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(Prepared by the GEF Evaluation Office)

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1. MAIN FINDINGS AND RECOMMENDATIONS

1.1. Background

1. The GEF portfolio has now matured to a stage at which consideration can be given to the long-term impacts of its projects. The Evaluation Office has included impact evaluations in its planning since June 2005. In the first year of activities, methodological approaches were explored, which led to the first series of studies in the second year. Given the diversity of the work that can and should be done, this will be reported on in an Annual Report on Impact rather than in separate documents per study. Each case study and evaluation will be published separately as an Evaluation Document.

2. Two parallel evaluation approaches were developed and tested. The major effort consisted of a set of related studies of Protected Area projects, using a Theory Based Approach to link outcomes to impact, which included additional data collection and substantial analysis, managed by the Evaluation Office. A key element of this approach is an analysis of conservation targets and threats, which provides a direct measure of project impacts, by assessing both the change in status of the expected global environmental benefits (GEBs) and the change in the level of threats to these GEBs. This approach was used in case studies of three Protected Area projects in East Africa to analyze to what extent threats to the targeted elements of biodiversity had been reduced and with what sustainable impact.

3. The three projects whose impacts were evaluated are:

- Bwindi Impenetrable National Park and Mgahinga Gorilla National Park Conservation Project, Uganda (World Bank)
- Lewa Wildlife Conservancy, Kenya (World Bank)
- Reducing Biodiversity Loss at Cross-Border Sites in East Africa, Regional (Kenya, Tanzania, Uganda), (UNDP).

4. The second impact evaluation approach was a statistical analysis of existing time series data on deforestation and protected areas in Costa Rica. Comparisons were made between protected and unprotected areas over several years to determine differences in the extent of deforestation which occurred between them. Within the protected areas, additional comparisons were also made between GEF-assisted projects and those supported through other sources.

5. A third approach was considered by the Evaluation Office. Discussions were held with UNEP to explore the possible contribution of macro level data available to them, based on satellite imagery and other sources, towards impact evaluation. It was concluded that the available data for the three project areas under study in East Africa were not suitable to incorporate into the evaluation's analysis, partly because of data quality and partly because the possibility of collaboration was introduced too late for an effective result. However, it was agreed that the resources and skills of UNEP could be utilized more effectively in the context of one or more of the next round of Country Program Evaluations. Furthermore, in collaboration with UNEP and STAP, ways and means will be explored to utilize satellite images and

geographical information systems to find linkages between GEF interventions and global environmental trends.

1.2. Main Conclusions

Conclusion 1: There are measurable and recorded improvements to the status of two key threatened species in Bwindi (Mountain Gorillas) and Lewa (Black Rhino)

6. The Bwindi-Mgahinga project has contributed to the stabilization and later increase of a globally significant mountain gorilla population. The Lewa Conservancy project has had substantial impacts on the black rhino population of East Africa; reversing a dramatic historical decline and promoting an increase of the population within its area, to such an extent that it has been able to relocate some rhinos to other sites. Although the habitat of the Grevy's Zebra was substantially protected by the Conservancy, this did not lead to the expected increased population, because the lion population also benefited from the improved habitat and inflicted greater losses on the zebra.

Conclusion 2: Two of the three Protected Area projects have contributed to a sustained reduction in the threats to key conservation targets

7. The achievement of stable gorilla and rhino populations in Bwindi and Lewa respectively are major impacts in view of the substantial decline of these species historically and the well-publicized poaching in neighboring regions. Key factors in this success included protection of the animals and their habitat; improved relations between local communities and the parks; enhanced conservation research capacity (which enabled monitoring of some key aspects) and sustainable financing (particularly for Lewa). Thus, in two of the three projects the conditions were fulfilled to achieve impact.

Conclusion 3: The third Protected Area project has not been able to effectively continue with its threat-reduction mechanisms after GEF support ended.

8. At project conclusion, outcomes had been achieved with regard to enhanced forest management, largely through community-based means and an improved institutional environment for forest protection. However, the impact evaluation showed that the project ended before these mechanisms were sustainable and that, if there had been gains in the state of the forests stipulated for protection, there were no effective mechanisms for sustainability. Furthermore, inadequate project monitoring and evaluation meant that it was impossible to accurately assess achievements at community level or with regard to biodiversity.

Conclusion 4: Impact was achieved in two of the three Protected Area projects because an explicit plan for institutional continuity was built into the project from the start.

9. The approach adopted of evaluating three protected area projects in a limited sub-region was intended to offer some possibility of comparison of results. Contrasts between the projects emerged, suggestive of substantive underlying issues. There was a hierarchy of sustainability of impacts, which corresponded with the strength of the institutions responsible for this process.

The Lewa Conservancy is a private organization, dependent on generating income to support its activities. It therefore has a strong interest in ensuring the continuation and geographical expansion of improvements made with the existence of external funding. As well as managing its own protected area, the Conservancy has made substantial and consistent efforts to work with communities, which can extend the range of protection of habitat and animals. Furthermore, it has a highly professional approach to fund generation, which has benefited from its raised credibility to a broad range of potential external supporters, as a result of GEF support. The Bwindi-Mgahinga Conservation Trust was established as a mechanism to ensure continuing funding for activities to secure the support of local communities for protection of the forests and their animal population; as well as to conduct research, which is an important contribution to monitoring outcomes and impacts of the intervention. The activities of the Trust had variable results. The assistance to the indigenous Batwa population was only partially successful and the funding secured was less than anticipated because of changes in international financial markets. The Cross Border project lacked a clear strategy for institutional and financial sustainability of its activities and benefits and, once project funding ended, these rapidly declined.

Conclusion 5: The Bwindi and Lewa projects have both contributed towards substantial additional benefits through catalytic effects.

10. In the Bwindi-Mgahinga Conservation Trust project, the GEF inputs contributed to a much larger intervention, involving the Government of Uganda, international and national donors and several NGOs. The Lewa Wildlife Conservancy had great success in disseminating the concepts and practices of conservation to neighboring community owned land, enabling and supporting the creation of several community protected areas and game lodges. The culmination of this effort has been the creation of a new Trust to protect a large area of rangeland to the north of Lewa. The GEF intervention, although small, was well-timed and conceived and contributed substantially to the success of the Conservancy and, more particularly, to the replication of its approach to a broad set of neighboring community land areas.

Conclusion 6: The Bwindi project has not yet satisfactorily resolved some negative impacts of the Protected Areas on the indigenous Batwa.

11. An element of the Bwindi-Mgahinga Conservation Trust's work specifically funded by the GEF was the re-orientation of the livelihoods and lifestyle of the Batwa indigenous community. Fieldwork showed that this was only partially successful. The provision of land benefited some Batwa, but the failure to grant them access and controlled use rights for forest products, which they traditionally utilized, meant that these are now obtained illegally. Project efforts to promote income generating opportunities were not supported by training in financial management and have in some cases led to negative social consequences.

Conclusion 7: Even though Costa Rica's protected area policy was not primarily focused on avoiding deforestation within a specified time frame, it achieved a measurable impact on avoided deforestation of about 110,000 hectares between 1960 and 1997. GEF supported protected areas in Costa Rica were between 2% and 7% more effective at achieving avoided deforestation than similar projects funded by other sources.

