008) to 0.51 (SE=0.009) on a scale of 0 to 1 ($t= 5.25$, $p< 0.0001$), over a mean of 3.8 years (SE=0.09; median=3 years). A significant positive correlation was found between the number of years between first and last METT and the changes in scores, suggesting that the longer the period of management, the larger the change in score (Figure 9).

Out of the 30 individual METT measures, 26 showed statistically significant improvements (Figure 11)[36]. The greatest improvements were observed in the adequacy of management plans (question 7), law enforcement (question 3), PA regulations (question 2), resource inventory (question 9) and PA objectives (question 4). No statistically significant improvement was seen in legal status (question 1) and the use of fees (question 26); assessments on the involvement of indigenous people (question 22) and the biological conditions of the PA (question 27) indicated a decrease in the mean scores. Low or no improvement on legal status is expected, as the vast majority of PAs supported by the GEF are already legally gazetted (median score=3 on a scale of 1 to 4),

[36] For the full set of questions used by the METT see Annex 1

and thus there is very little room for improvement. Lower scores on involvement of indigenous people and biological conditions in the PAs appear more to be a result of weaknesses in the METT itself rather than a reflection of conditions in the PA. For instance, on the measure related to indigenous people, the structure of the METT does not allow evaluators to distinguish between PAs where no indigenous people were present, and PAs where indigenous people issues were relevant but not addressed. In both instances, this measure would receive a score of "0".

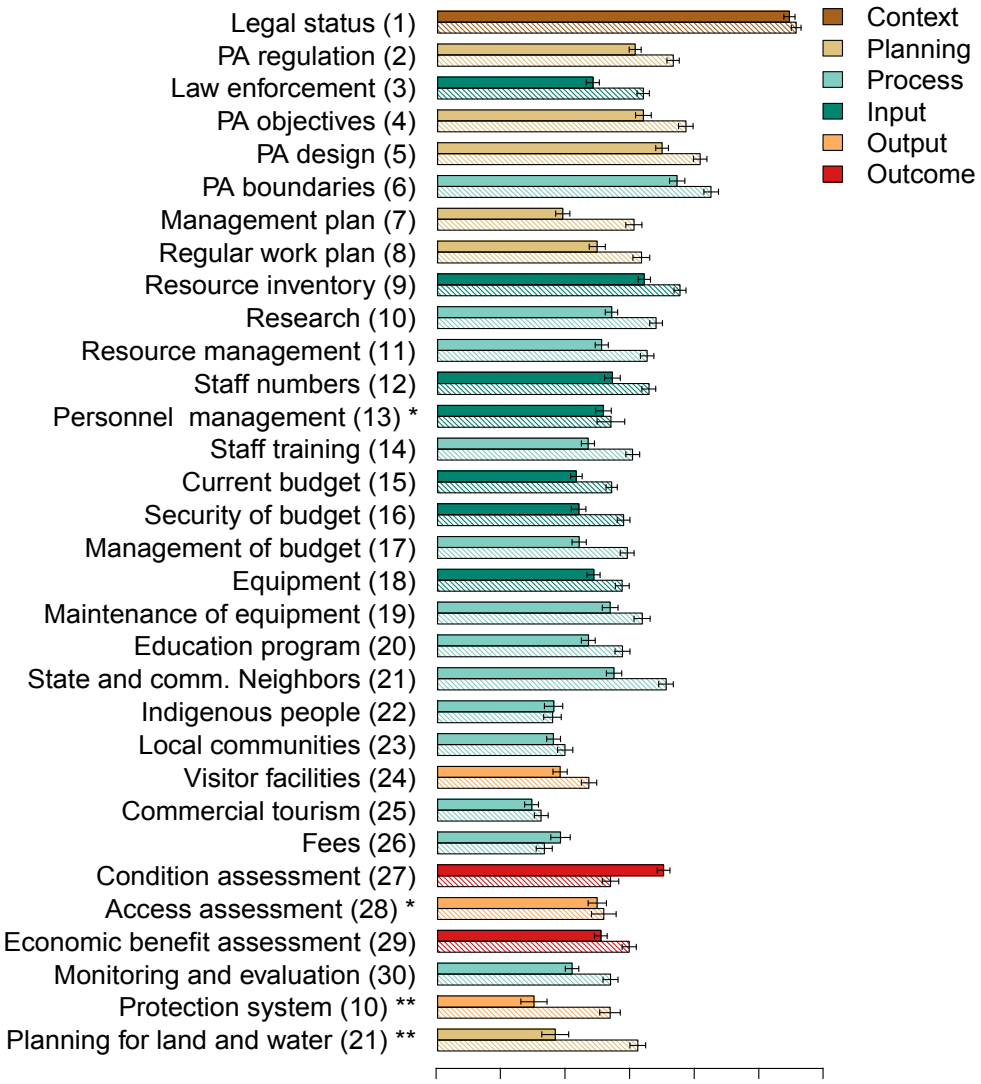

Figure 10 Changes in the individual questions' mean scores for the first and last METT

Notes: The first assessment (left and solid) and last assessment (right and hatched) for 275 GEF supported protected areas 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 PAME elements. (*) questions only found in METT 1; (**) questions only found in METT 3.

While the METT does include measures of outputs and outcomes, it is mostly designed to evaluate 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; it is assessed using a single four-point scale question rather than actual quantitative monitoring data. The 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. This makes the interpretation of data in the field difficult, as those who fill in the METT may find it challenging to integrate information from across different ecosystems and components of ecosystems (e.g. predators; herbivores; invasive species) to easily answer this single question.[37] Thus, to fully evaluate outcomes towards 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 the previous chapter, are used to triangulate these results.

None of the contextual variables significantly explain the over-all METT scores, suggesting that neither landscape characteristics, PA attributes nor socio-economic factors systematically impact the observed scores. In addition, an analysis comparing final METT scores with forest cover loss over the period from 2001 to 2012 (n=109) showed no correlations between over-all management effectiveness and forest cover loss. A correlation analysis between METT scores and wildlife abundance trends could not be done due to the low sample size of GEF-supported PAs matched to Living Planet Index data for the specific periods GEF of support. Analyses of changes in METT scores with and without, and before and after the period of GEF support were also done; however, information gaps in whether GEF support was present in certain PAs or not, and over which periods, made it extremely difficult to do this comparison with an acceptable margin of error.

The METT is a site-specific tool (Stolton et al. 2003), and as such it allows for a review of management, output and outcomes in the context of local conditions. It has a limited utility to inform on multi-site level initiatives or interventions targeted at higher, system-wide scales, e.g., national legislation, agency level or governance. Yet, many of the GEF projects have been designed at these scales, such as working to improve PA systems, country-level legislative procedures or governance structures. Many GEF projects working in non-marine PAs may therefore have contributed to changes at higher scales that are not captured by a site-level METT analysis.

[37] The GEF BD focal area has conducted two case studies, one in India and one in Zambia, assessing the usefulness of the METT that has led to a revision of the METT to address systemic weaknesses vís-a-vís outcome measurements. In addition, recommendations on the application were also made so as to eliminate bias. The METT has recently been revised to address these limitations in preparation for use in GEF-6.

Box 2 METT Application in the Countries: the Vietnam Conservation Fund Experience

METT Application in the Countries: the Vietnam Conservation Fund Experience

The GEF has provided considerable support to biodiversity monitoring using the Management Effectiveness Tracking Tool (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 (e.g. South Africa, Zambia), others preferring to use different tracking instruments (e.g. Mexico, Colombia, Indonesia, Uganda), and still others saying that they use it only to comply with GEF project requirements (e.g. Uganda, Vietnam). This points to a divide between the technical experts developing the tool and the end users at the country level. Capacities to fill out the METT also vary across PAs, making the quality of the data collected uncertain, or uneven at best. The experience of Vietnam illustrates the challenges in the use of the METT in its current form for informing management decisions.

The final report of the Vietnam Conservation Fund (VCF 2013), a component of the Forest Sector Development project in Vietnam, supported 77 Special Use Forests (SUF) through 112 grants totalling US$ 8.5 million. The VCF used the METT to assess improvements in management effectiveness. A total of 219 METTs were completed at the time of the report for 56 SUFs. METT scores referring to aspects related to Management Board (MB) capacities increased from 19% to 30%. Nonetheless, scores related to threats tended to decrease due to the increase in illegal logging and hunting, which the project found especially difficult to counter on account of very high levels of consumption and demand for bush meat and hardwood in the country as well as in China. VCF staff verified 113 of these METTs for 21 SUFs and made significant downwards adjustments in scores. Variations between how the METT was conducted in the different regions made comparisons difficult as two enumerators would seldom reach the same score. Particularly striking is that it was possible for MBs to score reasonably well and show improvements on some of the fields of the METT even in the presence of problems that are major threats to biodiversity. The report cites the extensive organized nature of illegal logging in Pu Huong National Park that was subsequently found to involve elements of the Forest Protection Department. Similarly, problems were cited with black cardamom cultivation in other PAs. VCF staff's assessment of the METT was that: 1- it is highly subjective; 2- the scores are open to manipulation; 3- scores are difficult to compare year to year; and 4- the METT has too many variables while it does not properly incorporate aspects related to threats.

Management Effectiveness in Visited PA Sites

Increased management effectiveness was reported in the majority of GEF-supported PAs visited in 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 the observed biodiversity outcomes, field visits were conducted in 28 PAs in seven countries, covering three regions[38]. Both GEF-supported and non-GEF PAs were visited to identify and compare factors affecting

[38] Countries for case studies were selected according to criteria developed by the evaluation team and the Reference Group: 1) presence of species or ecosystems within the country with high global biodiversity significance; 2) importance of biodiversity to local economies (whether directly or indirectly); 3) stability of country, where access is possible and relatively safe; 4) existence of protected areas without GEF support; and 5) long-term and extensive GEF engagement--as shown by a high number of

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, lack of information led to the expert opinion of Reference Group members and relevant government agencies being used as the basis for the final selection of PAs.

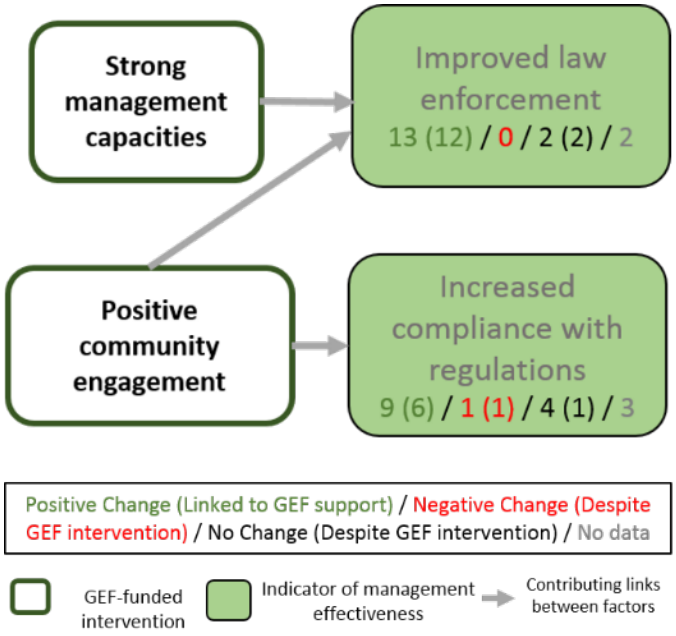

Figure 11 Management effectiveness in visited PA sites

Consistent with results of the METT analysis (see previous section), improved law enforcement was reported in 13 of the 17 GEF-supported PAs that were visited; 10 reported a reduction in at least one activity destructive to biodiversity, such as poaching or illegal logging. In 9 of these, compliance with PA regulations was said to also have improved. Positive changes were found in areas that experienced an increase in PA staff capacity and infrastructure, such as fences, ranger outposts, and surveillance technology. Even more important was increased cooperation from communities in enforcing the law. All PAs that reported increased compliance with regulations also reported increased participation among communities in PA management activities. 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 towards PAs. A more in-depth discussion of GEF support towards increasing community engagement is made in the following chapter.

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 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 key factors such 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.

completed GEF-supported biodiversity projects and high amount of GEF investment--to allow for the assessment of cumulative impacts over time. 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 also made with consideration to the number of UNDP projects (completed and ongoing) implemented in the country to ensure adequate representation among implementing agencies.

Among the 28 PAs visited, of which 11 were not supported by GEF, QCA[39] showed that 85% of PAs reporting a decrease in destructive activities had a combination of five characteristics in common: 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); and either good PA leadership, or external support in addition to that coming from the government. The presence of threatened species or high-value resources may provide an incentive to governments to increase protection in these PAs. However, despite the presence of all other contributing factors, failure to provide information to communities about the PA, which indicates a lack of community engagement, was the only factor that was different from the PAs that reported a decrease in destructive activities, thus leading to a difference in the outcome. This was seen in Nakuru in Kenya, which did not see a decrease in destructive activities despite having all these other key contributing characteristics.

Moreover, a decrease in destructive activities was seen when either communities perceived concrete benefits from PA management activities, or the PA was easy to access. This could mean that destructive activities declined when either communities complied more with regulations, or shifted their activities to more biodiversity-friendly ones, as a result of seeing direct or indirect benefits from the PA's existence. This 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 on a global scale in relation to lower forest cover loss [see previous section on Biodiversity Outcomes]. In 41% of PAs that saw the positive change, both conditions were seen to be present. QCA results showed that the presence of political conflict in the 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, in addition, 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 ones that GEF contributed to the most. Of the 17 PAs that received GEF support, 15 (88%) reported some or a significant GEF contribution towards developing professional and dedicated PA staff, and 13 (76%) reported similar levels of contribution towards community perception of concrete benefits from PA management activities. Twelve PAs (71%) said GEF also contributed towards leveraging other external support, and/ or forging effective relations with local governments. In half of the PAs, GEF was reported to also have contributed towards developing or supporting good PA leadership. GEF contribution was seen the least in making contextual factors more favorable towards positive biodiversity outcomes, as these were largely established prior to the entry of GEF support.

Table 16 Types of the GEF contribution in visited PA sites

	NUMBER OF PROTECTED AREAS	
AREA OF GEF CONTRIBUTION	*NEGLIGIBLE OR NO CONTRIBUTION*	*SOME OR SIGNIFICANT CONTRIBUTION*
Professional and trained and dedicated	2	15

[39] QCA (Qualitative Comparative Analysis) is a deterministic method (non-probabilistic) used to identify the conditions or combination of conditions that lead to specific outcomes. For this analysis, the 28 visited PAs were further split into 30 PAs, to account for different conditions and extent of GEF support in the Bwabwata core and buffer zones in Namibia, and between the adjacent Aketajawe and Lolobata PAs in Indonesia.

PA staff		
Concrete Benefits perceived by communities (including projects and financial support)	4	13
Provision of information	10	7
Good leadership	8	9
Other external support e.g. donors	5	12
Effective relation with local authorities	5	12
Easy Access to PA/Reduced isolation	15	2

In Mount Kenya National Park, the combination of infrastructure and tools for rangers, and alternative livelihood options for local communities provided by the "Mount Kenya East Pilot Project for Natural Resource Management" 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. GEF has also helped increase the capacity of both communities and local authorities to participate in natural resource management.