12. The second impact evaluation approach was a statistical analysis of existing time series data on deforestation and protected areas in Costa Rica. Comparisons were made between protected and unprotected areas over several years to determine differences in the extent of deforestation which occurred between them. Within the protected areas, additional comparisons were also made between GEF-assisted projects and those supported through other sources.

13. This approach concluded that, even though the Government of Costa Rica's protected area policy (supported by the GEF) was not primarily focused on avoiding deforestation within a specified time frame, it did succeed in avoiding about 110,000 hectares of deforestation between 1960 and 1997. This amount of avoided deforestation is supported through detailed counterfactual analysis. Two GEF protected areas, which received funding between 1993 and 1998, resulted in about 19,000 hectares of avoided deforestation up to 1997 and a further 25,000 hectares between 1997 and 2005, even though this was not their explicit objective. GEF-funded protected areas were between 2% and 7% more effective at achieving avoided deforestation than similar projects funded by other sources.

14. The Costa Rica analysis shows that opportunistic analysis of existing data sets can produce a general assessment of GEF's contribution to specific environmental trends at national level. However, more precise results would require the incorporation of evaluation data needs into project design, implementation and monitoring. Such an approach would be time consuming and costly, and require long term consistent management. Although there is increasing attention to monitoring and evaluation and the use of indicators, it is unlikely that this will lead in the near future to sufficiently comprehensive and focused data sets to allow systematic counterfactual analysis.

Conclusion 8: The most cost-effective and realistic approach to impact evaluation for the GEF Evaluation Office is a combination of opportunistic quasi-experimental analysis, using available data, with targeted case studies utilizing a theory-based approach.

15. This report therefore concludes that the most cost-effective and realistic approach to impact evaluation at a scaled-up level is a combination of opportunistic counterfactual analysis, using available data, with targeted case studies utilizing a theory-based approach. This would enable the strengths of one approach to be used to offset the weaknesses of another. Thus the detailed understanding of impacts and ways of achieving them provided by case studies could be supplemented by counterfactual analysis to enable the achievements of individual projects to be placed in the national or sectoral context.

16. Both of these methods as implemented were cost effective. The three project level evaluations required very intensive work, but nevertheless were produced for less (in external costs) than $30,000 each, including workshop expenses. The methodology developed can be widely applied at project level, but will need modification for the evaluation of more programmatic interventions.

1.3. Recommendations

Recommendation 1: Protected Area projects should include a specific plan for institutional continuity, which should be included in the biodiversity tracking tools of the GEF, or through the development of an alternative system, under the direction of the GEF Secretariat.

17. The absence of a specific plan for the institutionalized continuation of the Global Environment Benefits generated by project interventions was found to allow these to reduce over time. This contrasted with the sustained impact and even scaling up through replication or geographic expansion of projects, which had designed and implemented institutional sustainability plans, including financial provision for essential activities.

18. The GEF biodiversity focal area has adopted tracking tools that aim to measure progress towards achieving the portfolio-level outcomes agreed as part of each replenishment period. For Strategic Priority One, Catalyzing Sustainability of Protected Area Systems at National Levels, this report notes that the tracking tool could be improved by adding consideration of institutional continuity, as this factor was identified as crucial to achieving long-term impacts. However, it may also be possible to develop other means of defining and monitoring progress towards institutional sustainability and the Evaluation Office invites the GEF Secretariat to explore with its partners the most effective approach.

Follow-up in Evaluation Office work

19. On the basis of this first set of impact evaluations, the Evaluation Office concludes that a mixed method approach, which includes macro-level statistical analysis and satellite imagery, where these are available, as well as case studies of projects, offers the best prospect for a comprehensive understanding of the impact of GEF-supported activities. It will therefore use this approach in its future impact work, whether this is conducted through stand-alone evaluations or incorporated into other products such as Country or Thematic Evaluations.

2. APPROACH TO IMPACT EVALUATION

20. GEF Council document GEF/ME/C.25/3 of May 6, 2005, "Four Year Work Program and Budget of the Office of Monitoring and Evaluation – FY06-09 and Results in FY05", states that the "Council has requested on several occasions that GEF Office of Monitoring and Evaluation conduct Country Portfolio Reviews and Impact Evaluations, in particular post project completion evaluations. These evaluation modalities are essential elements for an independent Office, as presented in its TORs…" (Par. 20, P5).

21. The OECD's Development Assistance Committee defines impacts as "Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended."1 The objective of impact evaluation is therefore to evaluate the long-term results of GEF interventions, a few years after GEF support is concluded and to assess the sustainability and replication of the results achieved as well as to extract lessons learned. Impact evaluations will also seek to place impacts at the project level within the broader context of the GEF's overall goal of financing the incremental costs of global environmental benefits.

22. Impact evaluations face a set of conceptual and practical difficulties. These revolve around the necessity to be able to demonstrate that changes, which are observed to have occurred, can be attributed in part or in full to the intervention being evaluated. This issue has been addressed through a broad range of evaluation approaches. For many years, evaluators relied on the concept of a "counterfactual" as the baseline against which project impacts could be measured. Alternative approaches developed which questioned the utility of a hypothetically-determined baseline and placed a theoretical and empirical assessment of the cause and effect chain of an intervention as the most accurate means of attributing change.

23. In its Approach Paper to the Impact Evaluations, the GEF Evaluation Office explored the different available approaches in the light of the specifics of the GEF's mission and activities. It concluded that the most viable methodological approach was a theory-based one, but that other methods would also be utilized to enable the development of a comprehensive understanding of how best to evaluate the long term effects of the GEF's interventions.

24. Accordingly, two parallel approaches were developed and tested. The major effort consisted of a set of related studies of Protected Area projects, which included additional data collection and substantial analysis, managed by the Evaluation Office. This is reported in Section Three below. A second study was undertaken by the University of Georgia, utilizing existing data on Costa Rica, reanalyzed to explore the contribution of GEF towards avoided deforestation in that country. This is reported in Section Four below.

25. In addition, discussions were held with UNEP to explore the possible contribution of macro level data, based on satellite imagery and other sources, towards impact evaluation. It was concluded that the available data for the three project areas under study in East Africa were not suitable to incorporate into its findings, partly because of data quality and partly because the possibility of collaboration was introduced too late for an effective result. However, it was agreed that the resources and skills of UNEP could be utilized more effectively in the context of one or more of the next round of Country Program Evaluations.

[1] Development Assistance Committee, 2002 "Glossary of Key Terms in Evaluation and Results Based Management."

3. THEORY BASED EVALUATION OF THREE PROTECTED AREA PROJECTS

3.1 Approach and Selection of Projects for Evaluation

26. A consultancy study was undertaken, which developed the outline of a theory-based approach, and considered how to devise one or more systematic methods of tracing linkages between project impacts and global environmental status. Specifically, this study outlined an impact evaluation approach targeted to GEF's biodiversity focal area that should – with some modifications – be applicable to other GEF focal areas. There were three main components of this work:

- A proposal for an evaluation approach based on a "Theory of Change" concept;
- Analysis of policy decisions affecting GEF programmatic priorities and M&E work; and
- Analysis of how a GEF-wide evaluation approach might link to regional and global indicators.

27. Based on an analysis of 20 projects, the study concluded that a Theory of Change approach to impact evaluation could produce credible results concerning the long-term effects of GEF protected area projects. The approach provides a roadmap for analyzing how and why an initiative works.

28. A selection process was undertaken to establish appropriate candidates for inclusion in the first field study, with an initial focus on the Africa region. A total of 46 complete and active projects in the GEF portfolio in Africa were identified as having a Protected Area component. East Africa had the largest number of these projects (15 projects), including Full and Medium Size projects, with large GEF and co financing expenditure (totaling 54US$M and 198US$M). Three projects were selected for evaluation:

- Bwindi Impenetrable National Park and Mgahinga Gorilla National Park Conservation, Uganda (World Bank)
- Lewa Wildlife Conservancy, Kenya (World Bank)
- Reducing Biodiversity Loss at Cross-Border Sites in East Africa, Regional (Kenya, Tanzania, Uganda), (UNDP).

3.2 Methodological Development and Approach in East Africa

29. At an initial workshop in Nairobi, with the consultants selected to implement the three case studies, it was determined that, in order to proceed, it would be necessary to specify in advance two key factors:

(1) How can Global Environmental Benefits be determined: i.e., when does an environmental benefit become of global significance?
(2) What methods are available to determine whether they have been delivered and are likely to be sustained?

30. These issues were addressed in a paper prepared by the GEF Evaluation Office and formed the basis for phase one of the fieldwork, which comprised establishing key contacts, gathering existing data and preliminary field visits. A workshop at Bwindi in Uganda, one of the project sites, brought together a broad range of past and present stakeholders from the three projects to discuss the Theories of Change on the basis of which the projects were designed to achieve their objectives. Using the results of this workshop, a detailed Approach Paper was prepared detailing

the strategy for further data collection and the analytical basis for "Linking Project Outcomes with the delivery of Global Environmental Benefits".

31. At a third workshop, held in Kenya, project and evaluation stakeholders discussed preliminary findings of the analysis of existing data, together with the findings of additional field studies. On the basis of this workshop, the approach to final analysis of the three projects was prepared and some gaps in information were identified, requiring additional field visits to the Cross Border project. The three case study impact evaluations were then prepared.

32. A practical and realistic approach to measuring impact was developed, which built on the principle of the utilization of existing data concerning the project, supplemented by additional stakeholder interviews and limited new fieldwork. This **Impact Evaluation Framework** uses three distinct analyses for measuring impact, which together provide a comprehensive understanding of impacts, as well as a useful means for triangulating the findings. The three methods are:

- Project Logframe Analysis, which examines the delivery of project outputs and project outcomes as defined by the project logical framework.

- Outcomes-Impacts Theory of Change (TOC) Analysis, which examines the process by which project outcomes are converted to ultimate impacts, thereby providing an indirect measure of project impacts.

- Conservation Targets-Threats Analysis, which provides a direct measure of project impacts by assessing both the change in status of the expected global environmental benefits and the change in the level of threats to these GEBs.

3.3 The Bwindi Impenetrable and Mgahinga National Park Conservation Projects

33. The Bwindi Impenetrable National Park (BINP) and the Mgahinga Gorilla National Park (MGNP) are located in south-western Uganda, covering 321 km² and 33.7 km² respectively. They represent afro-montane and afro-alpine ecosystems that are among the most biologically diverse tropical forests in East Africa. Bwindi Impenetrable National Park is the largest remaining tract of natural forest in Uganda and is the only site in East Africa encompassing an unbroken ecological continuum of lowland, transitional and montane forest. Mgahinga Gorilla National Park is part of a larger Virunga volcanoes network of national parks that extend into Rwanda and the Democratic Republic of Congo. The entire world population of approximately 600 Mountain Gorillas (*Gorilla gorilla beringei*) is found within the Virungas range and Bwindi, about half of which are found within Bwindi Impenetrable National Park, which was designated a UNESCO World Heritage Site in 1994. These parks are located in one of the most densely populated parts of Africa, and the forests serve as critical water catchments and important sources of forest products for surrounding communities.

34. The *Bwindi Impenetrable National Park and Mgahinga Gorilla National Park Conservation Project* was a five-year full-sized GEF/ World Bank project that was initiated in 1995. The overall objective of the project was to establish the Bwindi Mgahinga Conservation Trust ("the Bwindi Trust", or BMCT)[2] as a long-term finance mechanism to support biodiversity conservation in BINP and MGNP. The rationale behind the project was that the establishment of the Bwindi Trust and its permanent endowment fund would provide the most appropriate

[2] Bwindi Mgahinga Conservation Trust (BMCT) was originally called the Mgahinga Bwindi Impenetrable Forest Conservation Trust (MBIFCT). In this case study it will be referred to as the Bwindi Trust.

mechanism for achieving long-term conservation of natural resources and sustainable development in the two parks and neighboring communities.

35. The Bwindi Trust was legally established in September 1995 by a Trust Deed under the Uganda Trust Act, and the GEF provided the initial funding of US$4.3 million to capitalize the endowment fund. The capital was invested overseas and the intention was that the annual income, net of administration costs, was to be used to fund conservation and development activities in the target area.

36. The activities to be funded from the BMCT endowment income fell under three main programmatic pillars. The first pillar, which was allocated 60% of net annual BMCT endowment income, was the provision of support to **community development activities**, such as alternative income-generating activities and social infrastructure projects for local communities surrounding the parks, consistent with biodiversity conservation. The second pillar, allocated 20% of endowment income, was the provision of support for ecological and socio-economic **research and monitoring** activities focused on improving park management and park/community interactions. The final pillar accounted for the remaining 20% of income and was the provision of support for **park management** activities, in particular meeting the incremental costs of implementing management plans for Bwindi and Mgahinga National Parks.

37. To enable the endowment fund to grow, other donors provided initial co-financing for the Trust's operational and program expenses. It was envisaged that the endowment fund would produce enough interest after this initial period to support the conservation and development activities of the Bwindi Trust's implementation program without further external support.

38. As the original GEF project brief did not define a logical framework, it was necessary to develop a "retrospective logframe" based on the broad project objectives identified in the project brief, coupled with an understanding of what the project actually achieved in practice. In building this retrospective logframe, the study team drew on existing documentation.

(a) Conclusions on Project Logframe Analysis

39. The Project Outcomes were assessed by its terminal evaluation to be **moderately to highly satisfactory**. However, the project lacked a clear logical framework, with a hierarchy of activities, outputs and outcomes. As a consequence a number of activities, outputs and components were omitted and only subsequently added during project implementation. In addition, too much focus was placed on monitoring and evaluation of the means (e.g. establishment of the trust fund) rather than the ends (e.g. biodiversity conservation through an established research program and community activities). This meant that the project was not always responsive to adapting its approaches and strategies and many shortcomings were subsequently not identified until the Mid-Term Review. Overall, the logframe analysis provides clear evidence that the project was successful in establishing the BMCT and its program of activities, but little information about the biodiversity conservation impacts of the project. The assessment of the achievement of the four project outcomes is summarized in **Box 1** below.