Stronger management capacities were seen in the form of expanded PA staff skills, upgraded equipment and infrastructure, stable funding for PA operations, monitoring & reporting systems for both management and biodiversity targets, and increase in areas under conservation management. Resources from GEF, national and local governments, CSOs, and bilateral donors in combination played a key role in strengthening these capacities. Few PAs have consistent funding for operations.

Out of the 17 GEF-supported PAs visited, all 16 that had sufficient information reported an improvement in staff capacity and/or PA infrastructure, partially or fully a result of GEF support. Funds and interventions that complemented GEF contributions came from national and local governments, CSOs and bilateral donors.

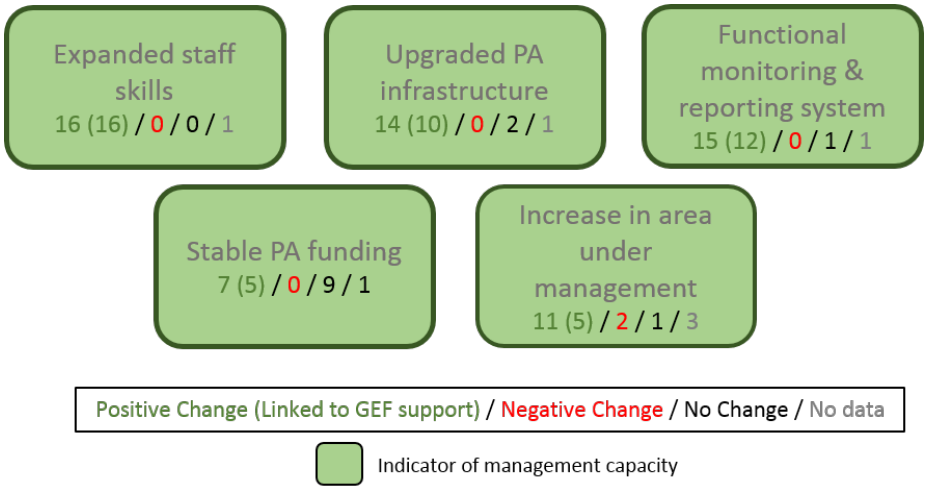

Figure 12 Strong Management capacities in visited PA sites

Management capacities

Very few PAs reported an increase in the number of PA staff or in the staff budget. However, all visited GEF-supported PAs reported an increase in staff skills, in many cases as a result of direct training through GEF-funded projects on topics as diverse as financial management, community engagement, and off-road driving. GEF projects often worked with CSO partners to train PA staff on management techniques and tools, including 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. GEF also directly supported the development of new management plans in several PAs, which is reflected as well in the results of the global METT analysis.

GEF support to infrastructure in 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 project Namibia Protected Landscape Conservation Areas (NAMPLACE), 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. When accompanied with strong law enforcement and oversight capacity, easier access to PAs due to the presence of main roads is associated with lower forest cover loss and a decrease in destructive activities, as seen in the previous chapter.

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 fencing resources, while USAID provided computers and improved capacities for data management and sharing. These organizations, together with Africa Wildlife Foundation, Zoological Society of London, and Japan International Cooperation Agency also provided training to both the Kenya Wildlife Service and 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 M&E structures or systems that until now continue to be used. In Mariposa Monarca in Mexico, community participation in M&E has expanded in capacity and reach, and the government has established automatic meteorological stations in the regions of Sierra Chincua and Chivati-Huacal. All three of the GEF-supported PAs in Namibia have adopted the Incident Book Monitoring System, used to collect data on wildlife, vegetation, high wildlife crime, poaching incidents and other key management aspects, and to inform management decisions. The Incident Book Monitoring System, first introduced by WWF, was refined and consolidated through GEF's national-level "Strengthening the Protected Area Network (SPAN)" and "Integrated Community-Based Ecosystem Management (ICEMA)" projects.

Expanded management

At least 10 PAs saw an increase in the extent of area under conservation management. GEF was reported to have contributed to the expansion of biodiversity conservation areas in 6 PAs. The most common process by which the extent of areas under conservation management increased was through increasing connectivity among ecosystems previously managed separately, as seen in Etosha and Mudumu in Namibia, Mount Kenya and Nairobi in Kenya, and Iguaqué and Los Nevados in Colombia. For example, corridors established between Nkasa-Rupara, Mudumu and Bwabwata National Parks enabled the

movement of wildlife between Botswana, Namibia, Zambia and Angola, four of the countries covering the larger Kavango-Zambezi (KAZA) Transfrontier Conservation Area. GEF's most important contribution to this increased connectivity was not only support for the creation of corridors, but also for the adoption of a co-management approach, which enlists communities in the sustainable management of lands adjacent to PAs. This occurred in 15 of the 17 GEF-supported PAs visited.

Some non-GEF PAs that were visited also reported adopting co-management, landscape and ecosystem-based management approaches as a spillover effect from GEF support to the PA system or a nearby GEF-supported PA. This was notably seen in PAs in Kenya, Colombia, Namibia, and Mexico. The promotion of new management approaches was found to be effective when there was national government support for these approaches 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 under PA management was the funding of boundary surveys. In Bwabwata National Park in Namibia, for example, this allowed the inclusion of the Kwando area in 2007 through the SPAN project, which targeted the country's entire PA system. In Aketajawe in Indonesia, GEF supported the boundary socialization and awareness exercise to enhance understanding of rights and responsibilities, and the resolution of disputes in this newly formed national park; the boundary demarcation was financed and conducted by the national government.

Sources of funding

Key to the effective operations of PAs is a consistent source of funding. In a few of the visited PAs, increased financial sustainability resulted as governments increased official PA budgets. GEF was reported to have some or significant contribution towards securing adequate funding for PA operations in 9 of the 17 PAs (53%), where in 5, this led to financial sustainability. In Bwindi and Mgahinga in Uganda, GEF established a trust fund that is helping fund both PA operations and community engagement activities.

In other cases, PA budgets were supplemented by the proceeds of ecotourism activities, or were combined with financial resources from conservancies, NGOs and other civil society actors. In Namibia, the GEF helped to establish an automated collection fee system in the Etosha National Park, which will be replicated in Bwabwata with the help of another GEF-funded project. In other 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 these positive changes, 13 GEF-supported PAs reported the 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 PAs. The continued expansion or intensification of agricultural or animal husbandry practices in and around PAs was reported in 9 of the GEF-supported PAs. In many of these PAs, adjacent communities were the source of the threat.

In the Nairobi National Park in Kenya, although the GEF's Wildlife Conservation Lease Project has helped improved compliance with regulations, poaching, bush meat trade, pollution, and illegal livestock grazing continue during periods of drought. In Ba Be in Vietnam, although illegal logging is no longer as common,

strong threats on resources outside the park have spilled over into the park in the form of wood collection for house construction and the market; and collection of orchids, snakes and other small animals. Since 2010, there has been a marked reduction of illegal logging in the core area of Mariposa Monarca, partly due to the growing participation of communities in payment for ecosystems services. However, due in part to new roads and transport options, some logging has continued in the butterfly nesting areas where it is most destructive (Figures 14 and 17). In the buffer zones, deforestation clears the way for avocado plantations with heavy herbicide and pesticide use. Due to a lack of water, natural water courses are diverted and springs are piped, leading to further habitat degradation. In Nairobi National Park in Kenya, expanding human settlements are also severely degrading the main catchment, and fragmenting animal habitats and migratory routes of zebra and wildebeest. Apart from this, pollutants from a power line and an oil pipeline installed inside the PA as well as external sources are also affecting water and air quality in the PA. In Ría Lagartos, in addition to the persistent and recurring threats of pollution sewage from the large human population within and around the PA, habitat loss from encroachment and arson further degrade environmental quality. Conflict between cattle herders and jaguars also continues to threaten wildlife.

Fire outbreaks in some PAs also continue to be a significant threat. For instance, in 2011, fire outbreaks in Etosha National Park, Namib Naukluft National Park, and private and communal lands destroyed close to 370,000 hectares of vegetation and killed 25 black rhinos, 5 white rhinos, 11 elephants, 60 giraffes, 30 kudu and 3 lions (estimated to be worth US$ 2.3 million). Etosha NP has started a controlled burning programme to reduce problems from uncontrolled fires, but it is clear that such fires continue to be a major threat, and that the fire management infrastructure in the affected PAs was inadequate.

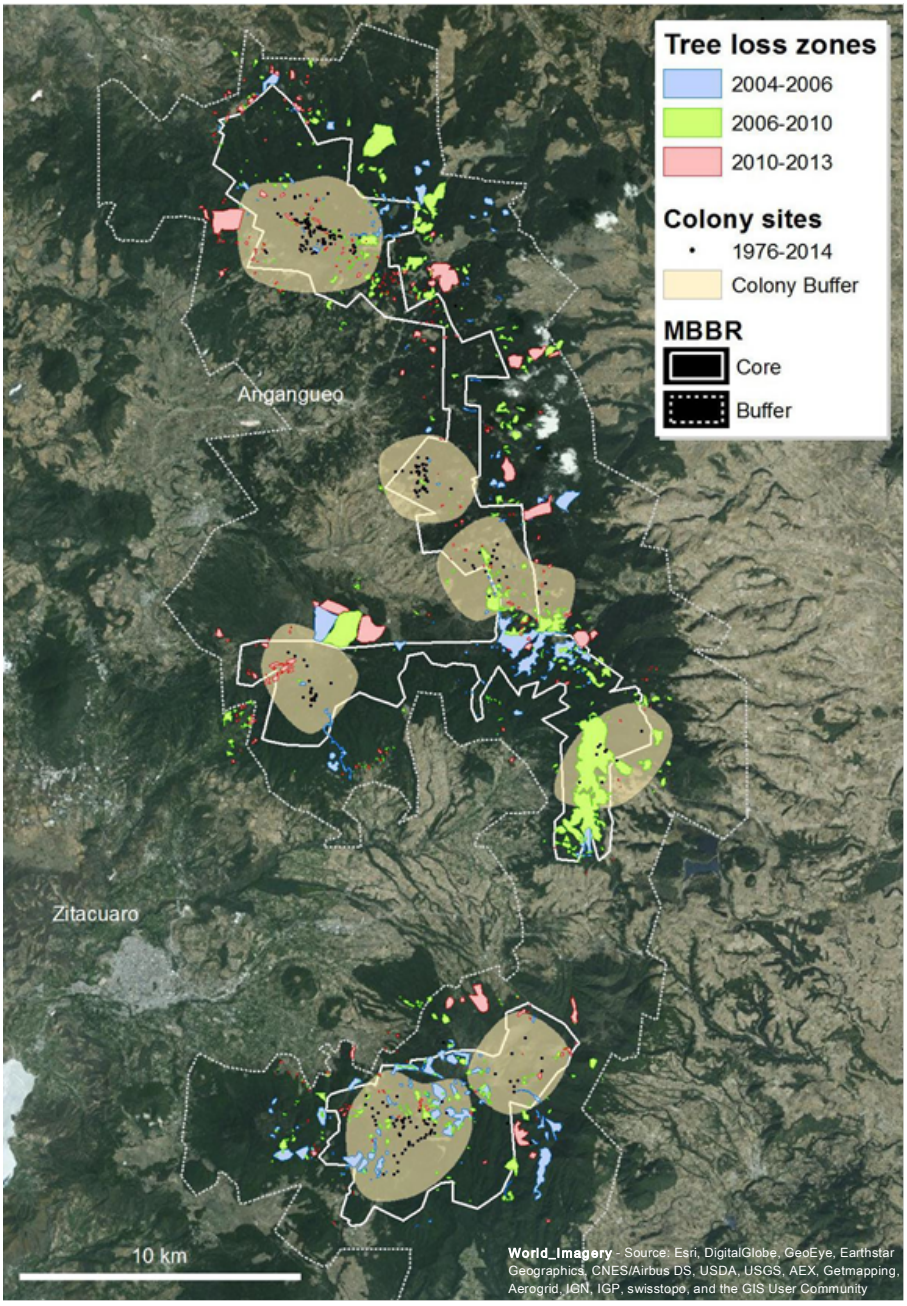

Figure 13 Tree loss during different time-periods in Monarch butterfly habitats, Monarch Butterfly Biosphere Reserve, Mexico

Note: Tree loss zones indicated by different colored polygons do NOT indicate clear cuts, but rather areas of tree loss activity (however, the large green (2006-2010) polygons in the middle of the map were clearcuts).

6. Community Engagement

In this section, we consider the extent to which GEF community-oriented activities have contributed to the achievement of results and impacts associated with PA management, and also 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 the negative the effects of its projects on local populations. The GEF instrument required that consultation and participation be conducted with major groups and local communities through the project cycle (paragraph 5, p. 6). Subsequently, the 1996 GEF Public Involvement Policy also reiterated 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. In 2013, the GEF Council adopted an Environmental and Social Safeguard Policy with the intent to couple a "do-no-harm" approach to environmental management together with the GEF's already 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 out of 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. Similar trends in community participation were seen in visited PAs not supported by 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, such as 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.

In Mariposa Monarca, Mexico, the PA was declared with little consultation with the local population, resulting in strong opposition to the reserve from most local stakeholders. Over the years, different mechanisms at various scales (the *ejido*, the micro-region and the reserve) 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. Since the GEF-supported SINAP I was implemented, there has been an increasing participation of community groups in PA monitoring, forest fire prevention, rehabilitation and restoration activities, and tourism services. Communities there 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 exchange of ideas. Community members are hired as PA staff, and are engaged in conservation activities such as ecotourism and habitat restoration. While there are a few communities who still resist the reserve, the increasing participation of local communities in the management of the reserve coupled with the income generated by the development of tourism around the reserve have

contributed to the gradual improvement of relations and collaboration between most of the local communities and the PA staff.