40. At the end of the project the Bwindi Trust had been successful in purchasing land for some indigenous Batwa, thereby directly responding to their aspiration to own land, and had contributed towards improved educational levels, in ways intended to help Batwa realize their own development. However, whilst this was a pragmatic approach to improving livelihoods, the study team felt there had been a lost opportunity to further contribute towards the long-term conservation of Bwindi and Mgahinga forests. This was the need to address the Batwa aspiration for access and controlled user rights to certain forest resources, to which they believe they have

customary tenure rights As a result, the study team considered the achievement of this outcome as partially achieved.

Box 1: Summary of the achievement of Bwindi Project Outcomes

Project Outcome	Assessment[3]
Outcome 1: Bwindi Trust established to finance and support conservation in the long term	**Well achieved (4)**
Outcome 2: Protected area authority's capacity to manage Bwindi and Mgahinga National Parks strengthened	**Partially achieved (3)**
Outcome 3: Local communities awareness, willingness and capacity to manage park and natural resources in sustainable manner strengthened	**Well achieved (4)**
Outcome 4: The livelihoods of the indigenous Batwa improved	**Partially achieved (3)**

(b) Outcomes-Impact Theory of Change Analysis

41. The Outcomes-Impacts Theory of Change (TOC) analysis emphasizes the importance of establishing long-term institutional mechanisms, which enable the impact drivers to be addressed beyond the scope of the project. This is especially important when dealing with integrated community and development initiatives, which require many years before achieving significant livelihood benefits let alone global environmental impacts.

42. This analysis provided evidence that the mechanisms established and interventions initiated by the project have been continued and expanded since project closure. Overall the assessment was that **impact from the outcomes has been partially achieved**. Another important conclusion from this analysis is that adequate stable funding is a critical impact driver and that both BMCT and UWA can achieve high impact when funds are available. Finally, this analysis highlights the replication of BMCT pilot model by other environmental funds, representing a catalytic effect of the Trust in broadening the scope of impact.

(c) Targets-Threats Analysis

43. The final analytical component provides good information regarding the conservation status of global environmental benefits accruing from Bwindi (see **Table 1** in the Annex). Perhaps the most striking findings are that, despite intense pressure from densely populated agricultural areas surrounding the park, there has been no loss of forest cover in Bwindi since the late 1980s, and the Mountain gorilla population is increasing. Prior to gazettement the park was being rapidly degraded by pit-sawing and uncontrolled exploitation of other resources. When Bwindi was made a national park, there was significant resistance from the local communities, and the resulting conflict and negative attitudes posed a major threat to the park and a challenge to the park managers. However, there has subsequently been a considerable reduction in conflict and improvement in the local communities' support for the conservation of Bwindi. That said, Bwindi does continue to face significant threats (See **Table 2** in the Annex). Poaching and other forms of illegal exploitation of forest resources persist, and there is no evidence that conservation efforts in recent years have had a significant impact in reducing these. In addition, the legacy of intense pit-sawing in degrading the forest remains, with a large number of forest gaps created by the removal of trees, and very little forest regeneration within these.

[3] Once information for the Impact assessment framework was collected and synthesized, the **achievement of the project in converting outcomes into impacts was rated.** Each Intermediary State, Impact Driver, and External Assumption was scored according to the level to which it has been achieved. The scores were as follows: No evidence available (0), Not achieved (1), Poorly achieved (2), Partially achieved (3), Well achieved (4), Fully achieved (5)

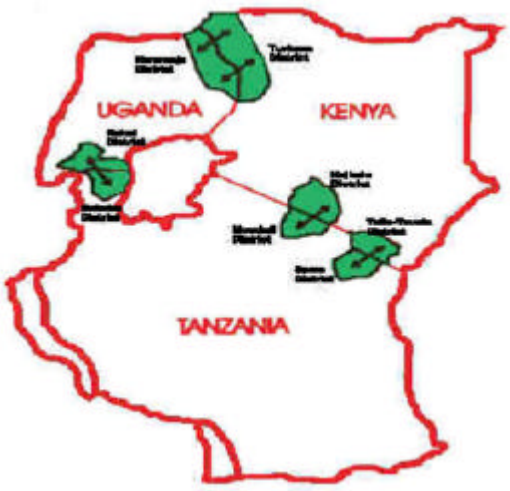
3.4 Reducing Biodiversity Loss at Cross-border sites in East Africa Project

44. The UNDP/GEF project "*Reducing Biodiversity Loss at Selected Cross Border Sites in East Africa*", also known as the East Africa Cross Borders Biodiversity Project, was a regional five-year, full-size GEF/ UNDP project that was operational between 1998 and 2003. The overall objective of the regional project was "*to reduce the rate of loss of forest and wetland biodiversity in specific cross border sites of national and global significance in East Africa*". This was to be achieved by establishing an enabling environment (policy, legislation, awareness) that allows sectoral and development agencies as well as local communities to promote sustainable use of biodiversity and by bringing demands on forest resources into balance with sustainable supply at key forest and wetland sites.

45. The GEF funding for the project amounted to US$12.9 million with additional co-financing of US$5.5 million. The project concept was developed in response to requests for a regional biodiversity project from the East African Governments and the recommendations of an external evaluation of the first GEF regional biodiversity project *Institutional Support for the Protection of East African Biodiversity*, which was implemented between 1992 and 1996.

46. The project had components in each of the three participating countries (Kenya, Uganda, Tanzania), as well as a regional co-ordination component based in Arusha, Tanzania. The project sought to provide support at four levels - regional, national, district and community - and to ensure strong linkages between these levels. Site-based conservation interventions took place at four paired cross-border sites, chosen on the basis of their biodiversity values, as illustrated in **Figure 1** below.

Figure1. The Project cross border sites and global biodiversity importance



1. **Minziro Forest (Tanzania) and Sango Bay Forest (Uganda).** Its extensive swamp forest with West African and Afro-Montane forest species and endemic swamp podo (*Afrocarpus dawei*) represents a *unique ecological community* found nowhere else.
2. **Karamoja (Uganda) and Loima Hills (Kenya)** dry montane forest representing an *ecological refugia/ island* for threatened ecological communities surrounded by arid and semi-arid pastoralist land
3. **Kajiado (Kenya) and Monduli (Tanzania)** dry montane forest, also providing an *ecological refugia* surrounded by arid and semi-arid lands
4. **Eastern Arc Forests: Pare Mountains (Tanzania) – Taita Hills (Kenya)**. Representing one of 25 *Global Hotspots* for plant diversity with exceptional levels of endemism.

47. Three distinct types of biodiversity loss were identified for these sites:

- **Complete loss of forest habitat** due to either legal conversion of non-gazetted forest to agriculture or to illegal encroachment of gazetted forest and conversion to agriculture or

settlement. Both of these processes were taking place at many forest sites at project start up.

- **Loss of forest cover** due to fire or heavy logging, causing large gaps in the canopy, which would be unlikely to regenerate.

- **Loss of specific biodiversity** components due to selected over-harvesting; or by gradual habitat change in the forest, due to such factors as increased openness. Such loss is of concern when such components are "keystone", endemic or rare species.

48. The project interventions to address biodiversity loss were targeted at two levels: firstly, to reduce the immediate loss of forest biodiversity through interventions seeking to stop encroachment and to reduce logging and harvesting of key species; and secondly, to prevent such loss in the future by putting in place specific measures, following project completion; i.e. dealing with the root causes.

49. Due to the extensive coverage of this project, it was not realistic for this case study to evaluate all the various aspects at all the cross border sites. Instead, it focused on the Sango Bay Central Forest Reserve (Uganda) and the Minziro Forest Reserve (Tanzania) and the associated project activities. This site was considered by former project staff to be the most successful of the project and would therefore provide the best opportunities for testing the case study impact evaluation techniques.

(a) Conclusions on Project Logframe Analysis

50. The project logframe was the result of modifications made during the first two years of the project and formed the basis for subsequent implementation. The following sections examine the two intended project outcomes and the level of their achievement at the end of the GEF project support with regard to the **Sango Bay-Minziro forests cross border site only**.

Box 2. Summary of Achievements of Project Outcomes

Project Outcome	Assessment
Outcome 1: An enabling environment developed which supports the sustainable use of biodiversity	**Well achieved (4)**
Outcome 2: Resource demands brought into balance with supply at key sites	**Partially achieved (3)**

51. The project Terminal Evaluation and GEF EO Terminal Evaluation Review rated the achievement of the **project outcomes as satisfactory**. The main achievements to develop an enabling environment (Outcome 1) were that new participatory national forest policies were in place with inputs from the project, and that local community participation mechanisms were established and strengthened to enable government agencies and forest authorities to jointly manage the target forests. The main achievements to bring resource demands in balance with supply (Outcome 2) were the development of participatory forest management plans with high levels of buy-in from the community, the adoption of alternative use/ income-generating practices, and anecdotal evidence for improved regeneration in forest areas. However, although the project appears to have largely achieved its objectives, there was an inadequate project monitoring and evaluation system to measure the level of uptake of project activities by local communities and the resulting impact on local livelihoods, and to measure whether the delivery of project activities had the desired impact on biodiversity resources at the sites.

(b) Outcomes-Impact TOC Analysis

52. The analysis of the Sango Bay-Minziro Forests site shows that partial success has been achieved in mainstreaming improved forest management practices, especially at the national policy level, which may be expected to have a trickle-down effect to field sites in the longer term. In addition, a start has been made in establishing sustainable site-based institutions through the collaborative forest management community based organizations, which again should realize greater impact as they mature. Overall, the assessment was that **impact from the outcomes has been poorly to partially achieved**.

53. A major conclusion from this analysis is that five years is too short a period to establish sustainable community institutions. Although the project made a good start at Sango Bay, the community based organizations could not support themselves at the project end. Therefore, provisions need to be made during project implementation to ensure continued support post project, whether through government agencies or follow-up projects or programs, until the institutions are financially and institutionally independent.

54. Another conclusion at the village level is that registered community based organizations are more institutionally sustainable than more informal committees, in part due to their ability to establish a bank account and fundraise. The community based organizations established by the Cross Borders project, have all managed to access additional funds from international donors, such as the GEF-funded Nile Basin Initiative, and have managed to access the necessary technical support.

55. Although, there is limited evidence for achievement of impact at the Sango Bay-Minziro Forest, the fact that Collaborative Forest Management community based organizations are starting to be replicated and scaled up in Sango Bay does indicate that over time and with some continuing external support, these community institutions have a good chance of maturing and playing a more significant role in joint forest management, and ultimately in realizing impact.

(c) Targets-Threats Analysis

56. The project did not emphasize the direct measurement of the conservation status of the global environmental benefits accruing from Sango Bay-Minziro forests, due to a number of factors including the difficulty in establishing biodiversity baselines and the long time line for changes in ecosystems and biodiversity. As a result, there were neither measurements of the rate of biodiversity loss, nor any clear indication of the status of forests and their biodiversity before and after the project. Consequently it was difficult to make any firm conclusions about the conservation status of the species of global conservation concern and only possible to obtain circumstantial evidence and expert opinions that the conservation status of the forest-grassland system-level GEB had improved.

57. The project invested substantial resources into participatory approaches to measuring the threats to the global environmental benefits, which was considered by the project to be a realistic, participatory and effective approach. The Threat Reduction Analysis proved a cost effective tool for measuring biodiversity loss during project implementation. It provided good evidence that threat level from logging, fire and extractive use had been reduced at Sango Bay and to a lesser extent Minziro Forest over the lifespan of the project. The Terminal Evaluation considered the TRA to be an appropriate technique, especially as the Sango Bay-Minziro forest ecosystem did not contain any large charismatic species to focus conservation attention, unlike in the Lewa and Bwindi Case Studies. In addition, the TRA provided indications of impact in a

short time; produced results readily interpreted by all stakeholders, practitioners and community members, and enabled good levels of community involvement and ownership. However, concerns were raised over the consistency and objectivity of the application of this technique across sites.

58. Unfortunately, despite the successful application of the TRA methodology, the forest authorities have not taken it up for Sango Bay-Minziro after project closure, which has undermined the ability for effective collaborative forest management and made it difficult for this study to assess the post-project threat levels. From the 2007 field consultations, the opinions of local communities and the forest authorities was that although threat levels had increased since the project closure, the threats to the forest were still lower than before the project intervention.

3.5 Lewa Wildlife Conservancy Project

59. The Lewa GEF Medium-Sized Project provided support for the further development of Lewa Wildlife Conservancy ("Lewa", or LWC), a not-for-profit private wildlife conservation company that operates on 62,000 acres of land in Meru District, Kenya. The GEF awarded Lewa a grant of $0.75 million for the period 2000 to the end of 2003, with co-financing amounting to $3.193 million.

60. The objectives of the project, as outlined in the original proposal (GEF 1998), were:

- To enable Lewa to continue and further strengthen its conservation of endangered species
- To enable Lewa to implement its strategic and financial development plan, making it more viable in the long term and increasing the sustainability of its conservation activities and benefits
- To extend conservation benefits to biologically important community-controlled land and slow down environmentally negative land use patterns
- To facilitate the development of other community-based conservation initiatives as well as private NGO support of such initiatives in Kenya and elsewhere, by serving as a model and by providing training opportunities on a modest scale.

(a) Conclusions on Project Logframe Analysis

61. No project logical framework or outcomes were defined as such in the original GEF project brief. However, the GEF Evaluation Office Study of Local Benefits in Lewa (2004), with the participation of senior Lewa staff, identified five project outcomes and associated outputs that reflected the various intervention strategies employed by the project and identified missed opportunities in achieving the project goals. The retrospective logframe was subsequently adopted in the GEF Evaluation Office Terminal Evaluation Review (August 2006). The three key outcomes identified were:

(1) Long-term capacity of LWC to provide global and local benefits from wildlife conservation strengthened
(2) Protection & management of endangered wildlife species in the wider ecosystem strengthened, in collaboration with local communities
(3) Economic benefits to local communities from sustainable use of wildlife and natural resources improved

62. Overall, the terminal evaluation assessed that the Lewa project's **delivery of project outcomes was Highly Satisfactory** (the highest rating). The project was assessed to be especially successful in increasing Lewa's institutional capacity (Outcome 1), and in the protection and management of biodiversity (Outcome 2), which were the focus of the project funding support (80%). In addition, it was concluded that a strong foundation was laid with the project's work on improving community livelihoods. The main conclusions from this case study are summarized below according the three components of the analysis.