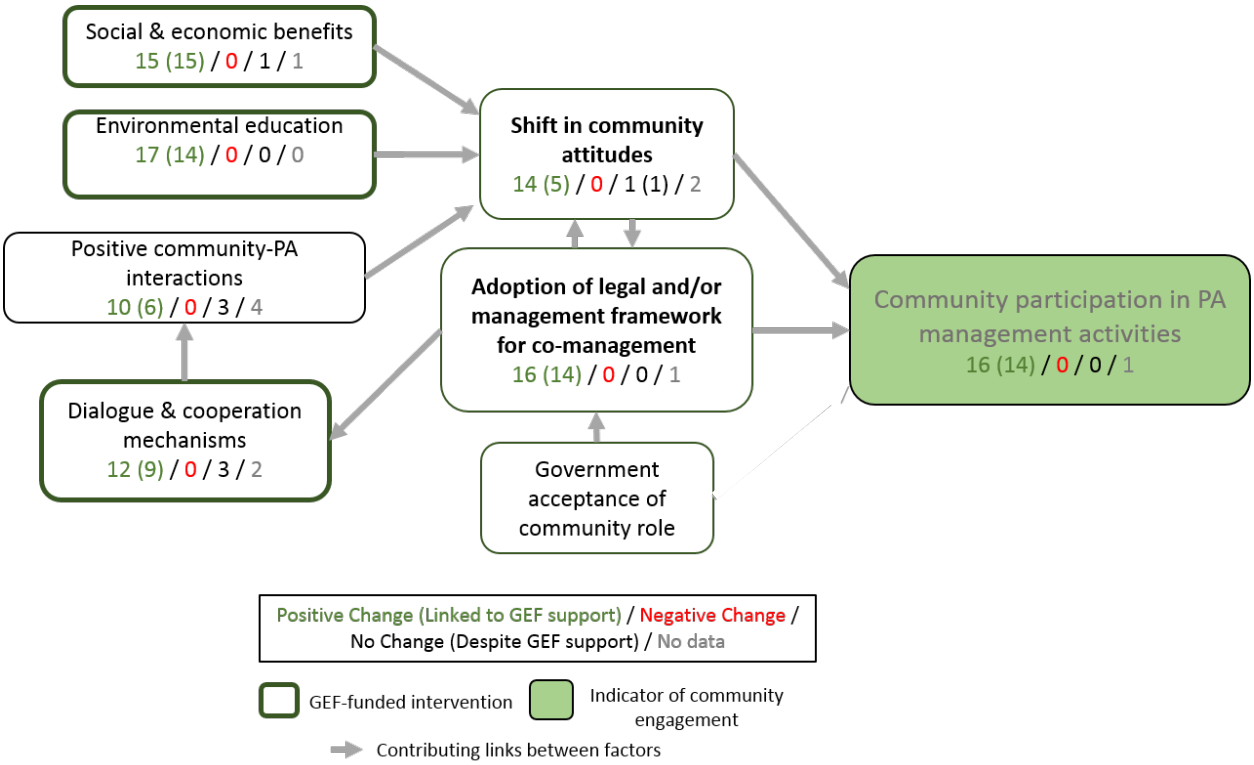

Figure 14 Community engagement in visited PA sites

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 very high fines and imprisonment for those caught. In Mount Kenya, the Kenya Forest Service adopted a country-wide Participatory Forest Management approach, and promoted the creation of community forest associations. Communities are now involved in resource protection, management of tourism, 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 the management of resources in and around the PA, and 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 (MKEPP)", GEF supported the development of the 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 rulemaking, 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 has increased the capacity of park

management. Fewer incidents of human-wildlife conflict and greater support for wildlife conservation have been reported, which in turn generates employment opportunities.

Community Attitudes and Interactions

Shifts in more favorable attitudes towards PAs in communities 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 that were supported by GEF, 14 reported a change in community attitudes regarding the importance of environmental protection, and the role of communities in natural resource management. Eleven PAs reported improved community relations with PA staff. All of the PAs reported an increase in the level of environmental awareness in adjacent communities.

Field interviews revealed that positive changes in community attitudes and interactions resulted from 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 established use or management rights for communities; and the creation of benefits for communities as part of PA management activities, or at the very least the implementation of measures to mitigate loss of economic benefits. These three types of interventions are each taken up in this chapter.

Environmental education took place through GEF projects, or through activities of PA management staff, local government or CSOs, often in collaboration with each other. This 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 GEF supported environmental education and skills development in fire control, landscape conservation and sustainable agricultural production, communities continue to participate in these activities.

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. GEF provided support in 9 of these PAs that directly contributed to the establishment of communication bodies and facilitation of stakeholder consultations. Government contributed to these changes with legislation that mandated community engagement, and encouraged dialogue between PA management and stakeholders. As illustrated in the cases of Mariposa Monarca and Mount Kenya above, in the best of cases, improvement in relations increased cooperation and collaboration between communities and PA staff.

Also, in Bwabwata in Namibia, cooperation between communities and PA staff has become standard PA management practice. Prior to GEF intervention, which first started in 2005, there was often conflict between park officials and communities, who were not legally permitted inside the PA and faced high degrees of uncertainty regarding their rights to land and resources. After national independence, and the entry of GEF and other international development players, there has been a growing acceptance of communities as partners in conservation. These changes in the role of communities in conservation have been adopted at a larger scale, in part through 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 of which provide guidelines for community engagement in PA management and were supported by GEF. The mandated cooperation between communities and PA staff has resulted in improved community relations, which in turn is credited with positive conservation outcomes, such as stable or increasing wildlife numbers and low poaching and encroachment in the PA.

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

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

Social and Economic Benefits

GEF support to biodiversity conservation includes interventions that have provided economic benefits to adjacent communities, which helped improve community attitudes towards 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 or 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 (n=186) had components that introduced alternative or supplementary sources of livelihood for local populations, such as promoting sustainable agroforestry practices and other conservation-friendly production systems or developing markets for non-traditional forest products. Alternative livelihood activities, both within and outside the PA, included ecotourism, sustainable harvesting of non-timber resources in the PA, agriculture and animal husbandry, and participation in PA management. Of these, 38% reported that opportunities for other sources of income had increased by the end of the project, through for instance diversification of crops, and 27% of projects reported that the community's actual income increased. On the other hand, 1% of projects reported a decline in their incomes, for example due to destruction of crops by increased wildlife populations. All of

the PAs visited during this evaluation for which information was available (n=15) reported GEF support to economic activities.

GEF has contributed to alternative sources of income and capital by supporting the development of operational mechanisms for specific economic activities, including 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 of the GEF-supported PAs, specific work has been done to develop services and infrastructure for tourists.

Payment for ecosystem services (PES) schemes have also been implemented with GEF support in Iguaqué, Columbia. The impact of the PES combined with other types of intervention in Mariposa Monarca is particularly striking in terms of the extent of consequent reduction in illegal logging, the most significant driver of deforestation in the reserve. From 2001 to 2007, studies calculate that a total of 2057 ha of forest in Mariposa Monarca were affected by illegal deforestation, of which 1503 hectares were caused by large-scale operators. In the period 2005 to 2007, the number of hectares attributed to large-scale illegal logging dropped to 713, and is reported to have reached zero in 2012 (Vidal et al. 2013). Remote sensing analysis carried out by this evaluation verified this trend but found that still some illegal logging continues at a much lower scale, and some affected areas were butterfly colonies (Figures 14 and 17).

While other factors affecting the reserve still require attention, the reduction in illegal logging 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 PES), improved coordination among public institutions, and the development of other livelihood opportunities for local people. These achievements also build on the many years of support from government programs, NGO initiatives, and most importantly the Monarca Butterfly Conservation Trust Fund, which is managed by the Mexican Fund for the Conservation of Nature (FMCN), and which operates funds from several foundations and organizations such as Packard Foundation, WWF, and the Carlos Slim Foundation, and was established with significant GEF funding. The Mariposa Monarca experience underlines the importance of robust community organizations that have a voice in the management of the PA, and the effective coordination between community institutions and government institutions (Tucker 2004). Communities in other PAs have also formed their own organizations that became active and important PA management partners, especially in enforcing aspects of PA regulations that are directly related to their income sources. A few examples are fishing cooperatives in Sian Ka'an in Mexico and Ria Lagartos, and conservancies adjacent to Bwabwata, Etosha and Mudumu in Namibia.

> *GEF support towards alternative sources of income and capital has also indirectly increased access to basic services and social benefits by building the financial capacity of communities 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 protected areas.*

Improved access to social services often came hand in hand with improvements in economic opportunities. The 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, with 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, although in only half were the improvements directly linked with GEF interventions.

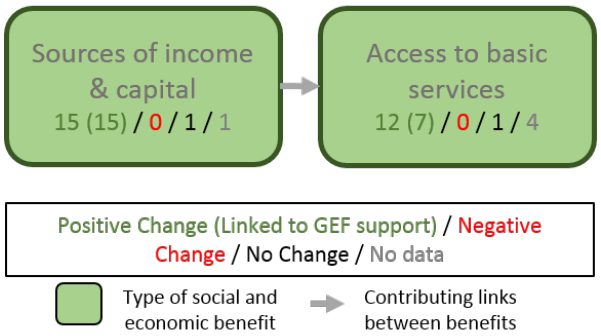

Figure 15 Social and Economic Benefits in visited PA sites

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.

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

Also in Uganda, in Bwindi, a UNDP-GEF 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 capacity-building activities of UNDP-GEF SGP. Likewise, in Lambusango, Mount Kenya and Mudumu, GEF-funded interventions helped to rehabilitate water sources and improve potable water access. Indirectly, the PES model supported by GEF in Iguaqué, Columbia has helped promote forest and water conservation, and enabled improved drinking water supply to rural and urban communities.

In the Nairobi and Mount Kenya PAs, GEF projects supported the building of new classrooms in several secondary schools, and timed payments to communities for parents to receive them just as the schoolyear 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 otherwise would not have qualified for the government's revenue-sharing program, which committed 20% of PA entry fees towards 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.

In Sian Ka'an the UNDP-GEF SGP PACT program worked in partnership with the Mexican government, The Nature Conservancy, WWF, Amigos de Sian Ka'an, and other community organizations to implement 20 small-scale economic development projects, including for 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. Amigos de Sian Ka'an and the Rare Center trained community members on agriculture and artisanal crafts methods and ecotourism. Community fishing cooperatives created "fishing refuges", and joined to create a single brand with which to market "sustainable" and "fair trade" spiny lobster. The SGP also supported a local women's group in the development of a tourist operation. SGP in collaboration with TNC, WWF and Rare Center also supported the negotiation of agreements among competing tourism cooperatives in Punta Allen to develop ecologically friendly standards and practices and to present a common front to tourist operators in Cancun, which immediately improved their negotiating power and resulted in higher fees to local tourist operators. The changes in livelihood for the communities in Sian Ka'an 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 to have greatly improved in comparison to the period prior to the PA's establishment, which were characterized by boom and bust economic cycles. One important factor in the sustainability of alternative livelihoods and income generation activities in Sian Ka'an is the proximity of a very dynamic tourism corridor between Cancun and Tikal (Brenner 2012), which while posing a threat to the reserve, has also been a positive contributing factor by maintaining demand for the crafts and ecotourism services provided by the communities. Nevertheless, threats remain even in this PA which up to now has been successful in slowing down biodiversity loss (Box 3).

Also in some cases, conservation activities have directly improved the safety of communities in a few PAs. 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 predation of livestock. As the economic significance of Bwindi has grown, the government of Uganda has prioritized peace, safety and stability in the region. The result has been better access to education and health services for communities in Bwindi.

It is important to note in this discussion 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 GEF in PAs often stimulates increased government and donor support for such basic services.

Socioeconomic Impacts and Distribution of Benefits

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

The literature regarding socioeconomic impacts of PAs is decidedly mixed, and presently 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 that take place at various scales, are all factors that affect how costs and benefits are distributed among the various stakeholders. Understanding the complex interaction of these factors is key to assessing the trade-offs between human well-being and biodiversity conservation (McShane et al. 2011).

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 previous consultation or information to local populations. While restrictions in the use of resources were put in place affecting individuals and communities with titles to the land, no compensation was granted to those affected (García-Frapolli et al. 2009). This has been a major obstacle in gaining support for conservation among affected populations in GEF-supported PAs. Similarly in Cuc Phuong, another GEF-supported PA that was visited in Vietnam, the pressures placed on the local population have been particularly high. 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).

The distribution of funds among PAs has also affected the levels of compensation to the local population. Again in Mexico, field visits reported multiple donor support to Sian Ka'an, one of best-known reserves in Mexico. Ria Lagartos, on other hand, has attracted much less funding from other sources despite the fact that it had a much higher population than Sian Ka'an and faced more complex social problems (Box 3).

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).When dealing with local populations, field visits to different parts of the same PAs 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. As an illustration, the community organization in Buhoma, situated near a visitor center in Bwindi Impenetrable Park in Uganda, benefited from more options for sources of income from associated tourist activities, and accordingly generated sufficient revenue to build schools and provide scholarships. In contrast, another visited community organization that was at a distance from visitor centers in Bwindi earned income only from basket-weaving, using non-timber resources from the PA that they 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, with significantly less income and no capital to invest in other sources of income.

Similar observations were made in Kibale, also in Uganda, and in Ba Be in Vietnam. In Uganda, where 20% 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; other parishes farther away receive nothing, despite also being stakeholders who have traditionally used resources in the PA. The BMCT Fund that 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.

Interviews with local people in Ba Be report that the communities living inside the PA, which provide homestays, food, transportation services and artisanal goods for tourists, have more income opportunities compared to communities living outside. 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. Villages within the PA on the other hand, while also having to comply with this requirement, 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, Vietnam most of the small-scale illegal logging that is still going on and the collection of high-value species such as orchids and snakes appears to be carried out by those living outside the PA.

Even within areas where community benefits are evident, field visits showed that the extent to which different groups have benefited from the same intervention varied. Individuals who had a higher economic status and educational level tended to be in a better position to take advantage of 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 farmers' communities were highly affected by the constraints placed by the PA, as their livelihoods are dependent on natural resources. Salt mine operators, owners of tourist operations and summer vacation home owners, on the other hand, are not under such constraints as they have access to information and political contacts that they use to their advantage (Brenner et al. 2012; Fraga 2006).

The same was observed in Ba Be, where community members that had more formal education and English language skills were reported to have more homestay visitors than others in the village. While successful homestay 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 et al. (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 management programs such as controlled access to PA resources.

In Sian Ka'an, Mexico, a fairly small local population has allowed progress on developing more equitable opportunities for livelihoods. This was achieved by concurrently focusing on strengthening community

institutions and coordinating with government agencies. But even in Sian Ka'an, differences are beginning to emerge, as a small group of families have captured key community institutions that are increasingly allowing them to broker external assistance (Box 3). In the Monarca Butterfly Reserve, while PA management has been highly successful in reducing large-scale illegal logging, smaller scale logging (Figure 17) and encroachment of cattle into the reserve continues, indicating that there are adjacent communities that have not benefited from livelihood opportunities that emerged around the reserve.

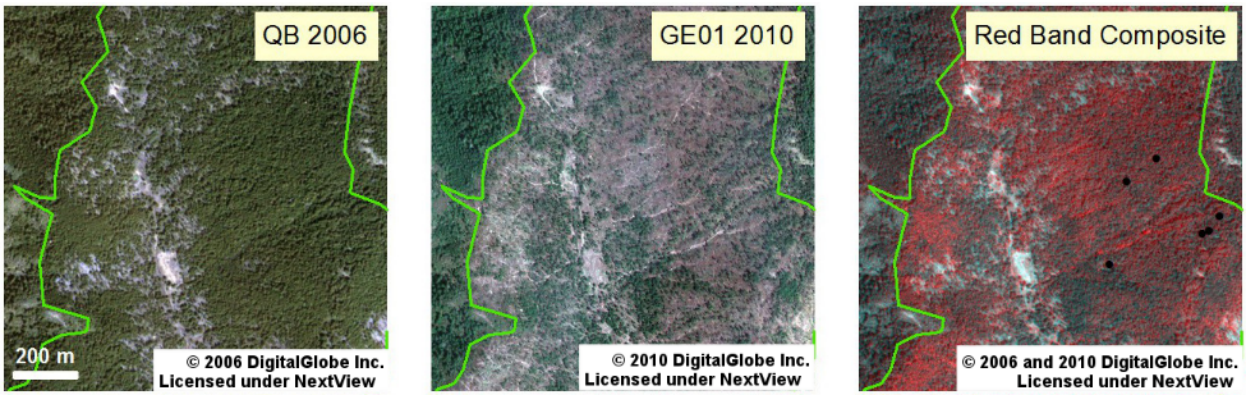

Figure 16 Example of tree loss due to clearcutting operations in Monarch Butterfly Biosphere Reserve (MBBR)

Note: Change highlighted in a red band composite image (RGB red set to QB 2006 red band, and RGB blue and green set to GE01 2010 red band). Final 2006-2010 change polygon in green. Also note that a more detailed analysis might exclude blocks in the center that do not appear significantly degraded. However, given the massive extent of surrounding clearcutting, these blocks might still be considered affected. Lomas d'Aparicio colony sites that occurred prior to the clearcut operations are shown as black dots in right panel.