Box 3. Summary of Achievements of Lewa Project Outcomes

Project Outcome	Assessment
Outcome 1: Long-term institutional and financial capacity of Lewa to provide global and local benefits from wildlife conservation strengthened	**Fully achieved (5)**
Outcome 2: Protection and management of endangered wildlife species in the wider ecosystem strengthened	**Well achieved (4)**
Outcome 3: Community-based conservation and natural resource management initiatives strengthened	**Well achieved (4)**

(b) Outcomes-Impact Theory of Change Analysis

63. The major finding of the Outcomes-Impacts TOC analysis is the importance of sustainable and appropriate institutional mechanisms in achieving global environmental benefits. The establishment of the Northern Rangeland Trust as a local umbrella organization to facilitate and catalyze the further replication and scaling up in the wider ecosystem was both very innovative and effective. In addition, the formation of a collaborative partnership with the nearby Ol Pejeta Conservancy demonstrated the synergies created by matching different skill sets and capacities, which added a new and important dimension to the scaling up of activities that were not fully addressed by the GEF project; namely livestock marketing and improved natural resource and rangeland management.

64. The Lewa project demonstrates the practical conservation impact of a relatively small investment by the GEF, which, has been subsequently successfully scaled up. However, the situation in the northern rangelands ecosystem is still precarious and it will be a while before the community institutions are institutionally and financially independent. Until that time, it will be important for continued levels of support, otherwise the situation could quickly reverse.

(c) Targets-Threats Analysis

65. The final analytical component provides good information regarding the conservation status of and threats to the two main global environmental benefits accruing from the Lewa project and subsequent scaling up. As shown in **Table 3** in the Annex, the conservation status of Black rhino is improving within the Lewa Conservancy area, with the steadily increasing population showing significant improvements in structure and growth rates. In addition, extensive security operations to counter the continuing poaching threats (see **Table 4** in the Annex) to the Black rhino at Lewa have meant that not one rhino has been poached to date. Today Lewa's Black rhino represent about 8% of the global population of the eastern sub species. The Grevy's zebra population on Lewa has remained almost stable (but for lion predation) and represents about 20% of the global population.

66. Although the analysis provides a clear indication that the Black rhino and Grevy's zebra populations on the Lewa Conservancy are extremely well managed and protected, perhaps the most notable achievement is the visionary, catalytic and support role that Lewa has provided for the conservation of these endangered species in the broader ecosystem. Lewa has played a

significant role in the protection and management of about 40% of Kenya's Black rhino population and is providing leadership in finding innovative ways to increase the coverage of secure sanctuaries for Black rhino. Regarding the conservation of Grevy's zebra, Lewa's role in the establishment of community conservancies, which have added almost one million acres of land set aside for conservation, has been unprecedented in East Africa and is enabling the recovering of Grevy's zebra populations within their natural range. However, the costs and resources required to manage and protect this increasing conservation estate are substantial and unless the continued and increasing financing streams are maintained, it is possible that the substantial gains in the conservation of this ecosystem and its global environmental benefits could eventually be reversed.

4. QUASI-EXPERIMENTAL ANALYSIS OF AVOIDED DEFORESTATION IN COSTA RICA

4.1 Background

67. In the last decade, conservation scientists and practitioners have increased their demand for more rigorous assessments of policies and programs designed to protect biodiversity and ecosystem services. One of the main findings of Millennium *Ecosystem Assessment* (2005) was that "few well-designed empirical analyses assess even the most common biodiversity conservation measures."

68. Protected areas (e.g., national parks, reserves) are an important component of the GEF's biodiversity portfolio and are central to the "avoided deforestation" debate in climate change policy. However, the returns from investments in protected areas, in terms of avoided deforestation, remain unclear. Measuring the deforestation that would have occurred, if the same area of forest were not protected - the counterfactual event – is complex because avoided deforestation cannot be observed directly.

69. The objective of this case study was to develop a quasi-experimental methodology[4] for evaluating the effectiveness of protected areas in reducing deforestation, and to apply the methodology in a country that has received GEF funds.

70. Between 1960 and 1997, Costa Rica cleared more than one million hectares of forest and protected about 900,000 hectares. Costa Rica has one of the most widely lauded protected areas systems and is a leader in the debate to have "avoided deforestation" credits recognized by the Kyoto Protocol. This case study explores the question, "How much more forest would have been cleared in the absence of the protected areas?"

71. To undertake this analysis of the effectiveness of protected ecosystems and their concomitant services, the following three characteristics were considered essential: (1) control of overt bias generated from the nonrandom nature of policy or program implementation (selection on observables); (2) detection and control for spatial spillovers; and (3) an assessment of sensitivity of the results to hidden bias (unobservable heterogeneity). These characteristics, however, are generally absent in the conservation science literature and this absence leads to inconclusive findings about program effectiveness. In fact, no analysis with at least two of the three characteristics was found – this case study addresses that gap.

72. By ignoring the nonrandomized nature of protected area establishment and the spatial spillovers that can result from their establishment, past empirical estimates of avoided deforestation fail to properly estimate the counterfactual vegetation cover. The case study demonstrates how matching estimators can be used to estimate avoided deforestation in and around protected areas.

[4] In randomized experiments the treatment is assigned at random. In quasi-experiments, the treatment conditions are assigned non-randomly, the assignment of treatment and control could be based on naturally occurring circumstances that create a treatment and control group. The challenge however is to ensure that systematic differences do not exist between the treatment and control groups.

4.2 Evaluation Scope and Methodology

73. Protected areas were defined as lands managed under the *Sistema Nacional de Areas de Conservacion*, which includes all public parks and refuges in Costa Rica. Geographic information was obtained on the location of protected area boundaries from GIS data layers provided by the Earth Observation Systems Laboratory of the University of Alberta, Canada. In the treatment group for analyzing the effects of all protected areas, lands from national parks, biological reserves, forest reserves, protected zones, and wildlife reserves were included. In the treatment group for analyzing GEF-protected areas, Corcovado national park and La Amistad national park were included.

74. Avoided deforestation is defined as the difference in the change within a defined period in forest cover on protected plots, and the change in forest cover in the same period on matched unprotected plots, referred to as the 'counterfactual'[5].

75. The analysis is split into three sections:

(1) estimation of the avoided deforestation between 1960 and 1997 from all protected areas;

(2) estimation of avoided deforestation in the periods 1986-1997 and 1997-2005 from two protected areas where activities were funded by the GEF in the 1990s, Corcovado national park and La Amistad national park;

(3) comparison of avoided deforestation from these GEF-funded protected areas with avoided deforestation from protected areas that did not receive GEF funding.

76. Matching works by, ex post, identifying a comparison group that is "very similar" to the treatment group with only one key difference: the comparison group did not participate in the program of interest (e.g. protection). If the researcher can select observable characteristics so that any two land units with the same value for these characteristics will display similar responses to the treatment, then the treatment effect can be measured without bias. This case study explores how 'matching' can be used to estimate avoided deforestation in and around protected areas.

77. In this matching analysis, the aim is to control for factors that jointly affect land use and the likelihood that a plot is selected for protection. Based on knowledge of the history of Costa Rica's protected areas, as well as the literature on tropical deforestation, variables that capture accessibility of the plot (distance to forest edges, distance to roads and slope) and land use opportunities (a function of the plot's production potential and distance to roads and major markets) are selected.

78. To conduct this analysis, a dataset was developed that includes historical information on forest cover, protection status, and biophysical, infrastructure, and socio-economic characteristics of the landscape. These latter characteristics affect both the likelihood that a land plot would be protected and the probability that the plot would be deforested. Thus they are potential confounding variables that can mask the effect of protection on deforestation. Matching analysis provides a way to control for these potential confounders by ensuring that protected plots are only compared to unprotected plots that are similar in their observable characteristics.

79. **Spillovers:** The analysis did not detect substantial spillover effects on deforestation on neighboring unprotected lands arising from the establishment of protected areas between 1960

[5] A plot is either forested or deforested (forested = 80%+ canopy cover).

and 1996, it was concluded that the estimates reflects the full effect of protected areas both within and outside protected areas.

4.3 Conclusions on Protected Areas in Costa Rica

80. Between 1960 and 1997, Costa Rica cleared more than one million hectares of forest and protected about 900,000 hectares. The evaluation of **all protected areas** in Costa Rica indicates that if not for protection, about 10% (about 111,000 ha) of the protected forest between 1960 and 1997 would have been deforested. These protected areas were designated for a variety of reasons, including preventing deforestation. For example, forests were protected to generate opportunities for tourism, to restrict hunting, to protect rural livelihoods associated with low-level extractive activities, or to raise environmental awareness among citizens and firms. Thus it cannot be inferred that Costa Rica's protected area network has generated few benefits simply because the gains in terms of avoided deforestation have been modest to date.

81. In the evaluation of **GEF-funded protected areas**[6], which received funding between 1993 and 1998, the evaluation estimates that protection resulted in about 8% (about 19,000 ha) of avoided deforestation between 1986 and 1997. The total forest areas under the two GEF-funded protected areas are 230,689 ha and 230,898 ha in 1986 and 1997 respectively. Thus, matching estimates imply that between 12,457 ha and 19,609 ha of forest in the period 1986-1997 and up to 25,399 ha of forest in 1997 were not deforested because they were under protection in these two parks. In the period 1997-2005, protection of these same areas resulted in 11% (about 25,000 ha) avoided deforestation.

82. The evaluation finds that the GEF-funded protected areas reduced deforestation by a little more than **other protected areas**: between 2 and 7 percentage points for 1986-1997 and up to 2 percentage points for 1997-2005. Given that 230,898 ha of forest in 1997 were under the GEF-funded protected areas, this estimate implies that GEF-funded protected areas contributed up to 7,000 ha. more avoided deforestation than non GEF-funded protected areas.

83. It is noted that the effect of funding levels is not explicitly modeled, but rather the effect of forest protection. Thus the effects of GEF funding, as distinct from the effects of other investments made into these same protected areas, cannot be completely isolated. If the Costa Rican government viewed GEF funds as a substitute for its own, it may have funded these areas at levels lower than it would have in the absence of GEF funds (thus making GEF funding look less effective in our analysis). Alternatively, the GEF may have simply invested its funds into protected areas that were already successful in the absence of GEF funds (thus making GEF funding look more effective in our analysis). Furthermore, only one aspect of conservation outcomes is being considered: avoided deforestation. GEF investments may have affected other outcomes that are not measured directly in this evaluation. Indeed, the objective of protected area projects is often much wider than avoiding deforestation[7]. In the case of the **Biodiversity**

[6] The GEF funded activities in two protected areas, Corcovado national park and La Amistad national park between 1993 and 1998 through a project called the Biodiversity Conservation and Sustainable Development in the Amistad and Osa Conservation Areas project (GEF Project ID: 364).

[7] The strategic objectives of GEF Biodiversity Program for catalyzing sustainability of protected area systems, in GEF4 (GEF/C31/10/revised; July 2007) include:

- Extent of habitat cover (hectares) by biome type maintained as measured by cover and fragmentation in protected area systems
- Extent and percentage increase of new habitat protected (hectares) by biome type in protected area systems that enhances ecosystem representation
- Protected area management effectiveness as measured by protected area scorecards that assess site management, financial sustainability and capacity

Conservation and Sustainable Development in the Amistad and Osa Conservation Areas project, the objective was to "contribute to the protection of important species and habitats of biodiversity."

84. The limited outcomes to date of protected areas in changing land use patterns in Costa Rica stem from administrative targeting of protection towards forests for which private agents had few incentives to deforest. In other words, the Costa Rican government chose to protect lands that were generally low in economic and political cost.

85. Although targeting mechanisms clearly contributed to the modest levels of avoided deforestation from protection, there are other potential contributors. Costa Rican policymakers in the 1960s and 1970s may have expected deforestation pressures to continue unabated into the 1980s and 1990s. They may have thus decided to gazette lands that were inexpensive to gazette in the 1960s and 1970s (i.e., low pressure) in order to create a bulwark against deforestation pressures after 1980. However, structural readjustment in the mid-1980s to a cessation of agricultural subsidies, which, when combined with growth of the manufacturing and service sectors, greatly reduced deforestation pressures.

86. This analysis is retrospective. The future role of Costa Rica's protected areas in affecting land use may be different from the past (but such a difference would require a fundamental change in the historical deforestation processes).

4.4 Scope to scale up Impact Evaluations

87. The methodology used in this evaluation of protected area effectiveness can be used to improve impact evaluations of GEF investments in projects such as payments for environmental services, ecotourism projects, and community forest management. While the focus in this case study is on the utility of this approach for measuring impacts of biodiversity programs, these methods can be used in impact evaluations of GEF projects in other focal areas such as climate change and international waters. This evaluation approach is particularly useful for measuring the impact of GEF interventions with two characteristics: (1) implementation is assigned to different geographic areas in a nonrandom manner; and (2) the project may result in spatial spillover effects on neighboring areas.

88. The key to implementing this evaluation approach successfully is to establish valid counterfactuals that measure the outcomes that would have occurred without the GEF intervention. This requires the collection of data in non-project areas in addition to data collection in project areas. The main data requirements for applying this methodology include measures of outcomes or indicators before and after the implementation of the project, and measures of important characteristics that potentially influence outcomes in both project and non-project locations.

89. This evaluation approach may be used to assess different outcomes of a conservation program. These same methods can be used to evaluate the effects of protected areas on reforestation and on human welfare around protected areas, as well as the impacts of other land use policies such as payments for environmental services or road building prohibitions. Once suitable counterfactuals have been identified by matching project areas with non-project areas, the impact of the policy or project can be obtained by measuring differences in outcomes, as demonstrated in this case study.