In Namibia, many communities have come to appreciate the benefits that are to be gained from the sustainable use of wildlife. Yet, there are some major differences in income and spending on community benefits even between neighboring conservancies. Moreover, human-wildlife conflict is emerging as a potentially serious problem, particularly 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, but has the potential to increase if people do not perceive sufficient benefit (WWF 1908).

Box 3 Different Beginnings, Different Outcomes

Different Beginnings, Different Outcomes

The contrast between Sian Ka'an and Ria Lagartos in Mexico illustrate how different local histories have resulted in conditions leading to different biodiversity outcomes. Both PAs are located in the Yucatan Peninsula and had people living in portions of the PA when they were first declared protected. Sian Ka'an was first declared protected in 1986 and Ria Lagartos in 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 (Fraga 2004, Brenner 2012). In both cases, the PA 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 reserve--such as salt mine owners, tourist operators and summer home owners--initially saw the reserve as curtailing their private livelihood or profit objectives.

Both PAs were included in the GEF project SINAP I in 1995, and before that received support from the UNDP-GEF SGP, as well as from government agencies and other NGOs. Over 30 years after the creation of these PAs, in Sian Ka'an, local communities and the PA staff have found an acceptable working arrangement that meets both local livelihood goals 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. There are several important differences between these two PAs that account for these conditions. Sian Ka'n has an area of 528,147.66 ha, most of it owned by the federal government. It has a total of 1500 persons living within the reserve, most of them fishers living in Punta Allen. Ria Lagartos, on the other hand, has a much smaller area of 60,347.82 ha, of which more than half are owned by private interests, ejidos, and communities. Ria Lagartos also has a much larger population of 7000 that lives in four towns and has a more diversified economy that includes salt mining, cattle-raising, tourism, fishing and agriculture.

Because of its large size and its importance in the country, Sian Ka'an attracted considerable attention from the federal government and national and international NGOs. The UNDP-GEF SGP also 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 help ensure a sustanable use of the area's natural resouces. Ria Lagartos, on the other hand, has faced a more complex situation with a more diverse population spread in different parts of the reserve. With only a small portion of the population involved with fishing, most people in Ria Lagartos depend on activities that have higher potential for environmental degradation, such as cattle-raising, agriculture and salt mining. The wider array of economic activities, coupled with a more diverse ethnic composition, also make for a more complex set of interests affecting biodiversity resouces in Ria Lagartos. Also, despite the more complex senario, 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 that the GEF-supported SINAP I project concluded, Fraga (2004) reported that most persons living in the reserve perceived the PA administration as distant, and they objected to the restrictions on cattle-raising and salt mining, which they viewed as an infringement on their livelihoods. Up to now, most local people continue to see the reserve as an imposition that curtails their livelihood opportunities (Doyan 2008). This has contributed to the ongoing encroachment of cattle herds into the core area of the reserve, resulting in loss of forest cover of 2.4 % from 2000 to 2012, which was corroborated by high-resolution remote sensing analysis carried out for this evaluation (Figures 3 and 18).

But in Sian Ka'an challenges remain. First, the development programs carried out in the region have disproportionately benefited the "duenos" -- a group of approximately 40 families that are members of the first fishers cooperative established in the area in the mid-1980s. While the expanding opportunities in the tourism sector are also generating employment and benefits to other families, this group of families has increasingly captured local institutions that act as brokers with government and other external funders, and is increasingly perceived as a local elite. This is a condition that is rekindling the conflicts that the local population faced in the past groups (Brenner 2012). The second challenge is that external remain a threat. From 2000 to 2012, Sian Ka'an lost 1.1% of its forest cover, mostly in the coastal zones, due to expansion of summer homes and construction of infrastructure (Besaury 2003). With the expansion of the Cancun-Tulum tourist corridor, the reserve is coming under more pressure to expand the tourist industry at scales much bigger than those now managed by community groups.

Figure 17 Map of the Ria Lagartos Biological Reserve, Mexico outlined in red.

Note: Commercial satellite 40 & 50 com data were used to identify and map roads, cleared areas, animal pens and area of development.

7. Governance

Legal Frameworks for Protection and Co-management

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

As outlined in the previous chapter, key to both 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 7 PAs, in only 3 of which GEF played an important role. For example, parts of Ría Lagartos were declared a Natural Protected Area and a Sanctuary; Sian Ka'an was declared a Biosphere Reserve and a UNESCO World Heritage Site; the Caprivi Game Reserve was expanded and declared Bwabwata National Park; and Bwindi and Kibale were converted from forest reserves to stricter national parks under the Uganda Wildlife Authority. In Mount Kenya, GEF contributed to this type of change by orchestrating the first meeting of all the relevant agencies, and supported the 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 non-supported PAs where CSOs and government support for co-management were the main contributors to change.

The GEF-funded Wildlife Conservation Lease Demonstration Project (2008-2012) in Nairobi National Park is credited with influencing the devolvement of responsibilities for wildlife to local people in Kenya's new 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 passed since have cemented the role of communities as key players in the management of PAs in Kenya.

The role of legislation in increasing community participation is shown to be particularly important in non-GEF PAs such as Aberdare in Kenya and Itwara in Uganda. Although CSOs and bilateral donors also implemented key interventions that contributed 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 for communities to directly participate. This could only occur where the national government came to recognize the role of communities living adjacent to or inside PAs. In some cases, changes to the legal framework came first, followed by increased community participation, was the case in PAs in Mexico, where previous to the mid-1990s, many PAs were declared with little or no consultation with the local populations (Brenner and Job 2012). In other cases, legislation was enacted after years of gradually increasing community participation, as in the case of PAs in Kenya.

Support at Higher Scales

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 PA level are part of a larger system-wide intervention. At least 21% of PA-related projects analyzed for OPS5 (n=186) reported activities linking individual PAs to the PA system. A review of the portfolio of projects involving non-marine PAs that started implementation in or prior to 2008 showed that GEF has provided support to PA systems or sub-systems in 57 countries. The possible effect of GEF support on PA systems was tested separately by comparing non-GEF PAs located in countries that received system-level support from GEF, and non-GEF PAs found in countries that did not receive GEF support at this scale. The percent forest cover loss was marginally lower in non-GEF PAs within countries receiving PA system support, compared to non-GEF PAs in countries where GEF only supported individual PAs[40]. The results of this analysis suggest that the effect of GEF support to the PA system level is not clearly discernible. Although GEF support at the system level affects the management effectiveness of all PAs in the country, such as through policies and regulations, whether or not this support leads to reduced forest cover loss is difficult to establish.

Out of the seven countries visited, four had GEF projects intended to directly support the country's PA system (Uganda, Namibia, Colombia and Mexico). Countries that received PA system support were also found to be the most functional[41]. Of the three countries that did not receive system-wide support from GEF, Kenya[42] was found to have a functional PA system, while Indonesia and Vietnam[43] had less robust PA

[40]These differences are marginal but statistically significant (n=7108, mean=1.42% for PAs in countries with system support; n=2730, mean=1.55% for PAs in countries without system support; p-value < 0.05).

[41] The evaluation team through a workshop has defined a "functional PA management system" to have the following characteristics: a) sufficient resources (human, financial, etc.) to meet its management objectives, b) staff with requisite skills and expertise to carry out management functions (including timely planning), c) operational management information system that generates knowledge used for adaptive management, and d) ability to be resilient against catastrophes and shocks (e.g. market forces, climate change). Uganda has two PA systems administered by two separate ministries; one was considered functional, while the other was less robust. This is distinct from how GEF defines a "sustainable PA system" as one that: a) 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; b) has sufficient and predictable financial resources available, including external funding, to support PA management costs; and c) retains adequate individual and institutional capacity to manage PAs such that they achieve their conservation objectives.

[42] While Kenya received some GEF support for its Eastern Montane Forest Protected Area Network and Coastal Forest Protected Area System during GEF-4, it did not receive support for its entire PA system that included national parks. However, it benefited from the tourism-focused "Protected Areas and Wildlife Services" (PAWS) Project implemented by the World Bank at the system level prior to the entry of GEF support in the country. A similar intervention was designed and implemented by the World Bank for Uganda's wildlife PA system, the two-phase "Protected Areas Management and Sustainable Use" (PAMSU) Project, with GEF support this time giving it a greater conservation focus.

systems. All functional PA systems and none of the less robust ones were reported in field interviews as generally having good enforcement of laws.

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

Table 17 Types of GEF interventions at the level of the PA system

AREAS OF GEF CONTRIBUTION	UGANDA (UWA)	NAMIBIA	MEXICO	COLOMBIA
Policy Development	X	X	X	no
-Technical support	*no*	X	X	*no*
-Consultations/ meetings	*no*	X	X	*no*
-Research	X	X	*no*	*no*
Financial & HR Systems	X	X	X	no
Establishment of new PAs / Improved representativeness of ecosystems	X	X	X	X
New Management Approaches	X	X	X	X
Sustainable Financing Mechanisms	X	no	X	X
New Administrative Bodies	X	X	X	no
Monitoring System (Biological Outcomes & Management Effectiveness)	no	X	X	X
Vehicles/ Equipment/ Infrastructure	X	X	X	no
Community Participation/ Benefits	X	X	X	no

Policy development

During the mid-1990s when the restructured GEF stepped up its grant activities, many countries were in the process of developing national biodiversity strategies and conducting the necessary reforms to ratify the Convention on Biological Diversity adopted in 1992 in Rio de Janeiro. During this time, GEF supported most countries reporting to the Convention through enabling activities. However, the extent and ways that GEF provided support differed from country to country. Four out of the seven visited countries credited GEF support for significantly contributing to an adequate legal framework for conservation. GEF support to policy development processes included technical support in the crafting of 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 system in Namibia and Uganda.

In Latin America, the GEF financed a regional workshop to discuss and identify approaches and conservation priorities, thus helping many of the region's countries define policies and administrative

[43] 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.

arrangements for PAs. In the case of Mexico, GEF support to a national workshop involving academia, CSOs and government was important to identify conservation priorities in the country (Carabias et al. 2003; de la Maza 2005). In Namibia, the GEF projects "Strengthening the Protected Area Network" (SPAN) implemented by UNDP and "Integrated Community-Based Ecosystem Management" (ICEMA) implemented by the World Bank Group funded technical assistance to develop new policies, which permitted multiple use zones, outlined guidance on working with neighboring communities, and rationalized PA management. 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. In countries that did not have PA system-level support, 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.

In Namibia, Mexico, and to some extent in Uganda, GEF support was reported to also have 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. This was particularly relevant in Namibia, where GEF's policy support was driven directly by government demand. Thus the role of GEF support was to help make these benefit-sharing arrangements more concrete and favorable towards communities adjacent to PAs, and to enable the implementation of these arrangements on the ground.

The GEF-funded projects SPAN, ICEMA and NAMPLACE in Namibia supported the evolution of co-management between the PAs and neighboring conservancies in the Mudumu North Complex and Mudumu landscape, which was then adopted by national legislation throughout the PA system. In Uganda, GEF helped promote a system of revenue-sharing of user fees with adjacent communities in national parks, as well as the development of a national framework for co-managed community conservation areas in important wetland areas, which as of 2014 were not considered part of the national PA system. In Mexico, the model of biodiversity conservation ("the Mexican Model") since the 1970s has been to allow people to live in PAs. Sarukhan et al. (2009) reported that 25% of the PAs in the country are located in lands inhabited by indigenous people; Halffter (2009) also reports that there are 3359 agrarian settlements situated in PAs across the country. Yet many of these 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 incorporate people in PA management (World Bank 2003; World Bank 2010). It 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.

Management capacities and approaches

> *In 4 of the 7 countries visited the sustainable financing mechanisms and more streamlined financial systems established with support from 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 system-wide. Financial sustainability remains a critical concern.*

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

In Uganda, GEF support was also credited for 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 (MET) 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 the German Development Bank (KfW) and the NGO Integrated Rural Development and Nature Conservation helped promote this decentralization. The SPAN project was also reported to have helped persuade Namibia's Ministry of Finance to increase the over-all budget of the MET, in part by providing an economic valuation of the PAs and their wildlife. PA system support from GEF in Namibia, Uganda and Mexico also came in the form of vehicles, staff buildings and equipment. Management effectiveness monitoring systems were established with GEF support playing a significant role in Namibia and Colombia.

In Namibia, Colombia and Uganda, GEF support contributed to the establishment of new PAs or re-establishment of PA boundaries, with the intent of having better ecosystem representation within the PA system. Innovative management approaches supported by GEF at the PA level mainstreamed biodiversity conservation at the scale of the landscape, and have been further mainstreamed throughout the PA system. Among these approaches are the translocation of wildlife in Namibia, conservation mosaics in Colombia, payment for ecosystem services in Mexico, and corridors and community resource management arrangements in Mexico, Namibia, with initial efforts being made in Uganda, Kenya and Vietnam. In Namibia, GEF supported a system to grant concessions to communities in conservancies, which introduced sustainable use of fauna and natural resources, and which helped develop a stake among the local population in favor of 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.

Financial sustainability of national PA systems became an explicit and distinct priority area for GEF's biodiversity support starting in GEF-4.[44] Three of the seven visited countries credited GEF support to some extent for establishing a sustainable or adequate source of funding for PAs. GEF supported the establishment and strengthening of trust funds in Mexico and Colombia, while indirectly, GEF support helped put in place a cross-subsidization system as well as the creation of a reserve fund from tourism revenues in Uganda as sustainable financing mechanisms. This was particularly important in Mexico, as this led in 2008 to the eventual incorporation of PA management costs into the regular government budget, although gaps in PA system funding still remain (Creel et al. 2012). In Colombia, GEF supported initial establishment of the fund, and through subsequent projects provided additional financing for the

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

sustainable use of biodiversity through conservation mosaics that also covered indigenous people's territories. The World Bank reported that by project end in 2015, the project had financed the protection of 2,638,018 ha of core conservation areas (108% of the revised target value) and 1,444,246 ha or 51% of the surrounding territories. Landscape-oriented planning was strengthened in 10 conservation mosaics, and ecological connectivity had been improved in 8. The project also reported having supported 22 indigenous and Afro-Colombian associations (World Bank 2015).

In Uganda, while governance issues resulted in the reserve fund not remaining within the system, cross-subsidization and sound financial management that GEF support helped put in place continues to allow the PA system to be run almost entirely on revenues. USAID is now supporting a more efficient electronic fee collection system in selected PAs to further increase revenues. The National Forest Authority (NFA), on the other hand, received system-level support from the European Union. One output of the project was a Forest Conservation Master Plan, which intended to achieve financial sustainability through revenue from timber production in plantations. Stakeholders interviewed reported that the NFA has a long history of corruption at high levels, similar to other forest management agencies in other countries, which led to the plantations being grossly mismanaged. The EU project was discontinued; the EU is now investing mainly in strengthening the private sector for the expansion of tree plantations. Currently, the NFA 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 in different incidents. Even in those countries that have suitable financing plans, these will eventually be inadequate as new proclamations increase the size of the country's PA estate, and thus also the associated management costs.