5. ANNEX

Table 1. IMPACTS*:* CHANGES IN CONSERVATION STATUS LEVELS BEFORE AND AFTER THE GEF SUPPORT

***Bwindi Impenetrable National Park and Mgahinga Gorilla National Park Conservation*:**

Key Ecological Attribute	Indicator	Conservation Status			Trend
		Baseline	Project end	Now	
Continuous altitudinal forest gradation/ Montane Forest habitat					
Forest size and extent	Area of forest cover	No change in forest size since 1987			⇔
Canopy cover	Water quality indices	Since 2001, water quality is good and seems stable			⇔
Forest regeneration processes	Abundance of saplings and seedlings in forest gaps	There is little sign of regeneration in gaps caused by selective or intensive logging, or by fire. Regeneration is occurring in previously encroached areas.			⇔
Habitat diversity	No information				
Keystone species	No information, except for Mountain gorillas (see below)				
Mountain gorillas					
Population size	Total population size	300	320	340	⇑
Population distribution	Locations of gorillas groups	Groups appear to be more spread out across the park by 2006			⇑
Suitable undisturbed forest habitat	Areas of habitat	No change in forest size since 1987			⇔
	Encounter rates of disturbance signs	See threats analysis. No clear indication of a reduction in disturbance.			⇔
Reproductive rates	Insufficient data to allow comparison of reproductive rates over different periods				
Grauer's rush warbler					
Swamp forest	Size and extent	No known degradation of swamps within Bwindi over this period			⇔
Population size	Total population size			Stable or increasing	?

TABLE 2. IMPACTS: CHANGES IN THREAT LEVELS BEFORE AND AFTER THE GEF SUPPORT

***Bwindi Impenetrable National Park and Mgahinga Gorilla National Park Conservation*:**

Threat	Indicator	Threat level			Trend
		Baseline	**Project end**	**Now**	
Poaching	Encounter rate of poaching signs per patrol day.	0.31	0.25	-	⇔
	Encounter rate of poaching signs per km walked on census recce trails	No consistent pattern from census data from 1997, 2002 and 2006.			
Pit-sawing and tree cutting	Encounter rate of tree cutting per km walked on census recce trails.	No consistent pattern from census data from 1997, 2002 and 2006.			⇔
Encroachment	Area of forest loss around boundaries of Bwindi	Satellite image analysis shows almost no loss of forest cover inside park between 1987 and 2000. Encroachment rarely reported since 1995.			⇓
Fire	Frequency and extent of fires, community response to fires.	Fire incidences declining and community cooperation in fire control improving since 2000. No incident of arson reported since 1992.			⇓
Lack of regeneration of forest gaps	Abundance of saplings and seedlings in forest gaps	Little sign of regeneration in gaps caused by selective or intensive logging			⇔
Hostile neighbouring communities	Park adjacent community members expressing lack of support for the park, as percentage of community members surveyed	53	24	-	⇓
Loss of forest connectivity at neck	Area of forest loss at the neck in Bwindi	Satellite image analysis shows almost no loss of forest cover inside park between 1987 and 2000.			⇔
Disease (gorillas)	No information				

TABLE 3. IMPACTS: CHANGES IN THREAT LEVELS BEFORE AND AFTER THE GEF SUPPORT

Reducing Biodiversity Loss at Selected Cross Border Sites in East Africa:

Threats to the GEBs	Indicator	Threat Level			Trend
		Baseline	Project end	Now	
Encroachment/ conversion of forest land	Incidence of encroachment/ land conversion	No incidences of successful encroachment or land conversion since project			⇩
	Measures put in place to prevent the chance of future conversion	The project initiated re-establishment and demarcation of forest reserve boundaries, which continue to be respected and maintained			⇩
Logging	Percentage of threat met (Minziro Forest)	25	70	-	⇩
	Percentage of threat met (Sango Bay)	40	85	-	⇩
	Maintenance of reduced threat level after project closure	The lifting of the logging ban in Minziro and the reduced level of CFM activities seems to indicate the threat level has increased post project, although no to previous levels			⇔
Uncontrolled fires	Percentage of threat reduced (Sango Bay)	40	90	-	⇩
	Percentage of threat reduced (Minziro)	No data available			-
Over-harvesting of selected species	Sustainable off-take levels	TRA (2003) indicates limited success at reducing threat in two forest blocks during project implementation, but no monitoring system since project closure			⇔

Table 4. IMPACTS*:* CHANGES IN CONSERVATION STATUS LEVELS BEFORE AND AFTER THE GEF SUPPORT

Lewa Wildlife Conservancy:

Key Ecological Attribute	Indicator	Conservation Status			Trend
		Baseline	Project end	Now	
Black Rhino					
Population size	Total population size of Black rhino on Lewa	29	40	54	↑
Productivity	Annual growth rates at Lewa (%)	12	13	15	↑
Suitable secure habitat	Size of Lewa rhino sanctuary (acres)	55,000	55,000	62,000	↑
Genetic diversity	Degree of genetic variation	No data available			
Population size	Total population size of Grevy's zebra on Lewa	497	435	430	↔
Productivity	Annual foaling rates on Lewa (%)	11	11	12	↔
Grevy's Zebra					
Population distribution	Number of known sub-populations and connectivity	No data available			
Suitable habitat (grassland & secure water)	Community conservancies set aside for conservation under Northern Rangeland Trust	3	4	15	↑
Genetic diversity	Degree of genetic variation	No data available			

TABLE 5. IMPACTS: CHANGES IN THREAT LEVELS BEFORE AND AFTER THE GEF SUPPORT

Lewa Wildlife Conservancy:

Threats to the GEBs	Indicator	*Threat Level*			Trend
		Baseline (Pre 2000)	**Project end (2000-03)**	**Now (2004-06)**	
Black Rhino					
Poaching and snaring	Black rhinos poached and snared in Lewa	0	0	0	⇔
	Black rhinos poached and snared nationally	2 (1998-1999)	15 (2000-2002)	15 (2003-2006)	⇔
Insufficient secure areas	Black rhino areas nationally	12 (1993)	13	16	⇓
	Land set aside for Black rhino conservation in Kenya (Km^2)	6,749 (1993)	7,376	8,607	⇓
Habitat loss (due to elephant density on Lewa)	Changes in density of woody vegetation	The density of woody vegetation on Lewa has increased between 1962-2000 as demonstrated by the aerial photos			⇓
Grevy's Zebra					
Poaching	Grevy's zebra poached	Poaching levels reduced in community land under conservation due to community security personnel and awareness.			⇓
Disease	Grevy's zebra killed by anthrax (%)	0	0	5	⇔
Predation	Lions on Lewa	0	25	16	⇑
Habitat loss/ degradation (competition with livestock)	Land secured for conservation in the region (acres)	364,420	670,210	1,236,483	⇓
Insufficient secure areas	Established NRT community conservancies	3	4	15	⇓
Hybridisation with Burchell's zebra	Confirmed hybrid populations	4	4	4	⇔