Contributing contextual factors

> *In the visited countries, large-scale political drivers were found to provide opportunities for environmental reform that then created robust PA systems. Factors found to be key to operating functional PA systems were positive stakeholder attitudes towards the environment, an adequate national government budget allocation or, in the absence of these, champions for the PA system and a stable financial mechanism.*

Key contextual factors that were 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 Namibia and Kenya, 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 (Rio Earth Summit), where GEF also saw its beginnings, was cited as creating a shift in countries' policies towards biodiversity conservation and community participation. This event was linked to the creation of national laws aligned with these themes. Thus by the mid 1990's when GEF financing picked up, many countries were seeking to strengthen their institutional and administrative capacities to better address environmental issues to meet their commitments to global conventions they had just signed to.

Another important factor reported in several countries is the increasing pressure on governments in the late 1980s and the early 1990s from academia, CSOs and the public opinion to address concerns over the destruction of natural resources. In most countries visited, as was the case in many other developing countries, while some PAs had been established since the late 19th century, these were only on paper, national monuments that had cultural or esthetic value or functioned 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, critical to this taking place was the engagement of academia and CSOs both from within and outside of the administrative apparatus of the state, especially the support provided by national and international NGOs such as WWF and TNC (de la Maza 1999,

Using QCA, factors that were found necessary for the operations of functional PA systems in the visited countries were transparency of financial flows and management, transparency of decision-making procedures, and clear mandates among institutions (i.e., no overlaps). All functional PA systems were reported to have these; however, these factors were not sufficient to ensure functionality of PA systems. In four of the five robust PA systems, positive societal attitudes towards 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.

All above factors being present, the analysis showed that in the countries visited, champions for the PA system needed to be present to ensure adequate financing through the national government budget. Otherwise, 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, such as those that GEF helped to initiate in Mexico, Colombia, and to some extent in Uganda. Namibia has also created a sustainable financing mechanism by directly apportioning 25% of PA revenues towards a Game Products Trust Fund that funds equipment and infrastructure proposals of individual PAs within the system. The remaining portion of the PA revenues goes to the central government, which allocates a budget to each park from the national treasury. However, GEF had no direct contribution in establishing this financing mechanism. 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.

Clarity and Coordination of Mandates

PA systems were found to function less coherently in three countries where the PA systems were managed by different government entities. Overlapping mandates and administrative jurisdictions within PAs further add to poor conservation practices resulting from often 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 management of the PA system being under one agency or ministry with strong mandate and enforcement capacity emerged as a key feature of the effective management of the PA system, such as in Colombia, Kenya, Mexico and Namibia. PA systems that were managed by different government ministries or agencies were reported to function less smoothly. 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, such as in Indonesia, Uganda and Vietnam, often

lacked funding for monitoring and enforcement activities, as local revenue typically was not sufficient and tended to be reallocated towards 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 of the PHKA/BKSDA. The result is that local governments can permit the reduction in natural habitats in the landscape outside the PA system, with resulting increased 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 for elephant in Aceh indicates that the 80% of the habitat lies outside of the protected areas. Government budget to conservation has increased over the years from approximately $US 72 million in 2008 to $US 130 million in 2012[45]. Much of this budget goes towards maintaining and expanding the infrastructure and apparatus of the government system, as well as demands from significant other priorities, notably fire control. However, the budget for ground level operations is low which results in constraints on protection and enforcement activities. International NGOs and donors correctly fill gaps at site level, but the scale of the PA system and the threats to it means that the system over-all remains significantly under-resourced.

Conservation organizations work under memoranda of understanding with government agencies, but remain largely outside the 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 the 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 – estimates put the amount currently allocated to the system at about a quarter of the global average (Government of Indonesia 2008). Financing this gap will always be a major challenge – demands on the government budget will always result in sub-optimal allocations to conservation, and there is little motivation from the Ministry of Finance for Indonesia to borrow from International Financial Institutions for biodiversity conservation when more economically attractive priorities exist in other sectors.

In Vietnam, multiple management jurisdictions, planning and budgeting processes affecting PAs are a major factor hindering 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 (MARD). The rest are managed by the provinces. The Ministry of Natural Resources and Environment (MNRE) provides guidelines and technical assistance related to PAs. The Ministry of Tourism has also a role in the identification and declaration of National Parks with cultural value. PAs managed by provincial governments are financed through central funds provided to provinces, which are then distributed by the Provincial Peoples Committee on the basis of provincial needs and priorities. But biodiversity conservation is rarely a high priority to local governments, thus allocations to PAs tend to be low. PAs managed by MARD are generally better-funded but management priorities are generally focused on forest protection and fire prevention, not on biodiversity conservation. Lastly, MONRE, the strongest institutional stakeholder in PAs, has the least voice and incidence on what happens in PAs.

One of MONRE's roles is to collect information and report on the state of PAs in the country, but has no direct access to PAs. It has to depend on the good will of provincial governments and MARD to be able to

45

access information. A lessons-learned study finance by the GEF project "Creating Protected Areas for Resource Conservation (PARC 2003) 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 to use the funds. Insufficient and extemporaneous funding was reported by a PA official in Ba Be as an important factor that impacted park management, as it was impossible for the current rangers to properly patrol the PA to prevent extraction of wildlife. GEF support to Vietnam for PAs and adjacent landscapes started in 1992, as in the case of most visited countries, and has consisted of 15 projects amounting to US$ 48 million. Nevertheless, 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 PARC had little effect on the over-all national PA system, as the coordination of PAs in MNRE has remained small with a weak mandate, and no capacities to interact with PAs.

The terminal evaluation reported that the multiple institutions responsible for PA management in Vietnam has resulted in a lack of clarity on roles and responsibilities on 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 individuals to perform effectively, and these result in adverse values, integrity and attitudes among PA staff

Having wildlife and forests managed as separate components by two ministries with different objectives makes it difficult to effectively manage a single PA system that is naturally composed of integrated ecosystems. In this, Uganda has a unique situation; in other countries, both wildlife and forestry management are typically under the mandate of the country's Ministry of Environment, if not under the same department[46], which allows better coordination and conflict resolution between the two sectors.

While both the Uganda Wildlife Authority (UWA) and National Forest Authority (NFA) have objectives of conservation and sustainable resource use, both are also compelled to earn revenue to support their operations—UWA through wildlife tourism, being under the Ministry of Tourism, Wildlife and Antiquities, and NFA through timber, under the Ministry of Water and Environment. As such, the incentive for conservation is greater for UWA, since wildlife tourism is profitable only if numbers of wildlife are high; NFA's business model, on the other hand, provides greater incentive for extraction rather 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, however, are important for the country's development and need equal attention despite differences in their current capacities to generate revenue.

No formal mechanism enables UWA and NFA to coordinate their mandates and activities on the ground, where they often overlap in the same or adjacent geographical areas. Local governments and community

[46] For example, the Kenya Wildlife Service (KWS) and Kenya Forestry Service (KFS) are currently in the process of merging, with the KFS to become a department under the KWS. Both are under the Ministry of Environment, which resolved previous conflicts on jurisdiction by assigning responsibility to one of these agencies in cases of overlapping or adjacent management areas. In Indonesia, wildlife and forests are also managed by different directorates, but both are under the Ministry of Forestry. Also, all national PAs are managed by the directorate for forestry.

members have to deal with two different authorities that each have their own processes and regulations to be followed. This inevitably results in double the operational costs (in terms of time and money) for everyone involved.

In addition, the national government's push towards mining and oil exploration in PAs risks undermining long-term conservation efforts, unless conservation priorities in PAs are enforced, and subsequent actions align with these priorities. Agricultural programs incompatible with sustainable use around PAs will also likely compromise achievements if the different 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.

Local Pressures, Large-scale Drivers

Despite the progress made as a result of GEF contributions to management and governance, high demand for wildlife products, extractive industries, infrastructure development, and lack of livelihood options for growing local populations continue to threaten biodiversity.

As indicated above, important advances have been made in the establishment of legal and institutional frameworks for PAs and PA systems. Also, there are many examples of effective engagement of local populations in biodiversity conservation, particularly when conservation initiatives take into account and respond to the livelihood needs of local populations. Nevertheless, regional or even global-scale drivers continue to affect biodiversity in PAs and their surrounding landscapes.

As a country's population continues to expand, 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 of land conversion in several PAs in Mexico In Ba Be National Park 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. Thus there are many examples in which eventually, the need for resources may 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 some poorly directed tourism and recreation activities, continue to be amongst key threats to biodiversity in some of the PAs. In Namibia, for instance, tourism and recreation raise special concern since these activities are concentrated in some of Namibia's most ecologically-sensitive areas. The development of tourism in the peninsula of Yucatan has provided alternative sources of income to local communities living in and around PAs. Nevertheless, its unchecked expansion is resulting in growing land encroachments of summer homes in PAs in the area.

In recent years, illegal activities of organized crime have resulted in an upsurge in poaching despite improvements in law enforcement and legal frameworks supported by GEF interventions. This was seen recently in the elephant populations in Bwabwata in Namibia and Kibale in Uganda, for example. Among the countries visited, local demand for illicit wildlife trade is particularly high in Vietnam and Indonesia (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 that PA management staff have to adapt to.

Drug trafficking has also been an important 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, and is affecting PAs in this region, including in the Mesoamerican Biodiversity Corridor which is an area consider of high globally important biodiversity, and has been the target of GEF grants totaling over US$ 50 million over the last 10 years (IEG 2011a). Thus, over the last 10 years, the spike of drug trafficking through this region has coincided with high rates of deforestation in areas that are considered to be drug trafficking nodes. But the money laundering effects are having much bigger and long-lasting effects through the capitalization of illegal loggers, palm oil producers, and land speculators who are converting to agriculture large tracts of land in the region (McSweeney et al. 2014).Recently the World Wildlife Society has 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". Also, trafficking networks often hire local people to help poachers with food, accommodation, information, and to act as guides (Robinson 2015).

These demonstrate how economic drivers such as high market demand, price shocks in wildlife trade or lack of food security, for example, 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 mechanism to coordinate activities in PAs. Two PAs in which this support did help to coordinate across ministries are the Sierra de Manatlan and the Mesoamerican Biological Corridor project. In Sierra de Manantlan, 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 to reach agreement on priority areas, coordinate enforcement of regulations and public investments in the region, and helped tap public funds to address the priorities identified with the local organizations (Graff 2002). The Mesoamerican Biological Corridor project in Mexico (MBC) also reports having formed advisory groups at the state level that facilitated the interagency coordination mechanism with the participation of state and regional representatives from key ministries, state and local governments, as well as CSOs, including indigenous groups. The Implementation Completion report indicated that through regular meetings, the MBC office has helped at least 40% of investment in public programs to coordinate their impacts on biodiversity within the project area (World Bank 2010). Nonetheless, despite these outstanding accomplishments in Mexico, the fiscal concerns caused by drops in the price of petroleum and the current economic slowdown have resulted in budget cuts across the board. Budget cuts in CONANP are risking major setbacks to the achievements as the national PA system still needs strengthening. Also, recent press reports indicate that the replacement of directors in key PAs with less experienced professionals is also threatening the integrity of PAs in light of expanding pressures from mining, tourism and infrastructure.

Since the pilot phase starting in 1991, GEF 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 is seen in the shift in priorities from the establishment of individual PAs during the pilot phase, towards the focus on corridors and landscape approaches, and now towards interventions targeting very specific drivers through the integrated approach pilots in GEF-6. However,

these challenges remain, requiring a concerted effort beyond the traditional environmental sectors and stakeholders.

8. GEF's Catalytic Role

The previous chapters demonstrate how GEF support has contributed to reducing environmental threats and improving management effectiveness, which in turn contribute to positive biodiversity outcomes. However, to achieve global environmental benefits as specified in its mandate, GEF is expected to catalyze transformational change in the ways and systems by 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 that were identified in OPS5. These set of processes are used in this section as a guide to assess how GEF support has contributed to broader changes observed in non-marine PAs and PA systems.

Sustaining: Interventions originally supported by GEF continue to be implemented by stakeholders without GEF support to demonstrate the benefits and provide benefits for adoption by other stakeholders beyond the original project scope.

Mainstreaming: Information, lessons, or specific results of GEF are incorporated into broader stakeholder mandates and initiatives such as laws, policies, regulations, and programs. This may occur through governments and/or through 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 towards impact at project end

> *Analysis of 191 completed projects in the GEF portfolio indicate that 95 % of these projects reported some broader adoption or impact in the form of threat reduction or on improvement of biodiversity in protected areas. Nonetheless the type, extent and speed of changes 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 non-marine PAs shows that 68% of GEF-supported projects report 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 towards larger-scale impact is being made.

As part of OPS5, terminal evaluations of 191 projects with objectives related to non-marine PAs were analyzed for the extent of progress made towards impact. As shown in Table 18, 45% reported both some type of broader adoption and environmental impact taking place by project end. In 34% 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. Despite this, in 20% of projects, some environmental impact was reported. In 5% of projects, neither broader adoption nor any environmental impact was reported.

Table 18 Occurrence of Broader Adoption and Environmental Impact in GEF Non-marine PA Projects

Extent of Broader Adoption	Projects Reporting No Environmental Impact		Projects Reporting Environmental Impact		Total	
	Count	Percentage	Count	Percentage	Count	Percentage
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 taking place	9	5%	4	2%	**13**	**7%**
Total	**62**	**32%**	**129**	**68%**	**191**	**100 %**

The ECA region had the greatest proportion of projects achieving progress towards impact (60%), but the least number of non-marine PA projects reviewed (35 projects). LAC and Africa had 45% of projects in each region achieving progress towards impact, while Asia had the least proportion of projects achieving the same at 24%.

Table 19 Regional Distribution of Broader Adoption and Environmental Impact

	AFR	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%

Note: Percent of each region. Out of 191 projects, 42 (22% of the total) were implemented in the African region; 46 (24%) in Asia; 35 (18%) in ECA; and 61 (32%) in LAC. Seven projects (4%) were global in scope.

Focusing on mainstreaming, replication, scaling-up and market change processes across the OPS5 portfolio, the analysis of 191 non-marine PA projects found that management frameworks and approaches, initially supported by the GEF, were the most commonly mainstreamed initiatives (70%). This

included such interventions as establishment of community-based PA management, and preparation and/or implementation of PA management plans. Adoption of laws, policies and regulations pertinent to PAs was also frequently reported (69%).

PA financial mechanisms that were introduced through GEF support, such as user fees, revolving funds and public-private partnerships, were also reported to have been mainstreamed in 46% of projects. Likewise, 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% 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% of projects, and financial mechanisms in 11% of projects. Scaling-up was the least commonly reported process (maximum of 11% for any type of intervention). This is not a surprising result given that the data was collected either at the end of the project or a few years after the project ended. This process generally requires longer time periods to take effect and needs high-level policy change by the government or large-scale adoption by the public or private sector to succeed.

Factors Affecting Progress towards Impact

Factors affecting the extent of progress toward impact were broadly classified into two types: project-related and contextual. The three most commonly reported factors for each category out of a total of 33 are presented in Table 20. Government support for project initiatives was the contextual factor cited most frequently, in 61% of the projects, as the factor that positively contributes to progress towards impact. The project-related contributing factor that emerged the most was good engagement with stakeholders (59%). Compared to the full OPS5 portfolio, more non-marine PA projects cited good engagement of key stakeholders, coordination with other initiatives, and government support as being present and contributing to progress towards impact. The number of non-marine PA projects citing other sources of support from stakeholders as contributing to progress, and unfavorable economic conditions or drivers hindering it was lower compared to the full OPS5 portfolio. Poor project design, cited as a hindering factor in 30% 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% of projects in this analysis did not support any activities that would initiate broader adoption processes or allow the outcomes to move forward.

Table 20 Factors Most Commonly Cited in Terminal Evaluations as Affecting Progress towards Impact

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

	sector) (67 or 35%)	conditions/drivers/events (37 or 19%)

Note: n= 191, numbers in brackets represent the number and the percentage of projects reporting that factor in terminal evaluations

Further analysis of these factors using QCA showed that for 88% of projects in the entire OPS5 portfolio where some or most broader adoption processes were underway 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% of such projects had either the combination of broader adoption processes initiated by the project and the existence of previous or current non-GEF initiatives that were related to project objectives or, in the absence of these two factors, the combination of strong government support and good engagement of stakeholders, as long as project design was not poor. Conversely, a separate analysis showed that in 89% of projects where broader adoption had not begun or been planned for by project end, there was a combination of four hindering factors: no broader adoption processes had been built into the 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. 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 interventions most commonly sustained or mainstreamed were management approaches, community participation in PA management, and community livelihoods.

Table 21 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

Generally, in the PAs visited, a combination of civil society, government and GEF support have contributed to the mainstreaming of community participation in PA management. Civil society organizations that include 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 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.

Private Forest Owners Associations organized through the GEF-supported "Conservation of Biodiversity in the Albertine Rift Forests of Uganda" (CBARF) project that piloted a corridor approach to conservation were further engaged in the testing of a payment for ecosystem services (PES) 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. In Vietnam's Ba Be National Park, some of the alternative livelihood models introduced by GEF have been sustained by some households 10 years after the completion of the "Creating Protected Areas for Resource Conservation in Vietnam Using a Landscape Ecology Approach" project. This project promoted new economic activities with awareness-raising campaigns and pilot demonstration projects, including a homestay ecotourism program, and sustainable bee production and animal husbandry. A key role played by the government was the development of infrastructure, including roads, electricity, and schools, and credit provision to local communities, which eased tourist access to these areas, and provided financial resources to community members.

In Nairobi NP in Kenya, the GEF Wildlife Conservation Lease 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, and are now being replicated in neighboring Tanzania, through a project led by the UN-FAO and Tanzania's International Livestock Research Institute. In Mexico, GEF supported the piloting of capacity-building approaches, monitoring and reporting systems, financial management of PAs, training materials and advisory councils, which were subsequently replicated across the PA system.

The piloting of a conservation fund in Africa through the Bwindi-Mgahinga Conservation Trust (BMCT) project in Uganda has led to Tanzania, Kenya and Malawi creating similar funds, some also with GEF support. There is also a discussion currently on creating a similar fund at the national level based on lessons learned from the BMCT experience, as well as from other funds worldwide. 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 GEF-supported COBWEB project in Uganda demonstrated the use of Community Conservation Areas in wetlands, and as of 2014 was planned to be further scaled up by the Wetlands Department at the national level through another project. 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 (see Box 4).

Box 4 Broader Adoption of Management Approaches through GEF and Other Stakeholder Support

Broader Adoption of Management Approaches through GEF and Other Stakeholder Support

All three of the visited GEF-supported PAs in Namibia (Mudumu, Etosha, and Bwabwata) have adopted changes in management approaches, which 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. 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 the 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, although initial efforts to develop a larger landscape conservation approach by linking two PAs (Etosha and Skeleton Coast NP) by the Kunene People's Park failed, the current deputy director is implementing a landscape conservation and shared management approach through tourism concessions with neighboring conservancies. There are efforts to replicate these landscape and co-management approaches in the Zambezi region, which aim to connect the Mudumu North and South Complexes with four other landscape conservation areas.

Various contextual factors have contributed to the broader adoption of management approaches. There was a gradual shift in government policy, from excluding people from PAs, towards 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 at the time 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, provided 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 a co-management approach to conservation. The conservancies provide an institutional mechanism for formal cooperation and co-management, for example, 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 also facilitates the existence of "core conservation areas" with a higher degree of protection.

Key Characteristics of GEF's catalytic support

> *While sharing similarities with the types of support provided by governments and other donors, GEF support was found to be more effective when it gave particular attention to the 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 the visited PAs and countries, many of the GEF-supported interventions were found to be similar to what other funders were supporting. Having a broader development mandate, governments, and bilateral and multilateral donors most often invested in large infrastructure investments (e.g., roads in Vietnam, Indonesia and Uganda; irrigation works in Mexico), and basic social service programs that improved the well-being of communities (nutritional and health programs in Mexico; schools and access to food and water in Namibia, Uganda and Kenya). However, as mentioned in other sections, 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 towards 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 resources management, both outside and inside the PA.

GEF support was often seen to complement 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 co-financed by much larger investments from governments, and bilateral and multilateral donors towards more tangible outcomes such as infrastructure and equipment that supported biodiversity-related projects. In all visited countries, GEF support was seen in contributing most effectively in strengthening the political will of both national and local governments to support conservation through PAs. This was seen to have taken place through support to policy development, and through the leveraging of government funds towards conservation projects where they might have not 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 in the government.

This complemented international pressure that was found to be a key driver in national government policymaking, particularly in Indonesia where international NGOs implement many biodiversity-related interventions. International NGOs, such as World Wildlife Fund, Wildlife Conservation Society, and The Nature Conservancy were influential in all visited countries, both in policy development and the piloting

of management approaches. Country CSOs were especially influential in Namibia, Uganda and Mexico. In the case of CSOs, which typically implement smaller projects relative to bilateral 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. 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 different stakeholders.

More important, GEF support was said to have delivered interventions in a way that allowed greater adaptability to changing circumstances, and 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 22 Key characteristics of GEF support by country

ELEMENTS OF GEF SUPPORT TO NON-MARINE PAs	UGANDA	NAMIBIA	MEXICO	COLOMBIA	KENYA	INDONESIA	VIETNAM
Long-term engagement	X	X	X	X	no	no	no
Financial sustainability	X	X	X	X	no	no	no
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 (Uganda, Namibia, Mexico, Colombia), GEF was found to have invested in a series of linked projects covering a period that ranged from 10 to nearly 25 years. These projects tended to target PA systems, although in some cases, specific PAs received some of this support continuously over the entire period. In other cases, specific PAs received interventions over a long time period both through support to the PA system and through projects, often medium-sized, that targeted only the specific PA. Both were most apparent in Namibia, Uganda and Mexico. Some of these investments were designed to be multi-phased from the beginning, while 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 the 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 mainstream GEF-supported interventions into their regular budgets. This was seen especially in Namibia, Uganda and Mexico, where GEF support to strengthening financial and human resource systems resulted in the creation of robust PA systems.

Table 23 Examples of long-term GEF investment in visited countries through phased or complementary projects

COUNTRY	EXAMPLES OF LONG-TERM GEF-SUPPORTED PROJECTS (GEF ID)	PROJECT PERIOD
UGANDA	• Institutional Capacity Building for Protected Areas Management	• 1998-2003

	and Sustainable Use (ICB-PAMSU) (101) • Protected Areas Management and Sustainable Use (PAMSU) (1830)	• 2002-2010
NAMIBIA	• Integrated Ecosystem Management in Namibia through the National Conservancy Network (ICEMA) (1590) • Strengthening the Protected Area Network (SPAN) (2492) • Namibia Protected Landscape Conservation Areas Initiative (NAMPLACE) (3737) • Strengthening the Capacity of the Protected Area System to Address New Management Challenges (4729)	• 2004-2011 • 2006-2012 • 2010-present • 2013-present
MEXICO	• Protected Areas Program (62) • Integrated Ecosystem Management in 3 Priority Ecoregions (839) • Consolidation of the Protected Areas Program (SINAP II) (in four tranches: 877, 2078, 2654, 2655)	• 1993-1997 • 2001-2010 • 2002-2010
COLOMBIA	• Colombian National Protected Areas Conservation Trust Fund (2551) • Colombian National Protected Areas Conservation Trust Fund – Additional Financing for the Sustainability of the Macizo Regional Protected Area System (SIRAPM) (3886)	• 2006-2011 • 2011-present

The World Bank-implemented ICB-PAMSU and PAMSU projects in Uganda were originally planned 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 be split into two projects, with the implementation of the larger project contingent upon the 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 equitable benefits and appropriate equipment for patrols, thus boosting staff morale and capacity to carry out PA protection. Learning from what worked in ICB-PAMSU, the subsequent PAMSU project then focused on revenue generation to ensure financial sustainability for the PA system, as well as increasing wildlife populations and addressing community concerns. To build capacities in financial management, the project was designed not to fund any recurrent costs but invest instead 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 (UWA), one of the institutions that 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, GEF has provided support to the National System of Natural Protected Areas (SINAP) for nearly 25 years. The pre-cursor to the four-phase SINAP II project (now called SINAP I) was originally intended 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 US$ 3.9 million dollars out of US$ 17.8 million by the original project end date in 1995. Project accomplishments were also mixed, but the government of Mexico requested an extension; after difficult negotiations, an agreement was reached between the government and Mexico, the World Bank, and the GEF Secretariat on a four-month extension and an independent analysis to be conducted for improving implementation and justifying the extension. The independent analysis recommended a restructured project that included the establishment of an endowment that provided a long-term source

of funding flexible enough to hire high quality staff, and make timely disbursements to carry out operations in 10 PAs. It also provided the funds to prepare and carry out workshops and exchanges among PAs to transfer the knowledge and systems tested in the 10 PAs financed by the GEF. Over time, this model of learning-by-doing and exchange of knowledge led to the strengthening of Mexico's National Commission on Natural Protected Areas (CONANP), an 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, GEF provided a second grant to consolidate the National System of Protected Natural Areas by extending the number of PAs financed under the endowment to a total of 23 PAs. SINAP II was approved in 2003 for a total of 31 million dollars to be disbursed in four tranches. Now in its fourth tranche, SINAP II has provided long-term continuity that helped develop a robust national PA system and a robust CONANP. In 2008, when the Mexican Government decided to bring all CONANP staff under the government budget, endowment funds previously dedicated to the support of the 23 PAs were made available 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, NAMPLACE and SPAN were three PA system-level projects that were 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 were reported to have reduced conflict with adjacent communities, as well as 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. Indonesia did not receive any long-term support from GEF for its PA system or any of its non-marine PAs; however, it has benefited from GEF's long-term investment in its marine PA system and adjacent coastal areas.

While disbursing very small amounts compared to typical GEF projects, the UNDP-implemented Small Grants Programme (SGP) is one way that GEF has made long-term investments at the local level. A series of SGP projects within the same area in Uganda allowed partner NGOs to test collaborative management approaches with communities and eventually advocate for their inclusion in national legislation. Community organizations in Bwindi and Kibale national parks credited SGP's continuous technical assistance beyond the implementation of their respective small grants for helping build their 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, 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 other areas that may have greater need 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 has greatly strengthened capacities in these PAs, others that have not attracted any funders tend to become progressively marginalized over the years. Also, an interview with a bilateral donor in the same country 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 projects immediately following these, even though these were related.

Financial sustainability

Complementing GEF's long-term investments is its support for building the ability of countries and PAs to continue the interventions and outcomes that GEF has supported, independently and beyond project lifetimes. As this is one of the strategic priorities for the biodiversity focal area, GEF has supported various approaches to financial sustainability depending on the conditions and priorities of the countries. This evaluation has 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, Uganda, Namibia), as well as market-based instruments such as establishment of concessions and user fee collection (Namibia) and payment for ecosystem services (Colombia and Mexico).[47] 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 allows the implementation of interventions through a phased approach in which new projects adapt to the results of prior projects, and which provides the continuity necessary for achieving impacts that take longer to emerge. In addition, access to financial and technical resources helps to raise the profile and credibility of biodiversity-related interventions, which has in part resulted in greater and more stable financing from the national governments. In Colombia, budget allocations to the national PA system went from US$ 13M USD in 2006 to US$ 32M USD 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 by 20 times. The impact of GEF support in Mexico was such that the World Bank Implementation Completion Report of SINAP I indicated 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)[48].

The existence of a sustainable financing mechanism also attracts other support, such as from bilateral donors, private companies, and academic and research institutions, who provide counterpart funds and technical assistance to PAs. As a result of GEF providing a grant of US $4 million as capital investment for the Bwindi-Mgahinga Conservation Trust (BMCT) Fund in Uganda, USAID also provided a supplemental US $880,700 grant for the first two years, while the Royal Netherlands government gave US $2.7 million over

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

[48] CONANP is the National Commission of Natural Protected Areas wish has the authority to administer the National Protected Natural Areas System. During this evaluation Julia Carabias Minister of the Environment at the time of the Creation of CONANP and Javier de la Maza the first Commissioner of CONANP and Ernesto Enkerlin and Luis Tello subsequent Commissioners of CONANP, communicated very similar messages regarding the importance of GEF support for the National System of Natural Protected Areas (SINANP) and CONANP in separate interviews with the evaluation team.

five years (World Bank 2001). Many donors do not create endowment funds themselves for many reasons, two of them being that these funds 1) do not have a concrete, specific and immediate impact that donors can report back to their boards as a "return on investment", and 2) 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 setting up of BMCT's institutional framework, and for the implementation of the first round of community projects consisting of schools and other needed infrastructure. From community members burning forests in the national parks out of anger in 1993, 58% of them had taken favorable views of the PAs by 2007, increasing to 78% by 2011 (Ikirezi et al. 2011). Since then, BMCT has attracted more than US $2.5 million from NGOs, private companies, and other donors for projects (BMCT, unpublished). The original US $4 million in 1995 has grown to almost US $7 million as of March 2014; the US$ 180,000 to 300,000 that the endowment generates annually in interest ensures that the BMCT structure has enough funds to operate, which increases donor confidence that their money will be used towards project implementation. The consistent presence of the BMCT also allows it to provide the necessary follow-up support to livelihood beneficiaries beyond the typical project cycle. In Mariposa Monarca in Mexico, the Monarca Fund supported in part by GEF's SINAP projects attracted new co-financing and partnerships among international NGOs, national and state governments, and private investors.

In Kenya, Indonesia and Vietnam, GEF support has taken place at the PA level only; no support was provided at the PA system level. As previously indicated, in Kenya 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 started implementation in 1996. Thus, GEF biodiversity financing was focused on specific PAs. The focus of the projects reviewed were 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 rather than ensuring the financial sustainability of their respective PA systems.

Only in 2014 did Indonesia start receiving GEF support towards financial sustainability, specifically for one of its PA sub-systems. In Vietnam, GEF supported the establishment of a US $9 million conservation fund in 2009 for 50 special use forests; while this fund leveraged cofinancing of US $5.1 million from the Netherlands and US $1.6 million from the national government, this was designed as a sinking fund that could be accessed on a competitive basis (World Bank 2004). 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 Uganda, Colombia and Mexico, this fund was not able to attract additional funding. Financing for the management of the PA also declined at project closure, as the park could not compete with other pressing needs on 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, as 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 focuses on specific households or groups of producers. In Mexico and Vietnam, the SGP has played an important role in supporting CSO 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 to improve their access to certified markets. In Mexico, SGP has also developed a system of readiness and response to hurricanes that covers a vast network of vulnerable communities across the Yucatán peninsula. Over time, the federal government adopted this system and extended it to three other states in southern Mexico.

As mentioned earlier, GEF-supported interventions may be delivered through different projects to target specific needs, often at different scales and scope. Given the vast array of conditions that exist among GEF partner countries, this has required the adoption of a very flexible approach to project planning and implementation that responds to the conditions and needs of specific countries and PAs. One of the way GEF addresses needs at different scales and through different channels is by having different funding modalities, primarily full-size, medium-size and small grants. In all visited countries, GEF has supported the strengthening of capacities in PAs, and in some cases, PA systems though full-size projects, while simultaneously addressing concerns of local communities though SGP or medium-size projects. While full-size projects typically include components that support the interactions between PA staff and local communities, in some cases, small grant components are embedded in full-size projects.

The broad unifying framework of GEF support coupled with the different support modalities allows GEF to support different types of approaches through different stakeholders, rather than any single approach, to suit the context. For example, GEF support combines payment for ecosystem services (PES) with PA management through conservation mosaics or biological corridors in Colombia, Uganda and Vietnam. Much of what GEF supported was innovative for the specific context. Governments typically find these innovative approaches too risky or "soft" to invest in, preferring instead to direct limited funds towards more tangible, and more basic infrastructure and services, as mentioned above. When innovative approaches are demonstrated to be successful, governments are then 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. Twelve of the 17 visited GEF-supported PAs said GEF also contributed towards leveraging other external support, and/ or forging effective relations with local governments. Four out of 7 of the visited countries cited that GEF also contributed to some extent towards increasing or improving CSO and private sector collaboration with the government at the national level, while other 3 countries it was reported that no such contributions had taken place. In the visited PAs, this was accomplished mainly through process-oriented activities such as consultations, planning sessions, and exchange workshops, which were credited for facilitating interactions that sped up the adoption of innovative management approaches. In Colombia, GEF-supported interventions are 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, Mexico, Kenya, Uganda and Vietnam it explicitly included ethnic minorities. Approaches were also introduced to facilitate exchange of information and dispute resolution among the various stakeholders resulting in collaborative engagements that have significantly reduced pressures to biodiversity in Mount Kenya, and Sierra de Manantlan, Sian Ka'an and Mariposa Monarca in Mexico. In Lambusango and Aketajawe-Lolobata in Indonesia, GEF supported the establishment of multi-stakeholder forums that fostered dialogue among adjacent communities, PA management staff, local governments, and NGOs, among others. This helped raise environmental awareness and increased vigilance among community members against illegal logging activities.

In Ba Be and subsequently in other special use forests, GEF supported collaborative law enforcement between village police and army patrols (MARD 2013). In Namibia, the translocation of game from PAs into conservancies, supported by the ICEMA Project, was an important catalyst for the emergence of lasting collaboration in the Mudumu North Complex (MNC). Conservancies started working together to monitor the introduced game as they moved between conservancies. Then conservancy game guards and MET rangers also started working together to monitor the re-introduced wildlife. The SPAN project supported the holding of meetings, food and fuel for some of the initial monitoring patrols, and some technical support to the MNC activities. This was an important role as it enabled the cooperation to develop; as mutual trust developed, cooperation on other activities increased. Twelve of the 17 visited GEF-supported PAs said GEF also contributed towards leveraging other external support, and/ or forging effective relations with local governments. Four out of 7 of the visited countries cited that GEF also contributed to some extent towards increasing or improving CSO and private sector collaboration with the government at the national level, while other 3 countries it was reported that no such contributions had taken place.

The UNDP-GEF SGP has been another means for GEF support to help bring stakeholders together, especially community organizations and NGOS, sometimes linking community activities with national-level initiatives (GEF EO/ UNDP EO 2008; GEF IEO/ UNDP IEO 2015). GEF has also provided bottom-up support to community groups frequently living in or around the same PAs supported through its full-size and medium-size projects. While the levels of coordination between SGP country programs and other GEF projects vary, SGP has by and large been a very effective mechanism to reach community groups under the same over-all framework that seeks to promote conservation and sustainable use, but which 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 both governments and other donors tend to shy away from these types of interventions. This makes GEF support of such activities particularly critical. Efforts by other donors, such as international NGOs, to replicate landscape management approaches in Khaudum in Namibia and Lake Nakuru in Kenya, for example, failed to take off due to lack of sustained funding to facilitate meetings among different stakeholders in these socially complex PAs.

Large co-financing requirements was another important tool by which GEF projects catalyzed collaboration between different stakeholders. In all cases, co-financing around a GEF project has helped to coordinate investments and support to PAs, and has helped reduce redundancies with existing initiatives of governments and other funders, such as bilateral donors, CSOs, or the private sector. For example, in Uganda, funds intended towards 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. Financial sustainability initiatives supported by GEF in Uganda, Colombia and Mexico over the long term 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 that the effects of GEF support are regulated with other factors, such as the structure of the PA systems and the extent of political will in the countries.

In addition, linking multiple stakeholders and interventions across time has allowed GEF to provide opportunities for persons to continue working on similar interventions in different capacities, such as with government or with other donors. This enabled the development of synergistic relationships between different GEF projects, as well as with other existing interventions. For example, in Namibia, the same government staff often took on similar positions in projects supported by GEF and the German Development Bank (KfW), the other large funder of environmental projects in the country; two national-scale GEF projects shared the same policy advisor. 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 them to provide technical assistance that took into account unique country and PA dynamics.

This continuity of persons linking time periods, interventions and government agencies facilitated the communication and application of knowledge across these boundaries, while preventing duplication of support in the case of parallel projects. These persons were not necessarily “champions” in the charismatic sense; in many cases, these were simply several individuals in various key decision-making or implementation positions who were committed to pushing the conservation agenda forward over the long term, and whose combined efforts ensured that interventions were effective at each step of the causal chain. As shown by the QCA results, the presence of champions is important in the development of functional PA systems, especially to advocate for adequate government financing. In Namibia, Uganda and Mexico, continuity of persons was most prominent when projects directly involved government staff who took on the role of champions. Having worked within the government, these individuals already had in-depth knowledge of critical governance issues at both PA and PA system levels, a strong sense of vison and commitment to resolving these over the long term, and who then moved across the system in different capacities to implement or design related projects. In Mexico and Namibia, 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 key individuals that were highly credible and could push the conservation agenda forward.

Unlike bilateral donors and CSOs, as the official financial mechanism of the Convention on Biodiversity, GEF mostly executes its larger projects through government agencies, normally to fund planned or existing national initiatives. This has helped build capacities within the agencies, and increased ownership and likelihood of sustainability. In Namibia, GEF channeled its support to the Ministry of Environment and Tourism (MET) at a time when other donors provided support through NGOs. This helped to re-establish MET leadership in aspects related to community-based natural resource movement, and provided

important resources and capacities that helped MET to support conservancies. Bilateral donors, such as USAID in Colombia, Uganda, Namibia, Mexico and Kenya, and GIZ (German Corporation for International Cooperation) in Kenya and Vietnam, typically provided funds and support through CSOs or consulting firms that comprised project management teams, with a new one created for each project. As indicated earlier, direct support to governments from bilateral donors and development banks was more commonly directed towards infrastructure, equipment, and other improvements similar to those provided by national government support

Only in the cases of Indonesia and Vietnam was GEF support implemented mainly through NGOs or a project management unit dedicated to the GEF project. Similar to those in other countries, PA-level interventions were also intended as pilots to be adopted more broadly at a national scale. In these cases, however, GEF did not provide long-term support directly to government agencies or give sufficient attention to financial sustainability; thus, links among stakeholders tended to become weaker once the projects ended. In these two countries, forest management is shared by the local governments, which tend to prioritize budgets for basic services and infrastructure over biodiversity conservation, while management of national PAs are decentralized to the provincial offices of national PA agencies. Poor engagement with local government officials, and the 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 also contributed to this outcome.[49] 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 also found to be critical to the broader adoption of the local outcomes and lessons of GEF support.

[49] 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.

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 the PAs.

Over the past several decades, approaches to biodiversity protection have become more comprehensive and directed to drivers of biodiversity loss. Yet, the loss of biodiversity continues at an alarming rate. Assessing the state of biodiversity is a complex undertaking as, by definition, biodiversity encompasses all life on Earth. Despite the existing gaps in our knowledge on biodiversity, recent studies on changes in species abundance, population trends and the risk of extinctions all show significant declines. The available estimates on the global species extinction rates indicate that the present extinction rate is in the range of 100 to 10,000 times higher than the natural rate of extinction. 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 at slowing the rate of biodiversity loss. Increasingly, PAs are becoming the places of last refuge for many species, especially for charismatic megafauna, while also provisioning ecosystems 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 under-resourced, and recent large expansion in PAs globally risks widening current financial shortfalls. Mainstreaming biodiversity and its funding into development planning through the national policy and decision-making frameworks is crucial. Equally as important is that PAs are 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 the pilot phase starting in 1991, 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 by focusing not only on key factors affecting PA management, but also on large-scale governance issues and root causes of biodiversity loss. This is seen in the shift in priorities from the establishment of individual PAs during the pilot phase, towards the sustainability of PA systems and networks, and mainstreaming of biodiversity in productive landscapes and production sectors starting in

GEF-4, and now towards interventions targeting very specific drivers through the integrated approach pilots in GEF-6.

Conclusion 2: GEF support is contributing to biodiversity conservation by helping to lower habitat loss in PAs as indicated by less forest cover loss in GEF-supported PAs compared to PAs not supported by 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 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[50]. GEF has helped protect at least 2,785,350 km^2 of the world's non-marine ecosystems. Of the 1,292 GEF-supported PAs identified by the evaluation, 58% have been classified as Key Biodiversity Areas (KBAs), currently the highest scientific standard used to assess global biodiversity significance. Thirty-one percent of the PAs, while not classified as KBAs, have received one or more international designations for high biodiversity and/ or cultural value[51]. The evaluation faced significant challenges to assess the impact of this support provided by GEF due to data gaps in the GEF information systems, and in existing biodiversity and geospatial global databases. Nevertheless, by adopting mixed methods that used multiple datasets 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 the findings that forest cover loss in GEF-supported PAs is lower than in PAs not supported by 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 country-wide aggregate, and at least two times less than PAs that were not supported by GEF in the same biomes and countries. Choosing a country where highly reliable data on GEF support was available, analyses show that GEF-supported PAs in Mexico avoided up to 23% 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 high-resolution SPOT satellite data in the Mesoamerican Corridor in Mexico also indicate that two GEF-supported *ejidos* had less forest loss and more forest gain when compared with two *ejidos* that did not get support[52]. Another analysis carried out on 88 cases of species in 39 GEF-supported PAs, where conservation of these species was linked with project objectives, shows that 45% of these cases had a positive trend in wildlife abundance, 39% presented no change, and 16% showed negative trends. In PAs where conservation of a particular species was not strongly linked with the 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 to 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, where in six, clear links were established between these reductions and GEF

[50] Adjusted for inflation at 2015 values

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

[52] An *ejido* is an area of land owned and worked by a group of small farmers in accordance with the Agrarian Reform Law.

support. The evaluation also carried out an assessment of environmental impacts of 191 completed projects included in OPS 5. This study found that at project end, 68% had reported positive environmental impacts. While none of these findings alone present conclusive evidence, when taken as a whole they indicate that GEF support is making important contributions to biodiversity conservation.

Conclusion 3: GEF support has helped to 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 Management Effectiveness Tracking Tool (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 regulations, and resource inventory. The least improvements over time were 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 in 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 GEF has supported to a significant extent in the majority of PAs. In the case of the 17 visited PAs, in 11, GEF support was assessed as having contributed to the development of key factors such 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 seen in the form of expanded PA staff skills, upgraded equipment and infrastructure, stable funding for PA operations, and monitoring & reporting systems for both management and biodiversity targets. Resources from GEF, national and local governments, NGOs and bilateral donors in combination played a key role in strengthening these capacities. The evaluation found that key to the effective operations of PAs is a consistent source of funding. 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. Yet financial sustainability of PAs remains a critical concern. Only in a few of the visited PAs did governments increase official PA budgets. GEF was reported to have a moderate or high contribution towards securing adequate funding for PA operations in 9 of the 17 PAs (53%), where 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, fire prevention and law enforcement. In many cases, PA management activities have produced social and economic benefits, which have helped improve community attitudes towards the PA, and their willingness to cooperate with PA staff. Sixteen out of 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. Generally, in the PAs visited, a combination of civil society, government and GEF support have contributed to the mainstreaming of community participation in PA management. Governments had an important role by enacting legislation or regulations, and allocating budgets to PAs for community engagement. Two other prominent factors were the shift in community perspectives regarding the role of PAs in providing resources and

opportunities for improved well-being, and the shift in governmental and 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 to reduce biodiversity degradation.

As previously mentioned, GEF strategies have become more comprehensive in addressing biodiversity concerns beyond individual PAs through its mainstreaming interventions, and through the current integrated approach pilots. One of the earliest ways that GEF support has dealt with systemic challenges to governance at the PA level is by helping strengthen the country's PA system. As of 2008, GEF has invested in the PA systems or sub-systems 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, GEF was credited for having contributed to policymaking 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 GEF in three of the countries 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 system-wide.

In many cases, interventions implemented at PA level are part of a larger system-wide intervention. An analysis of 191 completed projects[53] indicates that 95% 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 changes 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 the 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 in the legal framework for communities to access or manage land and resources were often found to coincide with increased community participation, even in non-supported PAs. 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. GEF support in Nairobi National Park is credited

[53] These projects were part of the cohort analyzed for OPS5, and consisted of those with terminal evaluations submitted between 2005 and 2012.

with influencing the devolvement of responsibilities for wildlife to local people in Kenya's new Wildlife Act of 2013, while a series of GEF-funded projects in Namibia funded technical assistance to develop new policies, which permitted 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.

In all visited countries, GEF support 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 higher likelihood of interventions being sustained or scaled up, such as through longer-term projects implemented directly by government staff. This was seen especially in Namibia, Uganda and Mexico, where this type of support allowed the development of PA systems that continue to remain functional beyond GEF support. Longer-term projects enabled the testing and scaling-up of innovative management approaches that other funders, especially governments, found too risky to invest in. One notable type of intervention that most funders have shied away from are sustainable financing mechanisms, especially in the form of trust funds. In addition, GEF invests in promoting the adoption of multiple innovative approaches that have been introduced by different stakeholders, rather than any single approach.

GEF funding was also found to give greater attention to creating links between different scales and among different stakeholders that otherwise would not interact over a longer period of time. This was accomplished mainly through process-oriented activities that would yield benefits in the long term such as training, consultations and planning processes, and exchange workshops, which were credited for facilitating dialogues that sped up the adoption of innovative management approaches. As mentioned earlier, GEF support often linked PA-level interventions with higher-scale initiatives, facilitating the exchange of lessons across the system. While CSOs and bilateral donors also supported similar interventions directed towards building capacities and promoting dialogue, typically shorter project durations coupled with less flexible project implementation arrangements often meant that these activities did not continue beyond the project, especially when this type of support was not implemented directly by government staff. Furthermore, GEF co-financing requirements often served to attract investments by other funders towards more tangible outcomes such as infrastructure and equipment in biodiversity-related projects, which complement GEF projects that focused more on process-oriented activities. In general, co-financing requirements by GEF projects also helped catalyze collaboration between different stakeholders, which helped coordinate GEF spending with the funding of governments and other donors.

However, in cases where 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 was seen 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, GEF is also unable to deliver interventions in this manner.

Opportunities and Recommendations for achieving greater impact

In addition to having identified areas of strength of 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, we focus on presenting the opportunities to address such challenges, and some specific actions that could be initially taken. In some cases GEF is already moving in the directions recommended; in these cases, the evaluation seeks to shed light on aspects that GEF needs to be particularly attentive to as it moves forward. All areas were found to be critical for developing better ways to address the challenges driving biodiversity degradation, and to assess the extent to which GEF is supporting approaches that create global environmental benefits.

1. Ensuring that GEF support targets areas rich in global biodiversity

As indicated earlier, the great majority of PAs financed by GEF have international designations indicating global biodiversity value. The GEF 6 Programing Document also indicates that GEF will adopt a more systematic and rigorous approach to selecting areas for investment through the use of KBA criteria. Nonetheless, other considerations are also important. Climate change, PA downgrading, downsizing, and degazettement (PADD), and the inadequacy of existing PA networks in representing species richness have made PAs highly dynamic. PAs therefore cannot be assumed to have permanent boundaries, or to have boundaries that always coincide with biodiversity values.

Recommendation 1: GEF must continue to pursue better ways to ensure that its support is targeted towards globally significant sites with high biodiversity values, and extends to more of these sites. As it has consistently demonstrated, GEF must also continue to adopt the most rigorous scientific criteria in selecting areas for investment, integrating new criteria as more appropriate ones are developed. Going forward, 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. KBA, species richness, climate change vulnerability), and that allow for more systematic and rigorous analysis for allocating investments in areas that are important for global environmental benefits.

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

Through its work in the visited PAs, 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 towards greater interaction and increased social and economic benefits accruing to impacted communities within and adjacent to these PAs. Such benefits have increased without overwhelming the core focus of GEF

towards 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 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, and in some instances have been linked to the reduced overexploitation of PA resources. While socioeconomic benefits have been generated for some sectors of the local population, in many cases there has been an unequal distribution of benefits 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: At the project level, during design and implementation, GEF needs to have mechanisms to ensure that future projects reach full compliance with the GEF Social Safeguards. GEF needs to expand benefit-sharing across a wider cross-section of the impacted local populations, giving more attention to approaches that better mitigate the unequal distribution of costs and benefits of PA management interventions, with the aim of reducing local pressures on biodiversity stemming from adverse local socioeconomic conditions.

3. Investing in broader governance issues to address large-scale drivers

Despite the progress made as a result of GEF contributions to management and governance, development pressures, expansion of illicit activities 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 large strides made in improving law enforcement capacities, governance frameworks, and global environmental awareness. Apart from these, 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, in many cases also act as large-scale pressures with the similar effect of reversing or limiting the positive impacts of such 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 was seen particularly in the visited countries where PA systems were managed by different government units, and at different scales of governance, such as in Uganda, Indonesia and Vietnam. In other instances, lack of appropriate interagency coordination prevents the mitigation of large-scale, transnational drivers, such as those involving illicit activities.

GEF support was found to have contributed the least in helping to coordinate mandates such as those between national and local governments, and between biodiversity conservation-oriented and resource exploitation-oriented government units. However, in at least two instances (Sierra de Manantlan 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 priorities and economic development priorities. Similarly, much of the accomplishments in recent years in curbing illicit logging in Mariposa Monarca are related to effective interagency coordination. While GEF's role was not central in this latter case, it does illustrate the importance of interagency coordination in reducing such pressures. As indicated earlier, the case of Mexico also illustrates that risks to sustainability can emerge even after a long line of accomplishments. But this case also presents an opportunity for a GEF dialogue with the Mexican government to help overcome the challenges faced and to prevent setbacks to Mexico's important achievements in conservation. Intersectoral coordination is also 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: 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 – PA, landscape, PA system, national ministries -- that tend to have conflicting development priorities and management objectives with regards to biodiversity conservation. At the minimum, these would be stakeholders undertaking activities that involve environmental protection, natural resource use (e.g. water, land, energy), economic development, and infrastructure development.

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

Collecting, storing and analysing 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 Management Effectiveness Tracking Tool (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 saying that they use 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 2440 METTs submitted between 2004 and 2014, approximately 20% 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% of the 1924 PAs that had submitted METTs could be analyzed for this purpose, as the rest of the PAs completed a METT only once during the course of the GEF project.

On the other hand, many of the documents submitted at project approval or completion, including terminal evaluations, did not provide the basic information on which PAs were supported by the project,

through which types of interventions, and over which time periods. As mentioned in the methodology chapter, this made the task of assessing impact more difficult, as the evaluation could not always identify the specific areas that 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 really work for stakeholders at operating at other scales (Soberon and Peterson 2015).

GEF has the opportunity to strengthen its monitoring system and its databases in the Secretariat to improve the information on results of GEF support to biodiversity conservation and sustainable use. Changes over the last 10 to 15 years open up opportunities to address some of 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 assessment of outcomes, GEF now has the opportunity to streamline monitoring requirements placed on projects by identifying a few key indicators that are useful for global analyses, and 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 who are already compiling information relevant to 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, GEF would ensure access to more reliable field information (such as species population, biodiversity richness, or 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 monitoring burden to projects would allow financing partnership with country institutions.

Recommendation 4: 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, GEF also 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 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 that, when combined, 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) is available historically and into the future.
- 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 datasets and geospatial data to perform meaningful analyses on management effectiveness and biodiversity impacts at a 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 capacities in monitoring parameters that they find useful for improving biodiversity conservation management within their specific context, while still providing key information that can be compared and analyzed at a global level.
- Establish long-term partnerships for biodiversity and socioeconomic monitoring with country institutions that already have this 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. Focus initially on countries with the largest biodiversity 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.

5. 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, GEF is in a privileged position to draw from this extensive experience to improve its approaches to PA and PA systems support. One important lesson derived from this evaluation is that GEF has enabled country adaptability to changing contexts, and contributed to broader policy and institutional changes in support of biodiversity conservation through PAs when its support takes place over a long period of time, when it gives attention to financial sustainability, when it supports processes linking approaches, stakeholders and scales, and when all of these take place in the context of direct support to government agencies. But knowledge gaps on key areas of GEF support to PAs remain in several key areas affecting biodiversity conservation in PAs and adjacent landscapes, and in which a better understanding would increase the impact of GEF.

Recommendation 5: The GEF partners, including the Independent Evaluation Office, the Secretariat, STAP, 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 GEF has extensive experience over time, and in which better knowledge would significantly enhance the support that GEF provides to countries. These are:

- 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.

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Annexes

Annex 1 – METT Questions

Category	Notes
1 Legal status *(Context)*	0= The protected area is not gazetted 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
7 Management plan (*Planning*)	0 = There is no management plan 1 = Management plan is not being implemented 2 = Management plans 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 = Exists but few of the activities are implemented 2 = Exists and many activities are implemented 3 = 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 programme
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 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 the achievement of major management objectives 1 = Problems with personnel management partially constrain the achievement of major management objectives 2 = Personnel management is adequate to the achievement of major management objectives but could be improved 3 = Personnel management is excellent and aids the achievement major management objectives

Category	Notes
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 the objectives of management 3 = Staff training and skills are aligned with the 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
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
19Maintenance ofequipment (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 programme 1 = There is a limited and ad hoc education and awareness programme 2 = There is an education and awareness programme but it only partly meets needs 3 =There is an appropriate and implemented education and awareness programme
21 State and comm. Neighbors (Process)	0 = There is no contact between managers and neighbouring official 1 = There is contact between managers and neighbouring official but little or no cooperation 2 = There is contact between managers and neighbouring official but only some co-operation 3 = There is regular contact between managers and neighbouring official
22 Indigenous people (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 discussions 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 co-operation between managers and tourism operators to enhance visitor experiences and maintain protected area values 3 = There is good co-operation 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
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	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

Category	Notes
(Output)	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 (Panning/ 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 2- GEF supported protected areas overlapping areas of high biodiversity value

Biodiversity Criteria					Count
None					151
WWF priority areas (G200)					121
CI biodiversity hot spots (BH)					108
Key Biodiversity Areas (KBA)					4
Important Bird Areas (IBA)	KBA				172
Alliance for Zero Extinction site (AZE)	KBA				1
Alliance for Zero Extinction site (AZE)	IBA	KBA			3
WWF priority areas (G200)	KBA				6
WWF priority areas (G200)	IBA	KBA			129
WWF priority areas (G200)	AZE	KBA			3
WWF priority areas (G200)	AZE	KBA	IBA		7
CI biodiversity hot spots (BH)	KBA				7
CI biodiversity hot spots (BH)	IBA	KBA			121
CI biodiversity hot spots (BH)	AZE	KBA			6
CI biodiversity hot spots (BH)	AZE	IBA	KBA		15
CI biodiversity hot spots (BH)	G200				153
CI biodiversity hot spots (BH)	G200	KBA			32
CI biodiversity hot spots (BH)	G200	IBA	KBA		200
CI biodiversity hot spots (BH)	G200	AZE			5
CI biodiversity hot spots (BH)	G200	AZE	KBA		4
CI biodiversity hot spots (BH)	G200	AZE	IBA	KBA	44
Total GEF supported PAs					**1292**

Annex 3 – Forest Area loss (sq. kms) in GEF supported protected areas

S/No.	ISO3	Country	Number of PAs	Forest Area(2000)	Forest Area Loss(2000-2012)	Forest Percent Loss(2000-2012)	Percentage Loss Country
1	ALB	Albania	3.00	101.44	2.43	2.39	4.47
2	ARG	Argentina	5.00	3629.04	262.76	7.24	10.63
3	ARM	Armenia	3.00	405.90	0.44	0.11	0.56
4	AZE	Azerbaijan	2.00	787.69	6.92	0.88	0.53
5	BGD	Bangladesh	1.00	18.35	0.82	4.47	2.69
6	BGR	Bulgaria	1.00	2396.38	34.35	1.43	1.83
7	BLR	Belarus	4.00	953.78	24.37	2.56	4.54
8	BLZ	Belize	10.00	2394.27	37.51	1.57	6.86
9	BOL	Bolivia	15.00	101712.76	1191.92	1.17	4.55
10	BRA	Brazil	28.00	61824.00	419.15	0.68	6.45
11	BTN	Bhutan	2.00	2070.31	10.26	0.50	0.46
12	CAF	Central African Republic	1.00	11923.70	103.17	0.87	0.93
13	CHL	Chile	21.00	13343.02	65.07	0.49	6.10
14	CHN	China	22.00	12270.56	108.20	0.88	3.61
15	CIV	Cì«te d'Ivoire	3.00	5522.57	359.20	6.50	7.54
16	CMR	Cameroon	8.00	16285.81	11.71	0.07	1.30
17	COG	Republic of the Congo	7.00	30130.58	111.82	0.37	1.08
18	COL	Colombia	29.00	32156.40	146.76	0.46	3.04
19	CRI	Costa Rica	24.00	7141.52	42.62	0.60	4.14
20	CUB	Cuba	6.00	1714.85	20.13	1.17	4.05
21	CZE	Czech Republic	6.00	1779.26	135.89	7.64	5.31
22	ECU	Ecuador	10.00	23342.26	123.64	0.53	2.72
23	ETH	Ethiopia	6.00	9119.42	225.14	2.47	1.89
24	GEO	Georgia	4.00	355.70	0.44	0.12	0.27
25	GHA	Ghana	2.00	403.16	8.21	2.04	6.11
26	GIN	Guinea	3.00	598.96	6.16	1.03	2.86
27	GNB	Guinea-Bissau	4.00	1832.43	67.17	3.67	4.26
28	GTM	Guatemala	8.00	11663.91	952.30	8.16	11.39
29	HND	Honduras	11.00	18998.90	1635.27	8.61	6.16
30	HRV	Croatia	7.00	1580.76	13.64	0.86	1.64
31	IDN	Indonesia	15.00	63587.64	1931.12	3.04	9.70
32	IND	India	5.00	1525.64	5.56	0.36	2.09
33	JAM	Jamaica	1.00	221.81	0.75	0.34	4.19
34	JOR	Jordan	1.00	2.58	0.00	0.00	0.18
35	KAZ	Kazakhstan	3.00	1348.42	1.39	0.10	1.16

36	KEN	Kenya	11.00	885.04	12.81	1.45	6.60
37	KGZ	Kyrgyzstan	1.00	57.70	0.04	0.07	0.33
38	KHM	Cambodia	7.00	11800.78	562.94	4.77	13.68
39	LAO	Laos	1.00	1664.64	26.95	1.62	6.10
40	LBR	Liberia	1.00	1557.51	1.67	0.11	4.20
41	LKA	Sri Lanka	13.00	2357.18	8.92	0.38	2.33
42	LTU	Lithuania	4.00	563.91	25.77	4.57	7.86
43	MDG	Madagascar	10.00	8786.47	633.13	7.21	7.44
44	MEX	Mexico	24.00	32231.01	494.47	1.53	4.10
45	MKD	Macedonia	13.00	543.64	11.42	2.10	3.64
46	MOZ	Mozambique	3.00	12241.79	157.59	1.29	5.75
47	MWI	Malawi	1.00	97.68	7.15	7.32	4.82
48	MYS	Malaysia	9.00	9910.25	103.37	1.04	15.96
49	NIC	Nicaragua	24.00	27320.52	2672.77	9.78	10.41
50	NPL	Nepal	6.00	3186.28	12.67	0.40	0.71
51	PAK	Pakistan	1.00	51.33	0.07	0.13	0.93
52	PAN	Panama	17.00	14604.70	245.54	1.68	4.62
53	PER	Peru	15.00	98809.70	332.43	0.34	1.95
54	PHL	Philippines	11.00	4795.60	57.32	1.20	3.30
55	PRY	Paraguay	5.00	2430.60	33.70	1.39	15.00
56	ROU	Romania	7.00	1877.84	106.50	5.67	2.89
57	RUS	Russia	30.00	53121.92	803.94	1.51	4.14
58	RWA	Rwanda	3.00	1511.41	5.81	0.38	2.86
59	SEN	Senegal	1.00	19.76	0.14	0.69	3.52
60	SLE	Sierra Leone	1.00	12.30	0.01	0.09	3.42
61	SLV	El Salvador	6.00	542.53	23.05	4.25	5.46
62	SUR	Suriname	2.00	12114.36	7.82	0.06	0.52
63	SVK	Slovakia	3.00	540.92	18.40	3.40	5.13
64	TUN	Tunisia	1.00	20.16	0.03	0.13	4.00
65	TUR	Turkey	1.00	175.40	0.05	0.03	2.86
66	TZA	Tanzania	12.00	35218.39	427.98	1.22	4.89
67	UGA	Uganda	11.00	7598.42	91.33	1.20	4.34
68	UKR	Ukraine	3.00	836.95	7.22	0.86	4.95
69	VEN	Venezuela	4.00	59869.40	257.59	0.43	2.16
70	VNM	Vietnam	16.00	6115.13	371.10	6.07	6.98
71	ZAF	South Africa	9.00	1936.00	87.29	4.51	14.36
72	ZMB	Zambia	11.00	19185.14	218.01	1.14	3.43
73	ZWE	Zimbabwe	1.00	132.60	7.24	5.46	8.26